

Prevalence of *Endoparasites* and their Zoonotic Significance in Wild Rabbits of Ahar City, Iran

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Abstract: In this study, 30 wild rabbits in Ahar city of Iran from April to June 2020, to determine the prevalence of Endo parasites were selected by hunting with weapons or trapping and were prepared for necropsy. They were euthanized and inspected for helminths and protozoa infection. Faecal sampling was carried out directly from recti and the oocysts or cysts were isolated using sedimentation and floatation techniques and the sporulated oocyst were identified based on morphological. Endo parasites infestation was encountered in 12 (40%) of Necropside rabbits. Two different Nematodes and one species of Metacestoda and two different protozoa were identified in the contaminated cases. The endo parasites found were identified as: *Passalurus ambiguus* (6.66%), *Trichostrongylus retortaeformis* (6.66%), *cysticercus pisiformis* (13.33%), *Eimeria magna* (10%), *Eimeria steidae* (3.33%). Wild rabbits are a potential source of human parasitic zoonosis. Public health concerns indicate the need for epidemiological studies on zoonotic diseases affecting wildlife species that are a source of food for humans. In this respect, the role of wild rabbits as reservoirs of zoonotic parasites has been widely documented.

Keywords: Prevalence, Endoparasites, Wild-Rabbits, Ahar City, Iran

Introduction

The rabbit is an herbivorous mammal, belonging to the family of rabbits (Leporidae) and has a cat-like body and long ears and cleft lips.

There are several types of rabbits, the most famous of which is the New Zealand rabbit, which is very fat and large and suitable for breeding (Garedaghi and Hashemzade, 2011).

Rabbits have been widely used in research since ancient times. Rabbits are now widely used in immunological research, infectious diseases and in ophthalmology and pharmacological studies. The skin of some breeds of rabbits is also used in the manufacture of decorative items and clothing (Tehrani *et al.*, 2013).

Some viral, bacterial, fungal and parasitic diseases of rabbits are common diseases with humans (Zoonosis) and can cause various lesions in humans (Tanideh *et al.*, 2010).

Some of the parasites are helminthes like roundworms, tapeworms, flukes and the others are ectoparasites like ticks, mites, lice, etc. Ectoparasites are considered as common and important cause of pruritic skin diseases and hypersensitivity disorders in rabbits, as well as some

ectoparasites, which are vectors of a wide range of important zoonotic diseases worldwide, such as borreliosis, bartonellosis, ehrlichiosis, rickettsiosis, anaplasmosis, yersiniosis, tularemia (Raue *et al.*, 2017).

Due to the fact that the basis of combating animal and human diseases is their correct and timely diagnosis, therefore in this study we tried to identify the internal parasites of wild rabbits in the city of Ahar in Iran.

Materials and Methods

Sampling

The present study has been performed since April to June 2020 based on cross-sectional design. The samples including, 30 wild rabbits from Ahar city in Iran, 15 (50%) female and 15 (50%) male. These areas included: Ahar (15) and Horand (15). Wild rabbits from Ahar city in Iran were selected by hunting with weapons or trapping and were prepared for necropsy by anesthesia with diethyl ether and then anesthesia by intramuscular injection of 10% ketamine with high dose according to the protocol described by Eslami and Changizy with some modifications (Eslami *et al.*, 2000).

Table 1: Prevalence of Endoparasites in examined of wild rabbits in Ahar city, Iran (n. %)

Parasite	Nich	Number of wild rabbit (n = 30)		
		Female (n = 15)	Male (n = 15)	Total
Without parasites	-	7 (23.33)	11 (36.66)	18 (60)
<i>Trichostrongylus retortaeformis</i>	Small intestine	1 (3.33)	1 (3.33)	2 (6.66)
<i>Passalurus ambiguus</i>	Cecum and colon	1 (3.33)	1 (3.33)	2 (6.66)
<i>Cysticercus pisiformis</i>	Abdominal cavity	3 (10)	1 (3.33)	4 (13.33)
<i>Eimeria magna</i>	Small intestine	1 (3.33)	2 (6.66)	3 (10)
<i>Eimeria steidae</i>	Bile ducts	0	1 (3.33)	1 (3.33)
Total	-	13 (43.33)	17 (56.66)	30 (100)

Parasitological Procedure

In the next step, prey was sampled from different tissues of the body of rabbits such as liver, lungs, kidneys, heart and gastrointestinal tract. Samples taken in 5% formalin were transferred to the parasitology laboratory of the Faculty of Veterinary Medicine, Islamic Azad University and Tabriz Branch.

In the laboratory, after longitudinal incision of the gastrointestinal tract, its contents were passed through parasitological sieves with mesh (score 60 and 100) and the rest of the contents on the sieves were transferred into petri dishes and their worm parasites were separated under a stereomicroscope.

Isolation of liver, lung, heart and kidney parasites was performed by scissor cutting method as well as smear method on cut tissues to prepare direct-smear and fix them with methanol and then Giemsa staining (Yakhchali and Tehrani, 2007).

In the next step, in order to detect the isolated worms according to their genus and species (spp), a wet-mount was prepared with lactophenol and after the samples became clear, the final diagnosis was made and in some cases by the dye method, we used Lugel's combination to more accurately detect the worms.

Fecal Examination

To detect the presence of helminthic eggs and protozoan cysts or oocytes, fecal samples collected from rabbits were processed by standard parasitological techniques (direct smear, sedimentation and floatation techniques).

The identification of parasitic eggs was done by morphological characters (Soulsby, 1982). For detection of coccidian oocysts, a part of sample (about 3 gr) was mixed with Zinc sulfate solution (specific gravity- 1.18) and subjected to floatation technique for detection of unsporulated oocysts of coccidia (Soulsby, 1982). After transferring into 2.5% aqueous potassium dichromate solution (w/v), the collected oocysts were incubated at 25°-28 °C for 168 h to allow the oocysts to sporulate. The mean sporulation time was assessed by periodically examination of oocysts. The identification of *Eimeria* species has been performed using some biological features such as oocyst size and morphology (Sürsäl *et al.*, 2014).

Statistical Evaluation

Chi-square test was used for analyzing statistical association between the data findings by using SPSS statistical software (ver. 14, Chicago, IL, USA). Probability of <0.05 was regarded as significant with confidence interval of 95%.

Results

Of the 30 wild rabbits tested, a total of 40% showed infection with internal parasites. Also, the percentage of infection with different types of internal parasites in wild rabbits is shown in Table 1.

Discussion

In this study, the rate of infection with internal parasites in wild rabbits in Ahar city of Iran was 40%. The highest infection rate was related to *Cysticercus pisiformis* (13.33%) and the lowest infection rate was related to *Eimeria steidae* (3.33%).

In this study, contrary to the results obtained by (Gibson, 2007). In 2007, *dicrocoelium dendriticum* was not isolated from wild rabbits (Gibson, 2007).

In this study, *Trichuris* was not isolated from wild rabbits, which is consistent with the results of Moraldo (2005).

In the study, 13.33% of the wild rabbits tested were infected with *Cysticercus pisiformis*, which does not correspond to the results obtained by Kerazoo (2004).

In this study, 6.66% of wild rabbits were infected with *Passalurus ambiguus* and *Trichostrongylus retortaeformis*, which is significantly different from the results obtained by Sherine (2006).

Of all wild rabbits studied, 10% were infected with *Eimeria magna* and 3.33% were infected with *Eimeria steidae*, which is relatively consistent with the results obtained by Wattson (2005)

It seems that the use of raw and uncooked diet in nature, lack of antiparasitic treatment, lack of proper nutrition and lack of environmental spraying for wild rabbits in comparison with domestic and domestic rabbits increases the rate of infection with internal parasites in wild rabbits (Soulsby, 1982).

Due to the fact that some internal parasites of wild rabbits, such as *Trichostrongylus*, can be transmitted to humans, wild rabbits should be prevented from entering the habitat or food storage of domestic rabbits for prevention and control.

In the world today, accurate statistics and information on the population of various types of pets (domestic and wild) that are kept alongside the human population, especially in urban communities, are not available (Nasser Hajipour and Mohammad Zavarshani, 2020).

Also, at the level of health organizations in the country, the Zoonotic Diseases Surveillance System has not been established effectively and efficiently and the incidence and prevalence of such diseases in the country in an integrated and regular manner in the country. Medical and veterinary health centers are not registered, reported and followed up (Catchpole and Norton, 1979).

Distribution, diversity and severity of clinical cases of human-animal transmissible diseases and their capacity to be used as biological weapons show the importance of paying attention to zoonotic pathogens in public health by strengthening the cooperation of physicians and veterinarians (Raue *et al.*, 2017). Therefore, it is necessary to identify the host and reservoir and methods of transmission of zoonotic infections, methods of control, prevention and treatment of these diseases by formulating national strategies and establishing a care system for diseases transmitted between humans and old, emerging and re-emerging animals.

Conclusion

Wild rabbits are a potential source of human parasitic zoonosis and strict hygienic practices are recommended during and after handling rabbits or in case of exposure to their feces. Public health concerns indicate the need for epidemiological studies on zoonotic diseases affecting wildlife species that are a source of food for humans. In this respect, the role of wild rabbits as reservoirs of zoonotic parasites has been widely documented.

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Authors' Contributions

Yagoob Gareadaghi: Did writing and editing of the manuscript.

Yaghoob Firouzvand and Iasmina Luca: Did data collection and statistical analysis.

Ethical Issues

In this research, ethical considerations have been fully observed.

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