

Study on Helminthic Parasites of Persian Leopard (*Panthera pardus saxicolor* Pocock, 1927) in Golestan National Park and Biosphere Reserve of Iran

¹Peyman Ghaemi, ²Nastaran Sadr-Shirazi, ³Parastoo Ghaemi

¹Young Researchers Club, Science and Research Branch, Islamic Azad University, Tehran, Iran

²Department of Parasitology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

³Department of Food Industrial Engineering, Islamic Azad University, Varamin-Pishva Branch, Varamin, Iran

Abstract: Golestan National Park is a very important area for its amazing richness of biodiversity in Iran. The Persian leopard (*Panthera pardus saxicolor*) is the largest subspecies of this cat which is classified in the 2008 IUCN Red List of Threatened Species as “Endangered”. In this survey, internal and external parasites of two leopards including both genders, killed in a car accident inadvertently, in the Golestan National Park and Biosphere Reserve in North of Iran were studied. Total of 24 nematode helminthes were obtained from the intestine of both of them, identified as *Toxocara cati*. The number of parasites in the female one (21 worms) is seven times more than the male one (3 worms). This is the first report of *Toxocara cati* from the Persian Leopard in the Biosphere Reserve of the Golestan National Park from Iran.

Key words: *Toxocara cati* • Persian Leopard • Golestan National Park

INTRODUCTION

Golestan region in IUCN management, categorized in II list as National park and IX list as Biosphere Reserve. Golestan National park and Biosphere Reserve is situated 37°, 31' N and 56°, 35' E at the eastern end of the Alburz mountains between the cities Gonbad Ghaboos and Bojnord. The climate varies within the Golestan National Park from extremely wet in the west to moderately arid in the east. Mean annual precipitation is between 400-600 mm, mainly from winter rains and snow fall. Temperature range from -25°C to +35°C is varied. Golestan National Park is very important for conservation of biodiversity [1]. The richness of biodiversity in this area is very amazing. The park holds more than 150 bird fauna (one third of Iran's total bird species), more than 50% of total mammal species of all country and one fifth of all country's flora. Cliffs and crags as of its major habitats types, provide a good condition to Persian ibex and its predator leopard (*Panthera pardus saxicolor*) [1]. The Persian leopard (*Panthera pardus saxicolor*) is the largest member of eight felid species surviving today in Iran, after the extinction of the Asiatic lion (*Panthera leo persica*) and the Caspian tiger (*Panthera tigris virgata*) in the past 70 years [2]. The Persian leopard is the largest subspecies of this cat which is classified in the 2008 IUCN Red List of Threatened Species as “Endangered” [3]. The leopard

occurs widely in almost all types of habitats in Iran [4]. The leopard is fully protected by laws issued by Iran's Department of the Environment (DOE) that have guesstimated the leopard population in Iran to number 550-850 individuals [3]. In one study by Kiabi *et al.*, the population size of Persian leopard (*Panthera pardus saxicolor*) in Golestan National Park was guesstimated between 30-45 individuals and the main threat of this specimen was road kill [3]. In the present study, parasitic infections of Persian Leopard (*Panthera pardus saxicolor*) in Golestan National Park and Biosphere Reserve of Iran were determined and this study is the first report from this region.

MATERIALS AND METHODS

In this study two young leopard in both sexes were examined. Both of them have been found dead because of car accident in Golestan National Park, North of Iran. One of them was male and found in the Tangrah region but the other one was female and found in Serahe-Dasht region near the Asian highway. Both of them were transferred to the laboratory of Department of the Environment (DOE) in Golestan province. The age, weight and length of body of each case were evaluated and examined for external and internal parasites. Their digestive system and derivative organs were discharged from abdominal space and

Table 1: Characters of two specimens of Persian leopard (*Panthera pardus saxicolor*)

Sample Number	Sex	Age	Date of Death	Death Location	Weight (Kg)	Length of Body and Head (mm)	Length of Tail (mm)	Length of Head (mm)
1	Male	Immature	15 September 2009	Golestan N.P (Tangerah)	23	1000	760	210
2	Female	Immature	3 November 2009	Golestan N.P(Serahe-dasht)	7.5	550	420	135

stomach, liver, pancreas and digestive canal were opened and their contents were passed from sieve (pour size 60) and examined as the presence of endoparasites. Also other organs such as heart, lungs and kidneys were examined in necropsy. Also all of the body surfaces of each case were searched for ectoparasites. All of the separated parasites were fixed in ethanol 70% to be recognized later in the lab. For definitive identification we sent samples to the department of Parasitology, Faculty of specialized veterinary science, Islamic Azad University, Science and Research branch, Tehran, Iran. Characters of two specimens of Persian leopard (*Panthera pardus saxicolor*) given in Table 1.

RESULTS AND DISCUSSION

In this study no ectoparasite was detected in hairy coat of two specimens of Persian leopards, but 1 species of helminthes from nematoda was detected in both of them. All of the helminthes had cervical alae which were short and wide, giving the anterior end appearance of an arrow [5]. The esophagus terminated in a glandular ventriculus. The spicules of the males ranged from 1.65-1.95 mm in length. The egg measured 67-75 μ m and had the pitted eggshell typical of the eggs of this genus of ascaridoid. The pits on the eggs of *Toxocara cati* were smaller than the pits observed on the eggs of *Toxocara canis*. We obtained totally 24 nematode helminthes which were identified as *Toxocara cati* that was the only parasite that seen in the gastrointestinal tract of both animals. 3 and 21 *Toxocara cati* were detected from male and female Persian leopards, respectively. We found all 3 *Toxocara cati* in small intestine of male Persian leopards, but 1 *Toxocara cati* in mouth, 5 in stomach and 15 in small intestine of female Persian leopard. Adult worms of *Toxocara cati* are brownish yellow or cream colored to pinkish and have a length of up to 10 cm [6]. *Toxocara cati* is a cosmopolitan parasite of the domestic cat and probably one of the most commonly encountered parasites. In adult cats the infection is usually asymptomatic, but in juvenile cats can be fatal [7]. The adult worms live in the small intestine and the female produces eggs that are passed in feces in the feline host. [8]. Intermediate hosts especially mice had been orally infected with infected eggs [9]. In 2009, Yousefi *et al.*

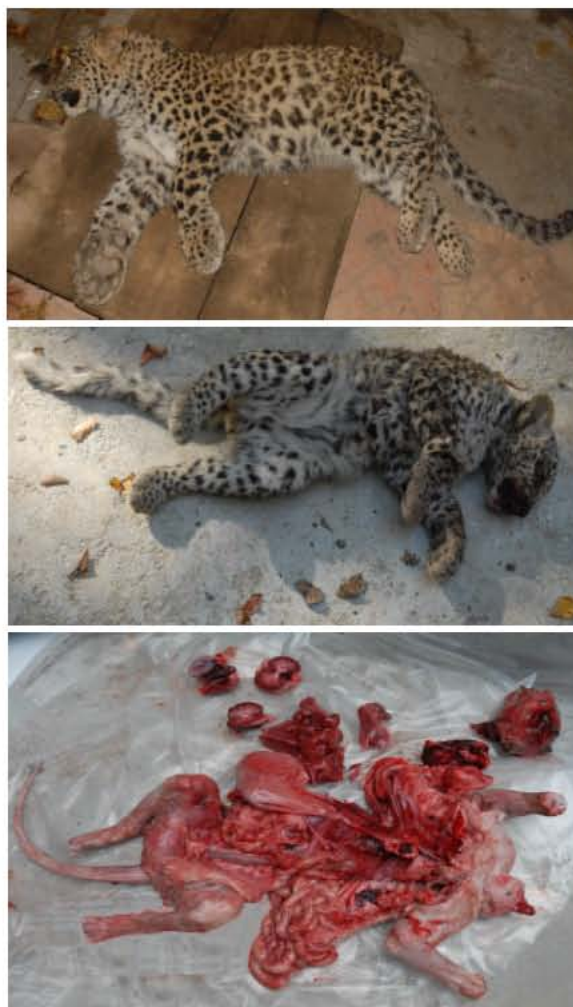


Fig. 1: Two Persian leopards were killed in car accident in Golestan National Park before and one of them after parasitological study

reported 3 *Toxocara cati* from a young female leopard in Semnan province of Iran. Also they reported 5 *Ancylostoma tubeform* and 1 *taenia taeniaformis* from this Persian leopard. [10, 11, 12]. In 1993, Yasuda and Akuzawa reported *Toxocara cati* in two Tsushima leopard cats on the Tushima Island of Japan. They found 2 *Toxocara cati* in stomach of one leopard cat and 34 in stomach and 37 in small intestine of another leopard cat [13]. Also in 1994, Patton and Rabinowitz reported 18 *Toxocara*-like helminthes in 54 fecal samples from leopard

in Huai kha Sanctuary of Thailand [14]. In agreement with other researchers, *Toxocara cati* is a common gastrointestinal helminth of Persian leopard (*Panthera pardus saxicolor*) in the world and Iran. Hence, evaluation of harmful effects of this parasite in Persian leopard (*Panthera pardus saxicolor*) is very important and need further studies. This is the first report of *Toxocara cati* from the Persian Leopard from Golestan National Park Biosphere Reserve of Iran.

ACKNOWLEDGMENTS

The authors would like to thank Professor Nasser Hoghooghi-Rad, Head of department of Parasitology and Mycology, Faculty of specialized veterinary science, Islamic Azad University, Science and Research branch, Tehran, Iran for definitive identification of nematode helminthes.

REFERENCES

1. Majnoonian, H., B. Zehzad, B. Kiabi, B.F. Darreh-Shoori and H.G. Meigooni, 1999. Golestan National Park (Biosphere Reserve), Department of the Environment Publication, pp: 130.
2. Ghoddousi, A., A. Kh. Hamidi, T. Ghadirian, D. Ashayeri, H. Moshiri and I. Khorozyan, 2008. The Status of the Persian Leopard in Bamu National Park, Iran, CAT News, 49: 10-13.
3. Kiabi, B.H., B.F. Dareshouri, R.A. Ghaemi and M. Jahanshahi, 2002. Population status of the Persian leopard (*Panthera pardus saxicolor* Pocock, 1927) in Iran. Zoology in the Middle East, 26: 41-47.
4. Firouz, E., 2005. The complete fauna of Iran. I.B. Tauris, London & New York, pp: 322.
5. Beelitz, P., E. Gobel and R. Gothe, 1992. Species spectrum and incidence of endoparasites of cat litters and their mothers under different maintenance conditions in southern Germany. Tierarztliche Praxis, 20: 297-300.
6. Bowman, D., M.C. Hendrix, D.S. Lindsay and S.C. Barr, 2002. Feline clinical parasitology. Iowa State University Press A Blackwell Science Company. First edition, pp: 281-286.
7. Oikawa, H., K. Mikazuki, M. Kanda and T. Nakabayashi, 1991. Prevalence of intestinal parasites with faecal examination in stray cats collected in the western area of Japan from 1983 to 1990. Jap. J. Parasitol., 40: 407-409.
8. O'Lorcain, P., 1994. Epidemiology of *Toxocara* spp. In stray dogs and cats in Dublin, Ireland. J. Helminthol., 68: 331-336.
9. Dubinski, P., K. Havasiova-Reiterova, B. Petko and I. Hovorka, 1995. Role of small mammals in the epidemiology of toxocariasis. Parasitol., 110: 187-193.
10. Esfandiari, B., M.R. Youssefi and M. Abouhosseini-Tabari, 2010. First Report of *Toxocara Cati* in Persian Leopard (*Panthera pardus saxicolor*) in Iran, Global Veterinaria, 4(4): 394-395.
11. Youssefi, M.R., S.H. Hoseini and B. Esfandiari, 2010a. Intestinal parasite of Persian Leopard (*Panthera pardus saxicolor*) in Iran world J. Zool., 5(2): 122-124.
12. Youssefi, M.R., S.H. Hoseini, B.A. Zaheri and M. Abouhosseini-Tabari, 2010b. First report of *Ancylostoma tubaeforme* in Persian Leopard (*Panthera pardus saxicolor*), Iranian J. Parasitol., 5(1): 61-63.
13. Yasuda, N. and M. Akuzawa, 1993. Helminths of the Tsushima Leopard Cat. J. Wildlife Diseases, 29(1): 153-155.
14. Patton, S. and R. Rabinowitz, 1994. Parasites of Wild Felidae in Thailand: A Coprological Survey. J. Wildlife Diseases, 30(3): 472-475.