

Full length article

A description of parasites from Iranian snakes



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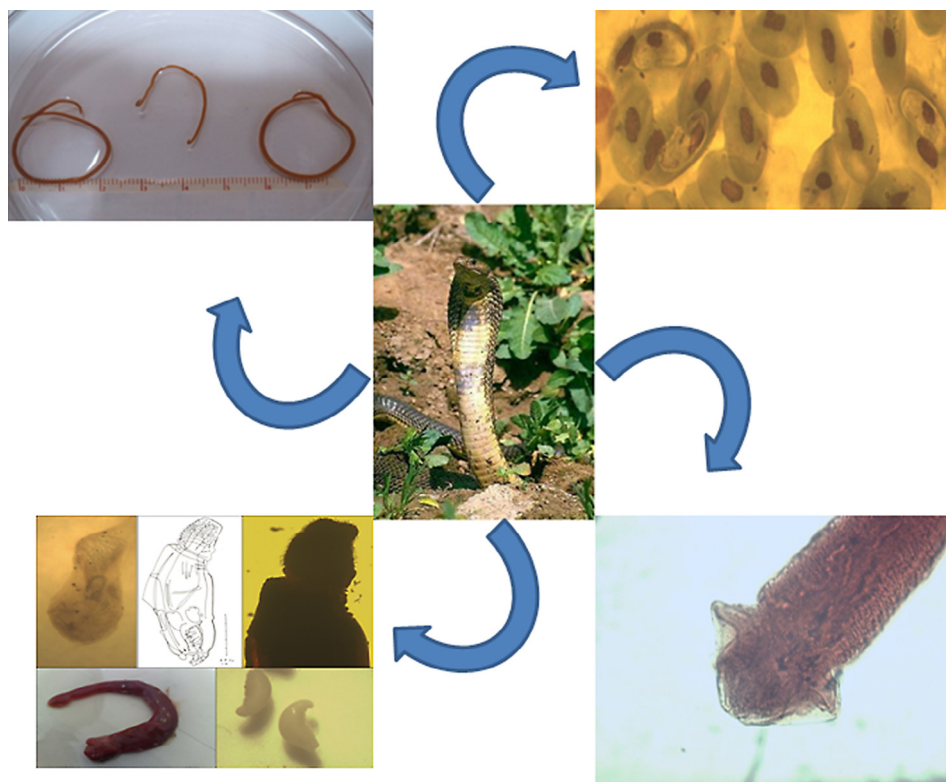
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HIGHLIGHTS

- These are the first data on the parasitic fauna of Iranian terrestrial snakes.
- Little is known of the parasitic fauna of terrestrial snakes in Iran.
- This study demonstrates the high prevalence of parasites among Iranian snakes.

GRAPHICAL ABSTRACT



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## ABSTRACT

Little is known of the parasitic fauna of terrestrial snakes in Iran. This study aimed to evaluate the parasitic infection rates of snakes in Iran. A total of 87 snakes belonging to eight different species, that were collected between May 2012 and September 2012 and died after the hold in captivity, under which they were kept for taking poisons, were examined for the presence of gastrointestinal and blood parasites. According to our study 12 different genera of endoparasites in 64 (73.56%) of 87 examined snakes were determined. Forty one snakes (47.12%) had gastrointestinal parasites. In prepared blood smears, it was found that in 23 (26.43%) of 87 examined snakes there are at least one hemoparasite. To our knowledge, these are the first data on the internal parasitic fauna of Iranian terrestrial snakes and our findings show a higher prevalence of these organisms among them.

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## 1. Introduction

More than 3500 species of snakes have been found around the world, less than 10% of which are venomous (Bawaskar, 2004; Blackman and Dillon, 1992; Meenatchisundaram and Michael, 2009; Warrel, 2005). In Iran, 69 species of snakes assigned to 37 genera in six families have been identified, of which 36 species are non-venomous, 25 species are venomous and 8 species are semi-venomous (Dehghani, 2010; Latifi, 2000; Zare Mirakabadi and Teymurzadeh, 2008).

The class Reptilia, consisting of more than 6000 species, is host to a wide variety of protozoan and metazoan parasites and virtually 100% of free-ranging reptiles harbor some kind of parasites and however, the presence of these organisms is not necessarily associated with a disease state (Barnard and Upton, 1994; McFarlen, 1991). Breeding snakes in captivity, particularly in a semi-extensive system, is an activity that exposes the animals to the action of several parasites (Mader, 1996). Intestinal helminths, pentastomids, and intestinal and blood protozoa are common endoparasites of captive or wild reptiles that these animals may serve as definitive, intermediate, accidental or paratenic hosts (Frye, 1991; Greiner and Mader, 2006; Hernandez-divers, 2006; Jackson and Cooper, 1981; Macarthur et al., 2004). The prevalence of parasites with a monoxenic cycle is higher than that of heteroxenic-cycle parasites, since the latter require an intermediate host to complete their cycle (Rey, 2001). The transmission of monoxenic-cycle parasites is favored by the physical and organic conditions of the captivity, thus a snake can contaminate other animals or even reinfect itself with its own feces. In addition, the captivity conditions or the related stress may be responsible for the acquisition or increase of the parasitic infection (Klingenberg, 1993). The result of this parasitism is competition with the host animal for food, removal of tissue and fluid, blocking of lymph and blood vessels, edema, ulcerations, necrosis, and anemia (Barnard, 1983; Frank, 1981; Frye, 1991; Marcus, 1981).

Although a considerable species of reptiles are present in Iran's ecosystems, there is not enough information about the parasitic fauna of reptiles and their role in transmission of veterinary and zoonotic disease (Youssefi et al., 2013). In a research in Iran, a *Natrix natrix* snake was found to be infected with the worm that belong to the genus *Ophiotaenia* (Youssefi et al., 2010). In a case report study, myiasis due to *Musca domestica* was described in a *Pseudocerastes persicus* snake and a lesion was found on its body where 14 live larvae of *M. domestica* was removed (Dehghani et al., 2012). An investigation showed that 1 turtle (*Mauremys caspica caspica*), 11 grass snakes (*Natrix natrix*) and 5 dice snakes (*Natrix tessellata*) have been infected with *Telorchis assula* in Mazandaran, north of Iran (Youssefi et al., 2013). In another research, one European glass lizard, *Pseudopus apodus*, and three European grass snakes, *Natrix natrix*, were examined for helminths and found that *Pseudopus apodus* harbored one species of Nematoda, *Entomelas entomelas* and *N. natrix* harbored 1 species of Digenea, *Telorchis assula*, 1 species of Cestoda, *Ophiotaenia europaea*, and 1 species of Nematoda, *Rhabdias fuscovenosa* (Halajian et al., 2013). Recently it have been reported that 18 snakes, including 9 *N. natrix* and 9 *N. tessellata* from Mazandaran Province, north of Iran were infected with parasitic helminths including 1 Nematode: *Rhabdias fuscovenosa* (larva), 1 Digenea: *Telorchis assula* and 1 Cestoda: *Ophiotaenia europaea* (Youssefi et al., 2014).

In this study the parasitic fauna of native Iranian snakes that were taken from the wild and kept in captivity were investigated.

## 2. Materials and methods

A total of 87 snakes representing eight species that were collected between May 2012 and September 2012 from various provinces of Iran sent to the department of Venomous Animals and Antivenom Production, Razi Vaccine and Serum Research Institute. These parasites were kept under captivity and after being transferred immediately to the Parasitology laboratory of Razi

Table 1

The taxonomic characterization of examined snakes and number of their parasites.

Scientific name of snakes	Common name	Number of examined snakes	Number of positive snakes for intestinal parasitic	Number of positive snakes for hemoparasites	Number of positive snakes for any parasites
<i>Pseudocerastes persicus fieldi</i>	Persian horned viper	23	10	13	23
<i>Naja oxiana</i>	Central Asian cobra	10	7	3	10
<i>Vipera albicornuta</i>	Zigzag mountain viper	5	5	0	5
<i>Vipera lebetina obtusa</i>	West-Asian blunt-nosed viper	20	10	6	16
<i>Vipera ursinii erivanensis</i>	Transcaucasian meadow viper	2	2	0	2
<i>Agkistrodon intermedius caucasicus</i>	Caucasian pit viper	23	5	0	5
<i>Natrix natrix</i>	European grass snake	1	1	0	1
<i>Coluber caspius gmelin</i>	Caspian whip snake	3	1	1	2
Total		87	41	23	64

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