

**FREQUENCY OF HELMINTHS IN *Crotalus durissus terrificus* (SERPENTES, VIPERIDAE) IN CAPTIVITY****Freqüência de helmintos em *Crotalus durissus terrificus* (Serpentes, Vipiridae) em cativeiro**SILVA<sup>1</sup> R.J. DA, BARRELLA<sup>2</sup> T.H., NOGUEIRA<sup>3</sup> M.F. & O'DWYER<sup>1</sup> L.H.

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**SUMMARY:** The objective of this study was to evaluate the frequency of helminths in a population of *Crotalus durissus terrificus* snakes maintained on a semi-extensive breeding system. Twenty-four snakes were sacrificed and the lung and digestive tract were examined. Trematodes and cestodes were not found. Nematodes were found parasitizing the lung, the intestine and the stomach, but none was found in the esophagus of the studied animals. Among the studied snakes, 7 (29.2%) were not infected, 4 (16.7%) presented nematodes in the stomach, 3 (12.5%) in the intestine and 17 (70.8%) in the lung. Among the parasitized snakes, 2 (8.4%) presented nematode infection in the stomach, intestine, and lung; 2 (8.4%) in the stomach and lung, and 1 (4.2%) in the intestine and lung. The parasitizing nematode species were *Ophidascaris sprengi* in the stomach, *Kalicephalus costatus* in the intestine, and *Rhabdias labiata* in the lung (which is the first report on the occurrence of this species in *C. durissus terrificus*).

**KEY WORDS:** Helminths, Nematoda, Frequency, *Crotalus durissus terrificus*, *Ophidascaris sprengi*, *Kalicephalus costatus*, *Rhabdias labiata*.

Snake breeding in captivity is an activity that may expose the animals to a more marked action of parasites (MADER, 1996). The prevalence of parasites of monoxenic cycle (direct) is higher than the prevalence of parasites of heteroxenic cycle (indirect) since the former do not need an intermediate host (REY, 2001). Transmission of monoxenic cycle parasites is facilitated under captivity conditions and an infected snake can re-infest itself simply by exposure to its own feces (KLINGENBERG, 1973). Captive or captivity-related stress may be responsible for parasite infections. Some of these parasites are self-limiting in nature but become pathogenic to animals held in captivity (KLINGENBERG, 1973). Therefore, the diagnosis of parasitic diseases are important in captivity breeding so that control measures may be applied (MADER, 1996; KLINGENBERG, 1973). Thus, the objective of the present study was to evaluate the frequency of helminths in *Crotalus durissus terrificus* snakes maintained on a semi-extensive breeding system.

The study was carried out on 24 *C. d. terrificus* snakes maintained on a semi-extensive breeding system at the Centro de Estudos de Venenos e Animais Peçonhentos of Universidade Estadual Paulista. The animals were euthanatized and the lung and the alimentary tract were collected, examined with the unaided eye and later incubated in physiologic solution overnight at 28°C. The helminths were recovered from the organs after incubation. All helminths collected were fixed in AFA solution. The nematodes were clarified with phenol and the identification were based on the paper by VICENTE *et al.* (1993).

Trematodes and cestodes were not found. Nematodes were found in lung, intestine and stomach, but not in the esophagus of the studied animals and their total prevalence was 70.8% (Table 1). Among the 24 studied snakes, 7 (29.2%) were not infected, 4 (16.7%) presented nematodes in the stomach, 3 (12.5%) in the intestine, and 17 (70.8%) in the lung. Among the parasitized snakes, 2 (8.4%) were

TABLE 1. Nematodes found in *Crotalus durissus terrificus* (Cdt) snakes maintained on a semi-extensive breeding system.

Snakes	Esophagus	Stomach	Intestine	Lung
Cdt <sub>1</sub>	-	-	-	-
Cdt <sub>2</sub>	-	-	-	<i>Rhabdias labiata</i>
Cdt <sub>3</sub>	-	-	-	-
Cdt <sub>4</sub>	-	N.I.	N.I.	<i>R. labiata</i>
Cdt <sub>5</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>6</sub>	-	-	-	-
Cdt <sub>7</sub>	-	<i>Ophidascaris sprenti</i>	<i>Kalicephalus costatus</i>	<i>R. labiata</i>
Cdt <sub>8</sub>	-	-	-	-
Cdt <sub>9</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>10</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>11</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>12</sub>	-	<i>O. sprenti</i>	-	<i>R. labiata</i>
Cdt <sub>13</sub>	-	-	-	-
Cdt <sub>14</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>15</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>16</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>17</sub>	-	-	-	-
Cdt <sub>18</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>19</sub>	-	<i>O. sprenti</i>	-	<i>R. labiata</i>
Cdt <sub>20</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>21</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>22</sub>	-	-	-	<i>R. labiata</i>
Cdt <sub>23</sub>	-	-	<i>K. costatus</i>	<i>R. labiata</i>
Cdt <sub>24</sub>	-	-	-	-

Legend: N.I. – nematode not identified; (-) helminths not detected.

infected with nematodes in the stomach, intestine and lung; 2 (8.4%) in the stomach and lung, and 1 (4.2%) in the intestine and lung (Table 1).

Among the animals that presented nematodes in the stomach, we detected *Ophidascaris sprenti* in three (Cdt<sub>7</sub>, Cdt<sub>12</sub> and Cdt<sub>19</sub>). In another specimen (Cdt<sub>4</sub>) we only found an immature or larval form of a nematode that could not be identified. Among the three specimens in which we found nematodes in the intestine, a single *Kalicephalus costatus* male was identified in one (Cdt<sub>3</sub>) and a single female of the same genus was identified in another (Cdt<sub>7</sub>). In specimen (Cdt<sub>4</sub>) we found an immature or larval form of a nematode that could not be identified. The most frequent organ infected was the lung. Seventeen snakes were infected and *Rhabdias labiata* was the only species involved in the parasitism.

In the present study we found a higher prevalence of nematodes in *C. d. terrificus* snakes. Studies on the frequency of helminths in captive Brazilian snakes have been published. GREGO *et al.* (2000) studied 157 snakes of the genera *Bothrops* and *Crotalus* and found a parasite prevalence of 61.5%. The prevalence of nematodes was 22.2%, and *Kalicephalus* spp. and *Rhabdias* spp. were the most frequent parasites. Besides, *C. d. terrificus* was the most affected snake.

In another publication, ARAÚJO *et al.* (1999) reported the occurrence of *Ophidascaris* sp. in the stomach and *Rhabdias* sp. in the windpipe from *C. d. terrificus* and *Bothrops alternatus*. In the fecal examinations from the same animals these authors found eggs of *Ophidascaris* sp., *Kalicephalus* sp, and *Oxyuris* sp.

*Ophidascaris sprenti* was found in the present study. This nematode was previously described as parasite of *C. d. terrificus* (ARAÚJO, 1969). This snake was host for other two other species of *Ophidascaris*: *O. travassosi* and *O. trichuriformis* (FREITAS, 1968; VAZ, 1935, 1938).

*Ophidascaris* spp. has an indirect cycle and requires intermediate hosts such as frogs, amphibians or rodents. Its transmission in captivity was less probable but not excluded. The infection by *Ophidascaris* spp. is common in snakes and these helminths may cause severe alterations in such animals (ARAÚJO *et al.*, 1999; TELFORD, 1971). Obstruction and inflammation of the stomach mucous membrane was reported (TELFORD, 1971). The most common effect of this infection is secondary malnutrition since these parasites can absorb and steal up to 40% of the usable nutrients available to the host (KLINGENBERG, 1973).

*Kalicephalus costatus* was found only in two snakes. Like *Rhabdias* spp., it presents a direct cycle. It was reported that *C. d. terrificus* may be host of *K. costatus* e *K. inermis* (VICENTE *et al.*, 1993). These parasites have very little host specificity and can pass to a number of potential hosts. In captivity, tremendous loads can build up within relatively short time periods (KLINGENBERG, 1973). The alterations induced by the *Kalicephalus* spp. was little evident. In severe cases, anorexia, weight loss and hemorrhages of the mucous membrane of the esophagus, stomach and intestine can be observed (COOPER, 1971).

The main nematode found in the lung of the studied snakes was *Rhabdias labiata* (70.8%). It is the first report on the occurrence of this nematode in *C. d. terrificus*. All parasitized snakes presented this parasite alone or associated with *K. costatus* or *O. sprenti*. This lung worm has a direct cycle and the larvae that hatch from eggs can gain entrance to the host by percutaneous penetration and by ingestion of fecally contaminated food and water (KLINGENBERG, 1973).

It has been reported that *Rhabdias* spp. may cause a “verminous” pneumonia characterized by gaping mouth, wheezing, and exudate from the trachea in heavily infested or extremely stressed animals (KLINGENBERG, 1973). The animals presented nasal discharge, open mouth breathing, and accumulation of caseous debris in the oral cavity, and some of them exhibited neurologic signs characterized by opisthotonus and head tremor.

Our results demonstrate that the prevalence of nematodes in the studied snakes is high. The semi-extensive breeding

system favors the transmission of *Rhabdias* spp. and *Kalicephalus* spp. parasites and therefore the diagnosis and later treatment of infected snakes are necessary in order to control these parasite infections.

## SUMÁRIO

O estudo teve como objetivo avaliar a frequência de helmintos em uma criação de cobras da espécie *Crotalus durissus terrificus* mantidas em um sistema de criação semi-extensivo. Foram sacrificadas vinte e quatro cobras e examinados o pulmão e o trato digestivo. Não foram encontrados trematódeos e cestóides. Foram encontrados nematóides parasitando o pulmão, o intestino e o estômago, mas nenhum no esôfago dos animais estudados. Entre as cobras examinadas, 7(29.2%) não estavam infetadas, 4(16.7%) apresentavam nematóides no estômago, 3(12.5%) no intestino e 17(70.8%) no pulmão. Das cobras parasitadas, 2(8.4%) estavam parasitadas por nematóide no estômago, intestino e pulmão; 2 (8.4%) no estômago e pulmão e 1 (4.2%) no intestino e pulmão. A espécie de nematóide identificadas foram, *Ophidascaris sprengi* parasitando o estômago, *Kalicephalus costatus* no intestino e *Rhabdias labiata* no pulmão, tendo sido o primeiro relatório de ocorrência desta espécie em *C. durissus terrificus*.

**PALAVRAS-CHAVE:** Helminto, Nematoda, Frequência, *Crotalus durissus terrificus*, *Ophidascaris sprengi*, *Kalicephalus costatus*, *Rhabdias labiata*.

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