The occurrence of *Crepidobothrium* sp. (Cestoda, Proteocephalidae) in *Bothrops moojeni* (Hoge) (Serpentes, Viperidae)

Reinaldo José da Silva [1]
Andrea Satie Matsubara Karasawa [2]
André Luis Cherubini [2]
Thomaz Henrique Barrella [2]
Carlos Alberto de Magalhães Lopes [2]
Alessandro Francisco Talamini Amarante [1]

ABSTRACT. The occurrence of *Crepidobothrium* sp. (Cestoda, Proteocephalidae) in the intestine of *Bothrops moojeni* (Hoge, 1965) (Serpentes, Viperidae) is reported. The host snake was rescued from the fauna in Porto Primavera dam, Mato Grosso do Sul State, Brazil. The snake died in captivity on July 13, 1999. At necropsy, 28 tapeworms were found in the snake intestine. The analysis of specimens morphology allowed the conclusion that they belong to the *Crepidobothrium* (Monticelli, 1900) genus. It was not possible to determine the *Crepidobothrium* species due to the lack of the gravid proglottids. This is the first report of *B. moojeni* as a host of cestodes.
KEY WORDS. Cestoda, Proteocephalidae, *Crepidobothrium*, *Bothrops moojeni*, snake

Snakes are hosts for trematodes, nematodes, and cestodes (MADER 1996). *Ophiotaenia* (La Rue, 1911), *Proteocephalus* (Weinland, 1858), and *Crepidobothrium* (Monticelli, 1900) were the most frequently reported tapeworms in Brazilian snakes (YAMAGUTI 1959)

The *Crepidobothrium* genus (YAMAGUTI 1959; SCHMIDT 1986; REGO 1995) was characterized by the following: large scolex with vestigial apical organ, four large suckers that are notched at posterior margin (heart- or horseshoe-shape), neck fairly long, distinct external segmentation, testes single layered distributed in two fields, genital pores alternating irregularly, ovary bilobed and posterior, vitellaria in marginal cortex, uterus median and tubular with lateral branches, vagina running anterior or posterior to cirrus pouch.

Taxonomic studies on the *Crepidobothrium* genus have demonstrated that there are only five valid species that are parasites of snakes: *C. gerrardii* (Baird, 1860), *C. dollfusi* (Freze, 1965), *C. lachesidis* (MacCallum, 1921), *C. viperis* (Beddard, 1913), and *C. garzonii* (Chambrier, 1988) (CHAMBRIER 1988, 1989a,b). In addition, it seems that there is a strict specificity between the *Crepidobothrium* species and the host snakes (CHAMBRIER 1989b).

1) Departamento de Parasitologia, Instituto de Biociências, Universidade Estadual Paulista. 18618-000 Botucatu, São Paulo, Brasil. E-mail: reinaldo@ibb.unesp.br
2) Centro de Estudos de Venenos e Animais Peçonhentos (CEVAP/UNESP). 18618-000 Botucatu, São Paulo, Brasil.

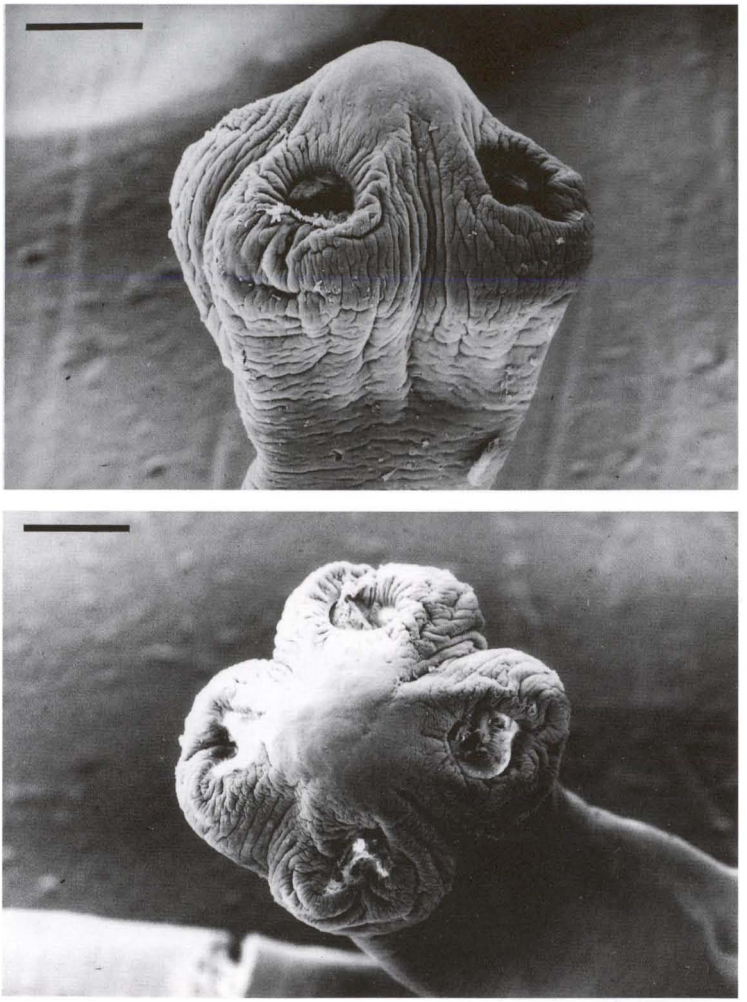
Species of *Crepidobothrium* were detected in *Bothrops alternatus* (Duméril, Bibron et Duméril, 1854), *Eunectes murinus* (Linnaeus, 1758), and *Boa constrictor* (Linnaeus, 1758) (CHAMBRIER 1988, 1989a,b). However, there was no report of the presence of *Crepidobothrium* species or any other tapeworm in *Bothrops moojeni* (Hoge, 1965). The objective of this paper was to report the occurrence of the *Crepidobothrium* sp. in a specimen of *B. moojeni*.

MATERIAL AND METHODS

An adult, male specimen of *Bothrops moojeni*, rescued in Porto Primavera dam, Mato Grosso do Sul State, Brazil, was donated to The Center for the Study of Venoms and Venomous Animals of São Paulo State University (CEVAP/UNESP). This snake died in captivity on July 13, 1999. At necropsy, 28 tapeworms were found in the snake intestine. These tapeworms were collected and fixed with Railliet & Henry solution. Fifteen tapeworms were stained with carmine, cleared in creosote, and mounted as permanent preparations in Permount. Morphological evaluation of carmine stained preparations was made using Optimas 4.10 computerized system for image analysis. Two specimens were also examined by scanning electron microscopy (SEM).

RESULTS

The characteristics and measurements of the tapeworm are (x = mean): scolex (Figs 1 and 2) large and swollen, wider than the neck, 773 μm in diameter and 774 μm long, with four proeminent suckers (Fig. 3) opening anteriorly, notched at posterior margin (heart- or horseshoe-shape), with well-marked ropelike edge, 361 μm in diameter. Neck present, fairly long, 425 μm wide. Strobila acraspedote and polyzoic, 51 mm long, bearing about 135 proglottids. Intermediate imature proglottids wider than long, 222-305 μm (x = 256 μm) long and 559-636 μm (x = 600 μm) wide. Mature proglottids (Fig. 4) longer than wide, 990-1263 μm (x = 1149 μm) long and 495-696 μm (x = 599 μm) wide. There were no gravid proglottids. Mature proglottids showed single-layered spherical testes, distributed in two fields, 215-233 (x = 223) total testis number, divided into 51-59 (x = 55) preporal, 33-50 (m = 44) postporal, and 117-129 (x = 124) antiporal, with 27-34 μ μm long (x = 29 μm) and 23-35 μ μm (x = 28 μm) wide; cirrus-pouch ellipsoid or piriform, thick-walled, 184-218 μm (x = 203 μm) long and 72-86 μm (x = 79 μm) wide; ejaculatory duct long and coiled; vas deferens coiled, occupying round field of 136-188 μm (x = 166 μm) by 119-153 μm (x = 140 μm), extending between the proximal part of the cirrus-pouch and the anterior part of the uterus; genital atrium present, well defined, with male and female genital pores, irregularly alternated and situated anteriorly between 28-50% (x = 41%) of proglottids length; ovary bilobed, butterfly-shaped and posterior in mature proglottids, each lobe occupying a field of 108-176 μm (x = 145 μm) by 111-181 μm (x = 150 μm); vagina running anterior (70%) or posterior (30%) to cirrus-pouch; uterus distended in the median longitudinal part, 799-1055 μm (x = 942 μm) long, occupying 72-90% (x = 82%) of the mature proglottids length; and vitellaria arranged in two lateral rows, formed by vitelline follicles, 883-1143 μm (x = 1026 μm) long, extending over 81-95% (x = 88%) length of mature proglottids.



Figs 1-2. Scolex of a *Crepidobothrium* specimen from a *Bothrops moojeni*. (1) Lateral view; (2) frontal view. SEM, scale bars = 200 μm.

DISCUSSION

This paper describes the first case in literature of the parasite *Crepidobothrium* sp. infecting a specimen of *B. moojeni*. In addition, this is the first report of a tapeworm as parasite of this snake species.

For the five valid species of *Crepidobothrium* genus, only *C. garzonii* and *C. viperis* were found in *B. alternatus*, a snake closely related to *B. moojeni* (CHAMBRIER 1988, 1989a). Unfortunately, a complete study for the characterization of this species was not performed due to the lack of gravid proglottis. However, the tapeworm reported in this paper is more resembled to *C. garzonii* than to *C. viperis*.

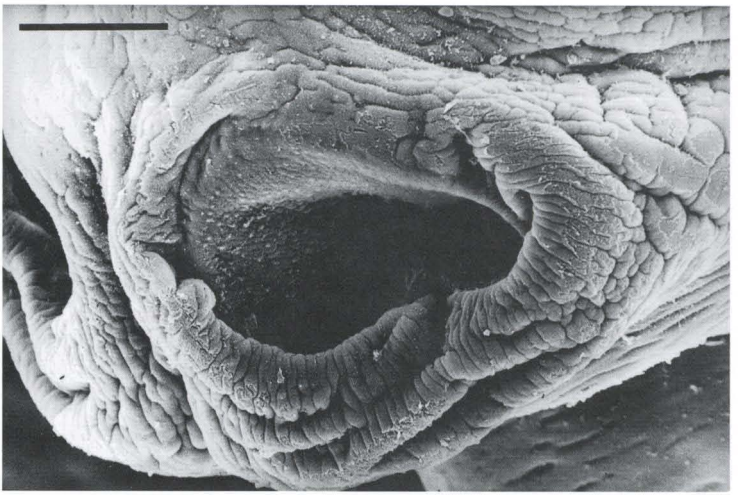


Fig. 3. Detail of the suckers of a *Crepidobothrium* specimen from a *Bothrops moojeni*. SEM, scale bars = 100 μm.

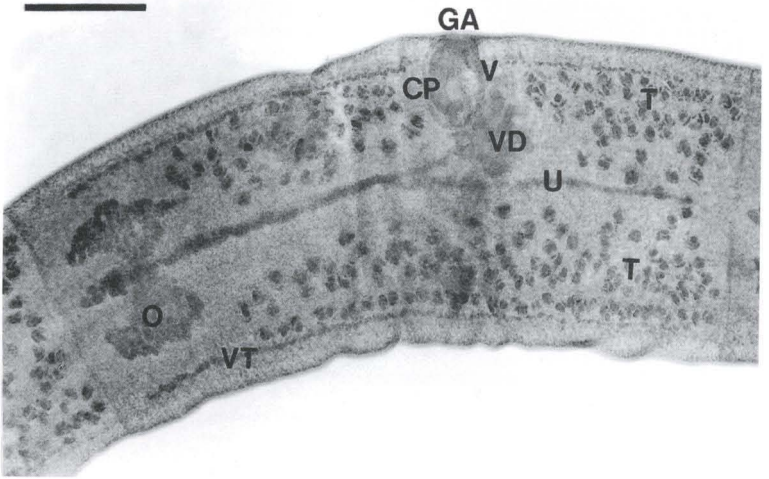


Fig. 4. Mature proglottid of a *Crepidobothrium* specimen from a *Bothrops moojeni*. Legend: genital atrium (GA), cirrus-pouch (CP), vagina (V), testes (T), vas deferens (VD), uterus (U), ovary (O), vitellaria (VT). Carmine staining, scale bars = 300 μm.

The absence of gravid proglottids in this *Crepidobothrium* sp. may be explained by the fact that the host snake died before the tapeworms were completely developed. Another possible explanation is that the *Bothrops moojeni* can be an unusual host for this cestode and for this reason its development was not complete. Two species of *Crepidobothrium* (*C. garzonii* and *C. viperis*) were described in *Bothrops alternatus*, but the cestodes have complete strobila (CHAMBRIER 1988, 1989a).

CHAMBRIER (1989b) mentioned a possible existence of a strict specificity between the *Crepidobothrium* species and the host snakes. A snake can be parasitized by one or more species of *Crepidobothrium*, but one species of *Crepidobothrium* do not parasitize more than one host. Then, this *Crepidobothrium* species found in *B. moojeni* may be a new species. However, the lack of a complete strobila in this tapeworm specimen makes characterization of the new species impossible. Further genetic studies and the search for more cestodes in *B. moojeni* will be necessary to elucidate this question.

ACKNOWLEDGMENTS. The authors are indebted to N.A. Basso, M.E.L. Peres and M. H. Moreno for their technical assistance, and to H.M.P. Toledo for her assistance with the English review.

REFERENCES

CHAMBRIER, A. DE. 1988. *Crepidobothrium garzonii* n. sp. (Cestoda: Proteocephalidae) parasite de *Bothrops alternatus* Dum. Bibr. & Dum., 1854 (Serpentes: Viperidae) au Paraguay. **Revue Suisse Zool. 95** (4): 1163-1170.

————. 1989a. Révision du genre *Crepidobothrium* Monticelli, 1900 (Cestoda: Proteocephalidae) parasite d'ophidiens néotropicaux. I. *C. gerrardii* (Baird, 1860) et *C. viperis* (Beddard, 1913). **Revue Suisse Zool. 96** (1): 191-217.

————. 1989b. Révision du genre *Crepidobothrium* Monticelli, 1900 (Cestoda: Proteocephalidae) parasite d'ophidiens néotropicaux. II. *C. dollfusi* Freze, 1965, *C. lachesidis* (MacCallum, 1921) et conclusions. **Revue Suisse Zool. 96** (2): 345-380.

MADER, D.R. 1996. **Reptile Medicine and Surgery.** Philadelphia, W.B. Saunders, 512p.

REGO, A.A. 1995. A new classification of the cestode order Proteocephalidea Mola. **Revta bras. Zool. 12** (4): 791-814.

SCHMIDT, G.D. 1986. **Handbook of Tapeworm Identification.** Florida, CRC Press, 675p.

YAMAGUTI, S. 1959. **Systema Helminthum – The Cestodes of Vertebrates.** New York, Interscience Publ., Vol. 2, 860p.

Recebido em 27.IV.2000; aceito em 02.V.2001.