

# Helminths of rabbits (Lagomorpha, Leporidae) deposited in the Helminthological Collection of the Oswaldo Cruz Institute

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**ABSTRACT.** Helminth samples (n = 35) recovered from *Oryctolagus cuniculus* (Linnaeus, 1758) Lilljeborg, 1873 (3) and from another rabbit species, *Sylvilagus brasiliensis* (Linnaeus, 1758) Thomas, 1901 (32), from August 1909 to February 1948 and that are deposited in the Helminthological Collection of the Oswaldo Cruz Institute were analyzed. The studied samples were represented by the cysticercus of the cestode *Taenia pisiformis* (Bloch, 1780) and by the nematodes *Passalurus ambiguus* (Rudolphi, 1819), *Vianella fariasi* (Travassos, 1915), *Longistriata perfida* Travassos, 1943, *Trichostrongylus retortaeformis* (Zeder, 1800). The scope of the present investigation is to survey the parasites infecting these hosts, commonly used as laboratory animal models in scientific research and supply figurative data on the helminths in order to provide their easy identification, since the presence of autochthonous parasite burdens, if undetected or misinterpreted, can alter the final results of experimental assays, mainly those related to immunological approaches, when cross-reactions can occur.

**KEY WORDS.** Cestodes, nematodes, *Oryctolagus cuniculus*, prevalences, *Sylvilagus brasiliensis*.

**RESUMO.** Trinta e cinco amostras de helmintos coletadas de *Oryctolagus cuniculus* (Linnaeus, 1758) Lilljeborg, 1873 (3) e de uma outra espécie de coelho, *Sylvilagus brasiliensis* (Linnaeus, 1758) Thomas, 1901 (32), de agosto de 1909 a fevereiro de 1948 e que estão depositadas na Coleção Helminológica do Instituto Oswaldo Cruz, foram analisadas. As amostras estudadas estão representadas pelo cisticerco do cestóide *Taenia pisiformis* (Bloch, 1780) e pelos nematóides *Passalurus ambiguus* (Rudolphi, 1819), *Vianella fariasi* (Travassos, 1915), *Longistriata perfida* Travassos, 1943, *Trichostrongylus retortaeformis* (Zeder, 1800). O objetivo da presente investigação é o de inventariar os parasitos que infectam estes hospedeiros, comumente utilizados como modelos de animais de laboratório na pesquisa científica e fornecer dados figurativos sobre os helmintos a fim de facilitar sua identificação, uma vez que, cargas parasitárias autóctones, caso não detectadas ou erroneamente avaliadas, podem alterar o resultado final de protocolos experimentais, principalmente dos relacionados a ensaios imunológicos, quando infecções cruzadas podem ocorrer.

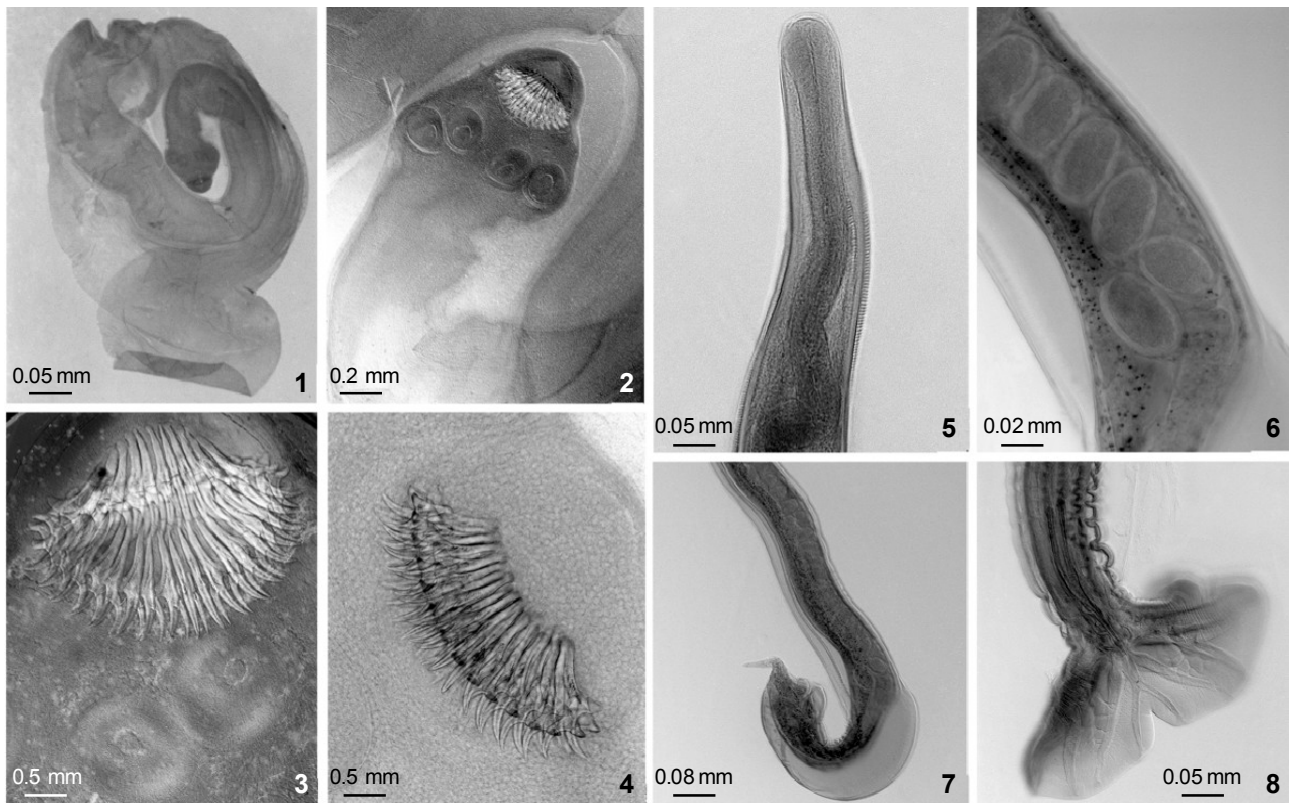
**PALAVRAS CHAVE.** Cestóides, nematóides, *Oryctolagus cuniculus*, prevalences, *Sylvilagus brasiliensis*.

Rabbits are one of the most common laboratory animals, used worldwide in experiments to evaluate different biological parameters. Considering that the rabbit is a high-responder model for immunological assays and in Brazil, as in other countries, this animal is either conventionally maintained in animal facilities to be used in scientific research or is also available in pet shops and in backyard colonies for commercial purposes.

The helminth fauna of laboratory mice, rats, hamsters,

guinea pigs and gerbils has been evaluated in Brazil and compared to that recovered from some of these animal models, openly kept in pet stores; the importance of the adequate identification of the parasites infecting these hosts has been strongly emphasized (BAZZANO *et al.* 2002, GONÇALVES *et al.* 1998, PINTO *et al.* 1994, 2001a, b, 2002, 2003 a, b).

The present survey is related to helminths recovered from two rabbit species in Brazil; the parasites were identified and figured.



Figures 1-8. (1-4) *Cysticercus* of *Taenia pisiformis*: (1) total; (2) scolex, showing rostellar hooks and the four suckers; (3) detail of rostellar hooks and suckers; (4) detail of rostellar hooks of another specimen. (5-8) *Vianella fariasi*: (5) anterior portion of female, ventral view; (6) eggs *in utero*; (7) posterior portion of female, lateral view; (8) posterior portion of male, ventral view.

## MATERIAL AND METHODS

The presently investigated 35 helminth samples (32 from *Sylvilagus brasiliensis* (Linnaeus, 1758) Thomas, 1901 (= *Lepus brasiliensis* = *Sylvilagus minensis*) and three from *Oryctolagus cuniculus* (Linnaeus, 1758) Lilljeborg, 1873 (= *Lepus cuniculus*), captured in the States of Rio de Janeiro (RJ), Espírito Santo (ES), Mato Grosso do Sul (MS), respectively, and that were previously deposited in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC) as wet material, were routinely processed for study as described elsewhere (PINTO *et al.* 1994) and those already preserved as whole mounts were also examined. Referred numbers of deposit do not always represent the amount of samples, since some sequential whole mounts can derive from a same sample kept as wet material, receiving another file number. Classification follows VICENTE *et al.* (1997) for the nematodes and RAUSCH (1994) for the cestodes and systematic of hosts is in accordance with HOFFMANN (1993). The ecological concept (prevalence) is used according to BUSH *et al.* (1997). Photomicrographs were obtained in a Zeiss

Axiophot brightfield microscope in a Differential Interference Contrast (DIC) system with a 100 ISO Kodak film.

## RESULTS

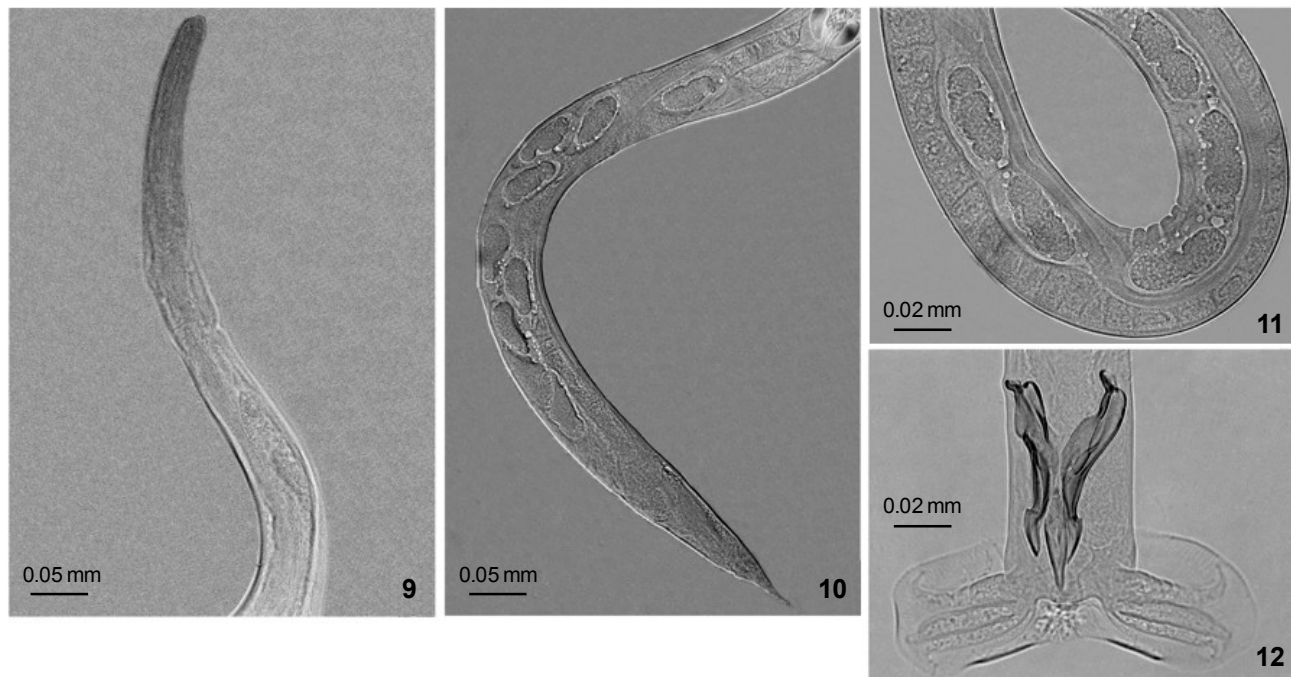
Results so far obtained showed that the samples recovered from *Sylvilagus brasiliensis* were represented by the cysticercus of one cestode and three nematode species.

### *Taenia pisiformis* (Bloch, 1780) (= *Cysticercus pisiformis*) (Figs 1-4)

Taxonomic summary: Taeniidae; site of infection: peritonium; locality: Rio de Janeiro, RJ; specimens deposited: CHIOC no. 4402, 4403 (whole mounts), 20042 (wet material).

### *Vianella fariasi* (Travassos, 1915) Travassos, 1918 (Figs 5-8)

Taxonomic summary: Trichostrongyloidea, Viannidae, Vianninae; site of infection: small intestine; localities: Angra dos Reis, RJ, Rio de Janeiro, RJ, Linhares, ES; specimens deposited: CHIOC no. 668 a-c, (whole mounts), 1789, 4283, 5087, 8042, 9238 (wet material), 9302 a-b (whole mounts), 9328, 12243, 12342, 14730, 17673 – 17676, 17678, 7685, 20041, 20043, 20044 (wet material).



Figures 9-12. *Trichostrongylus retortaeformis*: (9) anterior portion of female, ventral view; (10) posterior portion of female, lateral view; (11) eggs *in utero*; (12) posterior portion of male, ventral view.

***Trichostrongylus retortaeformis* (Zeder, 1800) Looss, 1905 (Figs 9-12)**

Taxonomic summary: Trichostrongyloidea, Trichostrongylidae, Trichostrongylinae; site of infection: small intestine; locality: Rio de Janeiro, RJ; specimens deposited: CHIOC no. 15430 a-c (whole mounts).

***Longistriata perfida* Travassos, 1943 (Figs 13-16)**

Taxonomic summary: Trichostrongyloidea, Trichostrongylidae, Heligmosominae; site of infection: small intestine; locality: Salobra, MT; specimens deposited: CHIOC no. 14387 (wet material); 14395-14401 a-b (whole mounts).

The cestode *T. pisiformis* represented 9.09 % of the samples. The most prevalent nematode species in specimens of *S. brasiliensis* was *V. fariasi*, occurring in 60.6 % of the samples, followed by *L. perfida* in 24.2 %, *P. ambiguus* and *T. retortaeformis* in 3.03 %, each.

The worms recovered from specimens of *Oryctolagus cuniculus* were represented only by nematodes in the three available samples examined.

***Passalurus ambiguus* (Rudolphi, 1819) Dujardin, 1845 (Figs 17-21)**

Taxonomic summary: Oxyuroidea, Oxyuridae; site of infection: large intestine; locality: Rio de Janeiro, RJ; specimens deposited: CHIOC no. 7520, 7615 (wet material).

***Trichostrongylus retortaeformis* (Zeder, 1800) Looss, 1905**

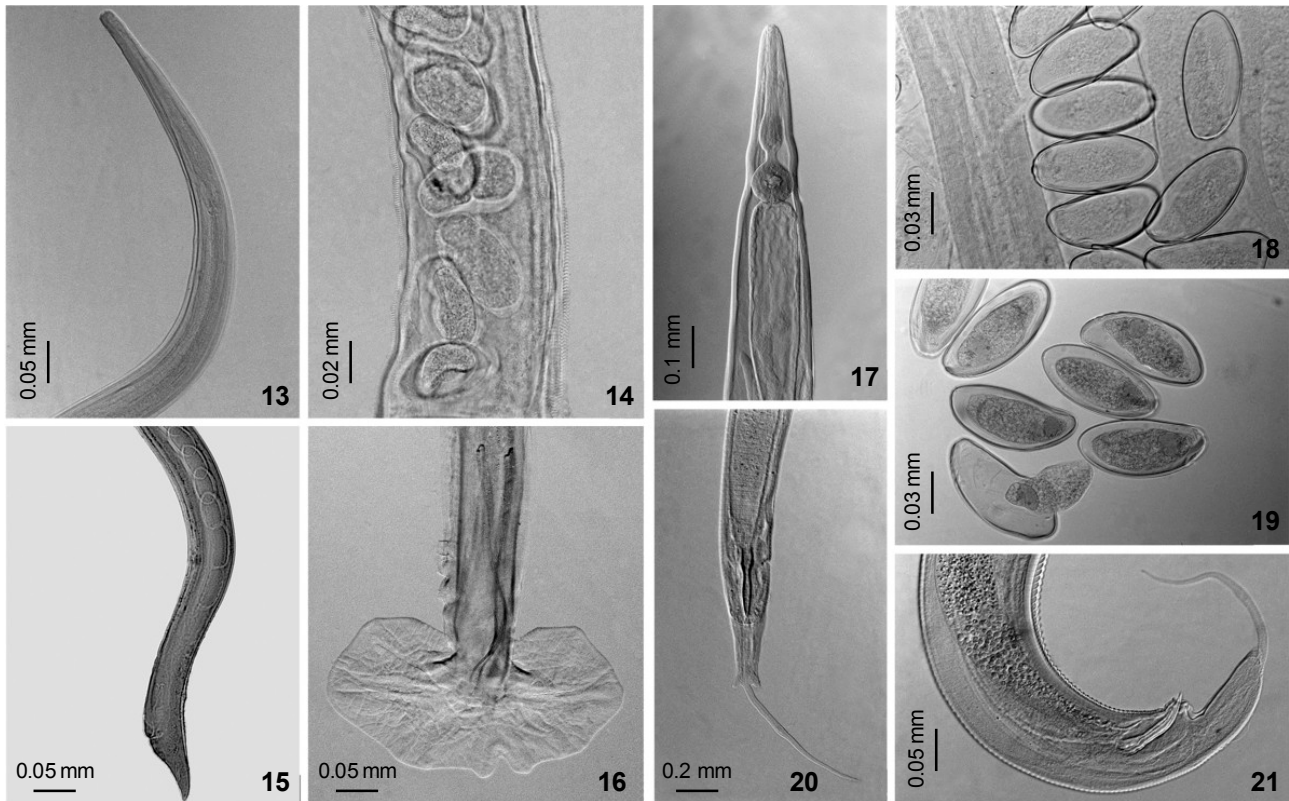
Taxonomic summary: Trichostrongyloidea, Trichostrongylidae, Trichostrongylinae; site of infection: large intestine; locality: Rio de Janeiro, RJ; specimen deposited: CHIOC no. 15326 (whole mount).

gylidae, Trichostrongylinae; site of infection: large intestine; locality: Rio de Janeiro, RJ; specimen deposited: CHIOC no. 15326 (whole mount).

## DISCUSSION

In Brazil few are the accounts related to taxonomic and systematic studies of the helminths naturally infecting rabbits and most of the available data refer to check lists of the metazoan endoparasites with no further reports on prevalence and size of the worm burdens. Previous data refer to the parasitism of Brazilian rabbits with the nematodes *Gongylonema neoplasticum* (Fibiger & Ditlevsen, 1914), *Paraspidodera uncinata* (Rudolphi, 1819) Travassos, 1914, *Passalurus ambiguus*, *Strongyloides papillosus* (Wedler, 1856) (= *Strongylus papillosus*), *Trichostrongylus retortaeformis* in *Oryctolagus cuniculus*; *Vianella fariasi* (= *Viannaia fariasi*) and *Longistriata perfida* are referred in *Sylvilagus brasiliensis* (VICENTE *et al.* 1997) and the cestodes *Taenia multiceps* (Gervais, 1847) (= *Multiceps multiceps*), *T. serialis* (Leske, 1780) (= *Multiceps serialis* = *Coenurus serialis*), *Taenia pisiformis* in *O. cuniculus* and *Taenia macrocystis* (Diesing, 1850) (= *Hydatigena macrocystis*) in *S. brasiliensis* (TRAVASSOS 1965, COSTA & FREITAS 1970).

Although the helminths of rabbits, mainly those harbored by specimens of *O. cuniculus*, distributed worldwide, have been largely investigated, data so far obtained from Brazilian rabbits report to the finding of a quite different nematode fauna



Figures 13-21. (13-16) *Longistriata perfida*: (13) anterior portion of male, ventral view; (14) eggs *in utero*; (15) posterior portion of female, lateral view; (16) posterior portion of male, ventral view. (17-21) *Passalurus ambiguus*: (17) anterior portion of male, ventral view; (18) eggs *in utero*; (19) mature deposited eggs; (20) posterior portion of male, ventral view; (21) posterior portion of male, lateral view.

when compared to that recovered from hosts of this species in other localities, suggesting that some of the parasites may be endemic.

Among the nematodes parasitizing rabbits in Brazil, only *T. retortaeformis*, *P. ambiguus* and *S. papillosus* have been referred infecting specimens of *O. cuniculus* from other countries mainly in Australia, England, Scotland and Spain; conversely, other nematode and cestode species were reported from this host overseas (NWAORGU & CONNAN 1980, BOAG 1985, 1987, BOAG & IASON 1986, BOAG & KOLB 1989, BOAG & GARSON 1993, ALLAN *et al.* 1999, MOLINA *et al.* 1999, HOBBS *et al.* 1999).

In the case of the helminths recovered from *S. brasiliensis* that is distributed from Mexico southward through Central and South America, as far as Peru, Bolivia, Argentina and Brazil, the available data on the parasites are on the basis of Brazilian samples only, except for the cestode *T. macrocystis*, also reported from other countries (SCHMIDT & MARTIN 1978, TIEKOTTER 1981, MARCHIONDO *et al.* 1986).

Similarly to what happens with *T. macrocystis* from *S. brasiliensis*, there are no morphometric and figurative data available in Brazil for the other cestode species *T. serialis*, *T.*

*hydatigena*, *T. pisiformis* and *T. multiceps* that can infect specimens of *O. cuniculus* in our country as well as other vertebrate hosts worldwide; nevertheless, morphological data related to these species have been reported elsewhere (VARELA 1971, BEVERIDGE & RICKARD 1976, EDWARDS & HERBERT 1981, KIETZMANN & HUGHGINS 1986, SOERENSEN *et al.* 1974).

*Paraspidodera uncinata*, a common nematode species that infects guinea pigs in Brazil and overseas and another nematode *Gongylonema neoplasticum* frequently referred in rodents worldwide, and of unusual occurrence in rabbits, although listed as parasites infecting specimens of *O. cuniculus* in Brazil by VICENTE *et al.* (1997) were not found among the presently studied samples; nevertheless, complete morphometric data on these species were reported by PINTO *et al.* (2002) and KASEGAWA *et al.* (1994), respectively.

Females of *Passalurus ambiguus*, presently studied showed, as expected, typical oxyurid eggs without any shell ornamentation, in disagreement with what was illustrated by PINTO (1945) and VICENTE *et al.* (1997). The lack of ornamentations was also confirmed by RODRIGUEZ *et al.* (1973) and thus, suggesting the occurrence of an artifact, misinterpreted by the former authors.

As already stated (PINTO *et al.* 1994, 2001b, 2002), the proper identification of parasites harbored by animal models used in scientific experiments is of great importance, considering that they, if overlooked or misinterpreted, can alter final results, mainly those related to immunological assays, when cross-reactions can occur.

Figurative data on the species presently examined are supplied, taking into account that most of the species have been poorly illustrated since their original description.

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