

***Trichostrongylus retortaeformis* (Zeder, 1800) (Nematoda, Trichostrongyloidea) in *Lepus europaeus* (Pallas, 1778) in southern Brazil**

***Trichostrongylus retortaeformis* (Zeder, 1800) (Nematoda, Trichostrongyloidea) em *Lepus europaeus* (Pallas, 1778) no sul do Brasil**

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**Abstract**

The aim of this study was to evaluate the presence of helminthes parasitizing hares (*Lepus europaeus*) in southern Brazil. The intestinal tracts of seven hares were opened and the contents were sieved. Among the seven animals in the study, *Trichostrongylus retortaeformis* parasitized six (85.7%). This study will be expanded and more animals captured to evaluate the occurrence of other helminthes and to assess whether the high prevalence of *T. retortaeformis* is accurate, as well as to assess the abundance and intensity of parasites. To our knowledge, this is the first record of *T. retortaeformis* parasitizing *L. europaeus* in southern Brazil.

**Key words:** Helminths. European hare. Exotic mammals. Southern Brazil.

**Resumo**

Foi realizado estudo sobre a presença de helmintos em lebres (*Lepus europaeus*) na região sul do Brasil. Foram capturados sete animais que foram necropsiados e os órgãos (estômago e intestino delgado e grosso) foram abertos e o conteúdo tamisado. Dos sete animais, seis (85,7%) estavam parasitados por *Trichostrongylus retortaeformis*. O estudo será ampliado com a captura de mais animais para avaliar a ocorrência de outros helmintos, se esta alta prevalência para *T. retortaeformis* permanece e para permitir avaliar a bundancia e intensidade dos parasitos. Este trabalho apresenta a primeira citação de *T. retortaeformis* parasitando *L. europaeus* no sul do Brasil.

**Palavras-chave:** Helmintos. Lebre europeia. Mamíferos exóticos. Sul do Brasil.

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European hare (*Lepus europaeus*) is a mammal of the order Lagomorpha and its natural range covers most of Europe except for Ireland, northeastern Great Britain, and a large part of the Iberian and Scandinavian peninsulas. In South America, the hare was introduced for hunting purposes in Argentina and Uruguay in early 20<sup>th</sup> century (BONINO et al., 2010). Grigera and Rapoport (1983) found that the hare was restricted to the states of Rio Grande do Sul and Santa Catarina in the south of Brazil; however, the hares' range expanded particularly toward the north of the country, invading the whole state of Paraná and the western part of Sao Paulo and Minas Gerais (BONINO et al., 2010; COSTA; FERNANDES, 2010). The dispersal rates varied between 10 and 37km a year. The increase in population size may be caused by the reduction of potential predators due to hunting pressure, road kill, and habitat loss. If not properly managed, this exotic species has the potential to cause extensive damage to native wildlife, habitat, and agricultural resources. The European hare competes for food and habitat with *Sylvilagus brasiliensis* (Linnaeus, 1758), a native medium-sized rabbit (COSTA; FERNANDES, 2010). Although the number of hunters has declined due to the outlawing of commercial and game hunting in Brazil, subsistence hunting of hare by rural communities in Rio Grande do Sul, Brazil is still reported (LOURIVAL; FONSECA, 1997).

Authorized hunters killed seven hare (Instituto Chico Mendes de Conservação da Biodiversidade-ICMBION°28810-1) in Rio Grande do Sul (Southern Brazil). The collected animals were placed in individual plastic bags in coolers and transported to the Laboratory of Wild-Animal Parasitology of the Federal University of Pelotas, where they were necropsied and weighed. The body condition and nutritional status were determined after the examination of kidney fat quantity (BANKS et al., 1999). The gastrointestinal tracts of the seven *L. europaeus* were then removed, the organs opened, and washed in a 106- $\mu$ m mesh sieve. Each organ was examined under a stereomicroscope, and its

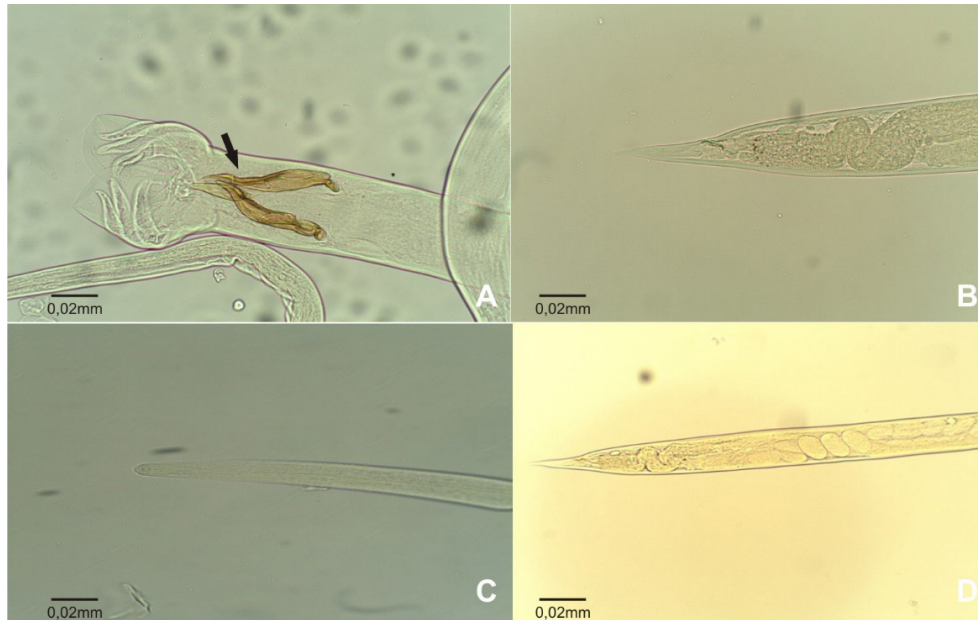
contents washed in order to collect any helminths. The nematodes found were fixed in ethanol (70%), clarified with Aman's lactophenol for identification in accordance with Allan et al. (1999) and Pinto (2004) and then photographed under an Olympus BX 41 microscope with an adapted camera system.

Six out of seven *L. europaeus* were parasitized (85.7%) by *T. retortaeformis*, which were found in the small intestines (Figure A-D). Among these parasites, 34 were males and 60 were females. Reports on endoparasites in hares are sporadic (especially recently), with none from southern Brazil. The European hare was found naturally infected with *T. retortaeformis* in many countries in Europe (BORDES et al., 2007; CHROUST et al., 2012; LUKEŠOVÁ et al., 2012; DIAKOU et al., 2014). In Chile (South America), 60% of hares found were naturally infected with *T. retortaeformis* (GONZÁLEZ-ACUÑA et al., 2005). In southern Brazil, Santiago et al. (1978) found *Trichostrongylus* sp., *T. colubriformis*, *Ostertagia* sp., and *Haemonchus* sp. in hare and *T. retortaeformis* in *Cavia aperea*. These two hosts share the same environment and food resources. The four known life cycles of *Trichostrongylus* species in ruminants present no significant difference compared with that of *T. retortaeformis*, except in the duration of the prepatent period. The parasite also has a tendency to migrate into the intestinal mucosa during the initial establishment phase, causing catarrhal enteritis, which maybe mild enough to avoid clinical detection (AUDEBERT et al., 2003; WIBBELT; FRÖLICH, 2005). These similarities in the lifecycles confirm the previously formulated hypotheses on the relationship between the parasites of the two host groups. In rabbits, infection rates vary seasonally and are influenced by the rabbit's age. Higher burdens are apparent in younger rabbits in summer months. Infection rate is also expected to increase in spring and summer as a result of immunosuppression associated with raised testosterone levels in males, immune systems of juveniles, and a combination of the periparturient rise in females sharing for aging

habitat with juveniles (CATTADORI et al., 2005; CORNELL et al., 2008). Our restricted number of individuals captured does not permit either intensity or prevalence estimates. We aim capture more hares to evaluate the consistency in prevalence rate and

the intensity and abundance of *T. retortaeformis* along with other helminthes found. In this work, we evaluated the presence of *T. retortaeformis* infection in hares from the southern area of Brazil, in the state of Rio Grande do Sul.

**Figure 1.** *Trichostrongylus retortaeformis*: (A) Posterior portion of male, the spicules are short, large, curved with two thin offshoots (arrow) (B) Posterior portion of female (C) Anterior portion of female. Posterior portion of female with eggs in utero; (12).



To our knowledge, this is the first study that has confirmed the presence of *Trichostrongylus retortaeformis* parasitizing *Lepus europaeus* in southern Brazil. Additional data is required to expand the knowledge.

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