

## ***Trichostrongylus calcaratus***

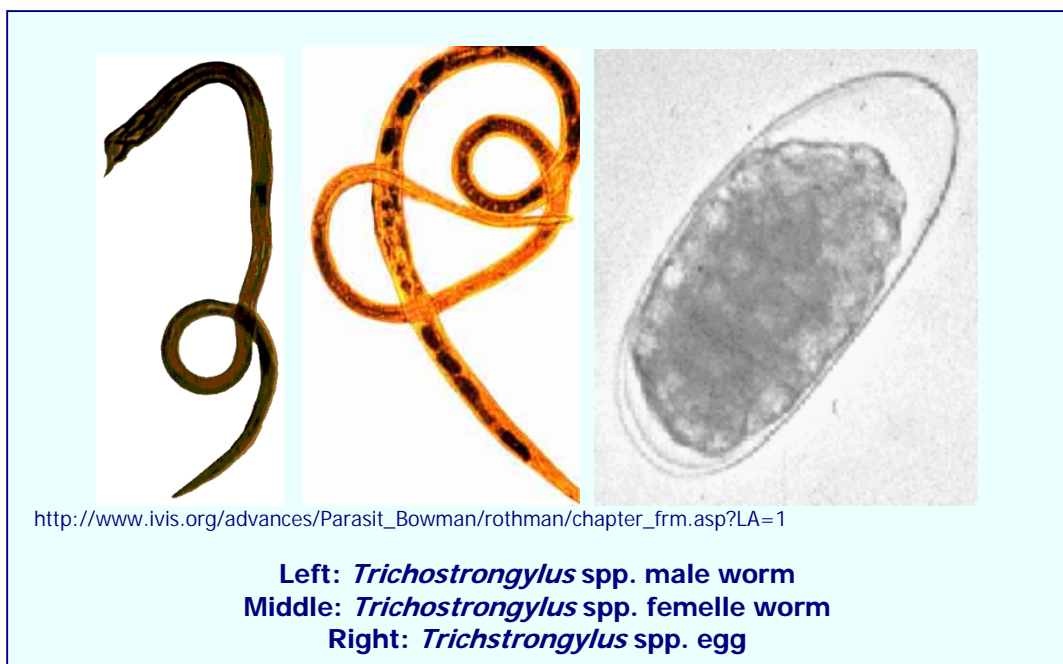
*Esther van Praag, Ph.D.*

*Trichostrongylus calcaratus*, and other species of *Trichostrongylus*, are commonly found in wild rabbits, especially in the eastern cottontail rabbits (*Sylvilagus floridanus*) in the USA, but are rare in house-rabbits. This parasite does not represent a public health danger.

*Trichostrongylus calcaratus* is located in the small intestine, or the colon of the rabbit; there is no known extra-intestinal migration. The rabbits become infested by eating food (hay, straw, fresh vegetables) that has been contaminated by the larvae.

The eggs produced by the female will pass in the feces and hatch outside the host. They measure between 80 and 90  $\mu\text{m}$ . They are usually already segmented when laid and develop into infective larvae within 6 days. The L<sub>1</sub> and L<sub>2</sub> stages of the larvae are microbivorous, L<sub>3</sub> stage, reached after 16-18 days, is non-feeding and infective by ingestion. L<sub>3</sub>, L<sub>4</sub> and L<sub>5</sub> are immature adults that develop into mature forms in the digestive tract. Their life cycle is direct, with no intermediate hosts.

The worms are slim, with small anterior ends and no buccal cavity. The male worm can be recognized by its asymmetrical dorsal ray and two short nearly equal spicules. The female has a vulva of about 1 mm, or slightly less, from



the tip of the tail.

Other members of the *Trichostrongylus* family have also been reported in rabbits. They can be differentiated by the size and the structures of the spicules.

#### *T. affinis*

It is encountered throughout the USA, in the cottontail rabbits (*Sylvilagus floridanus*) and snowshoe hares (*Lepus americanus*), rarely in house rabbits. It infects the cecum and the large intestine.

The eggs (average of 61 \* 37 µm) will pass in the feces, hatch and develop outside the host and the larvae become infective after 10-11 days. The adult worms have an average size of 5-7.5 mm for the males and 8.7-9.3 mm for the females. The male possesses spicules, while the female has a vulva at the posterior end.

Severe infection can cause a loss of weigh.

#### *T. retortaeformis*

This parasite is found only in Europe, British Islands and was introduced to Australia. It can be found in the small intestine of rabbits and hares (*Lepus europaeus*). Its life cycle is probably close to that of *T. affinis*.

The eggs are about 87 \* 33 µm. They are found in the portion of herbage with the least climatic changes, they will furthermore fail to develop when the maximum temperatures do not exceed 10°C. The larvae are able to migrate inside the vegetation to moist conditions. The adult worms measure between 6.8 and 8.4 mm long for the males and 9.6 and 10.4 mm long for the females. They are characterized by thin transverse and longitudinal grooves.

It is been reported that the pathogenesis of this nematode parasite is sufficient to reduce the population of rabbits. Clinical test include fecal flotation at 25 °C, 35 °C being lethal.

#### *T. ransomi*

It has been reported in *Sylvilagus floridanus* in Louisiana, USA, but it is not a common rabbit parasite. It is located in the small intestine. Its life cycle is unknown but probably close to that of *T. affinis*.

The eggs measure about 65 \* 33 µm. The adult worms are small: 2.2 - 3 mm for the males and 3 - 3,5 mm for the females.

#### *T. colubriformis (T. instabilis)*

It is a cosmopolitan of the small intestine of cattle and other ruminants, but lagomorphs are naturally infected with this parasite.



### Clinical Signs

The intrinsic pathogenic strength of these worms is weak and the infection is generally asymptomatic. Severe infections can, however, lead to a weight loss and/or anemia and aggravate other rabbit disorders, such as diarrhea and high eosinophilia and occasionally death. The mucous layer of the intestine is often irritated, which can lead to blood loss, sometimes the presence of nodules is observed.

*Trichostrongylus* sp. is diagnosed by fecal flotation for the presence of Strongyle- type eggs in the feces. The culture of these eggs to the L<sub>3</sub> stage is necessary for a specific identification. Adults can be specifically identified in the small intestine.

### Treatment:

|                       |               |   |
|-----------------------|---------------|---|
| <b>Benzimidazolen</b> | albendazole:  | 10 mg/kg                                      |
|                       | fenbendazole  | 10-20 mg/kg, PO, repeat in 10-14 days         |
|                       | thiabendazole | 100-200 mg/kg, PO                             |
| <b>Macroliden</b>     | ivermectin    | 0.2 - 0.4 mg/kg, PO, SC, repeat in 10-14 days |

### Further information

1. Anderson RC (2000) Nematode Parasites of Vertebrates. Their Development and Transmission. 2<sup>nd</sup> Ed. CABI Publishing, Oxon, UK.
2. Andrews CL, Davidson WR. Endoparasites of selected populations of cottontail rabbits (*Sylvilagus floridanus*) in the southeastern United States. J Wildl Dis. 1980; 16(3):395-401.
3. Audebert F, Cassone J, Hoste H, Durette-Desset MC. Morphogenesis and distribution of *Trichostrongylus retortaeformis* in the intestine of the rabbit. J Helminthol. 2000; 74(2):95-107.
4. Audebert F, Hoste H, Durette-Desset MC. Life cycle of *Trichostrongylus retortaeformis* in its natural host, the rabbit (*Oryctolagus cuniculus*). J Helminthol. 2002; 76(3):189-92.
5. Boag B. The incidence of helminth parasites from the wild rabbit *Oryctolagus cuniculus* (L.) in eastern Scotland. J Helminthol. 1985; 59(1):61-9.
6. Boag B, Iason G. The occurrence and abundance of helminth parasites of the mountain hare *Lepus timidus* (L.) and the wild rabbit *Oryctolagus cuniculus* (L.) in Aberdeenshire, Scotland. J Helminthol. 1986; 60(2):92-8.
7. Ciordia H BIZZELL WE, Porter DA, Dixon CF. The effect of culture temperature and age on the infectivity of the larvae of *Trichostrongylus axei* and *T. colubriformis* in rabbits and guinea pigs. J Parasitol. 1966; 52(5):866-70.
8. Duwel D, Brech K. Control of oxyuriasis in rabbits by fenbendazole. Lab Anim. 1981; 15(2):101-5.



9. Hoste H, Reilly M. Scanning electron microscopy of the jejunal and ileal mucosa of rabbits infected with *Trichostrongylus colubriformis*. *Ann Rech Vet.* 1988; 19(2):123-8.
10. Hoste H, Mallet S. Effects of size of *Trichostrongylus colubriformis* infections on histopathology of the mucosa along the whole small intestine in rabbits. *J Comp Pathol.* 1990; 103(4):457-65.
11. Hoste H, Mallet S, Koch C. *Trichostrongylus colubriformis* infection in rabbits: persistence of the distal adaptive response to parasitism after anthelmintic treatment. *J Comp Pathol.* 1995; 113(2):145-53.
12. Iason GR, Boag B. Do intestinal helminths affect condition and fecundity of adult mountain hares? *J Wildl Dis.* 1988; 24(4):599-605.
13. Molina X, Casanova JC, Feliu C. Influence of host weight, sex and reproductive status on helminth parasites of the wild rabbit, *Oryctolagus cuniculus*, in Navarra, Spain. *J Helminthol.* 1999; 73(3):221-5.
14. Prasad D, The effects of temperature and humidity on the free-living stages of *Trichostrongylus retortaeformis*. *Can. J. Zool.* 1959; 37: 305-316.
15. Purvis GM, Sewell MM. The host-parasite relationship between the domestic rabbit and *Trichostrongylus colubriformis*. *Vet Rec.* 1971; 89(5):151-2.
16. Strohlein DA, Christensen BM. Metazoan parasites of the eastern cottontail rabbit in western Kentucky. *J Wildl Dis.* 1983; 19(1):20-3.
17. Wiggins JP, Cosgrove M, Rothenbacher H. Gastrointestinal parasites of the eastern cottontail (*Sylvilagus floridanus*) in central Pennsylvania. *J Wildl Dis.* 1980; 16(4):541-4.

---

*The information and pictures on these pages may not be reproduced, or republished on another webpage, website, or elsewhere.*

**OCTOBER 2003**

updated: November 2005

