

# *Micronema deletrix* in the kidney of a horse

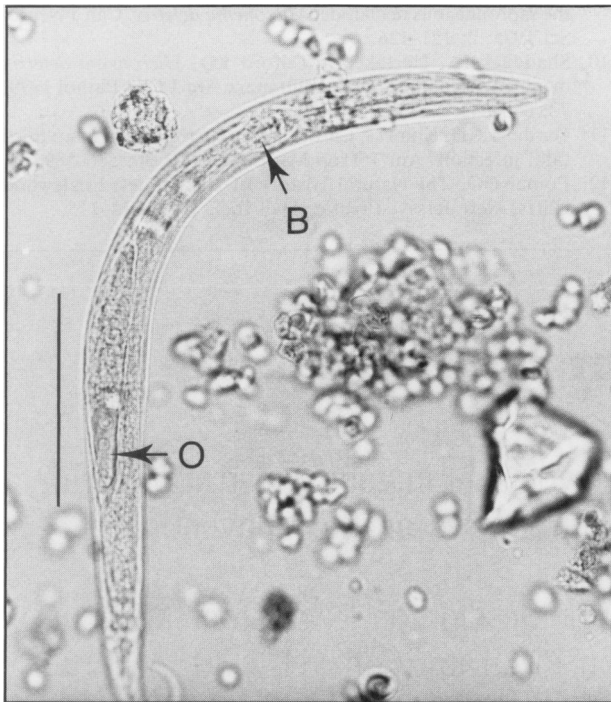
Gordon A. Chalmers, Murray J. Kennedy, W. Bryce Martin, Wilhelm F. Ettrich

Although most members of the Rhabditoidea are free-living saprophagous nematodes, some are true parasites, whereas others are facultative parasites. The Rhabditidae, and the Cephalobidae in which *Micronema* spp. are found, are mainly of the facultative group (1). The various genera are differentiated primarily on the form and armature of the stoma and glottoid apparatus (1,2). *Micronema deletrix* has been found in lesions in horses (3–8) and humans (9–11), likely as the result of accidental infections. We discuss herein the occurrence of *M. deletrix* in the kidney of a horse in Alberta, Canada.

The affected, unidentified horse was one of 145 killed during one day at a slaughter facility in Edmonton. Although most of these horses originated in Canada, 27 were known to have arrived from the United States. At inspection, personnel found that one kidney was enlarged, creamy white, and markedly fibrotic when sectioned. Other significant lesions were not found in

the carcass and it passed inspection. Portions of the affected kidney were fixed in 10% neutral buffered formalin and submitted to the Regional Veterinary Laboratory, Lethbridge. The fixed tissue was trimmed, processed routinely, embedded in paraffin, cut at 4  $\mu\text{m}$ , and stained by the hematoxylin and eosin (H & E) and Masson's trichrome methods. For identification, typical parasites were dissected from the fixed tissue, and cleared in lactophenol. A compound microscope and microprojector were used to measure these worms. On the basis of descriptions by Anderson and Bemrick (3), we identified the parasites as *M. deletrix* (Figure 1). All observed parasites were females; males or larvae were not found.

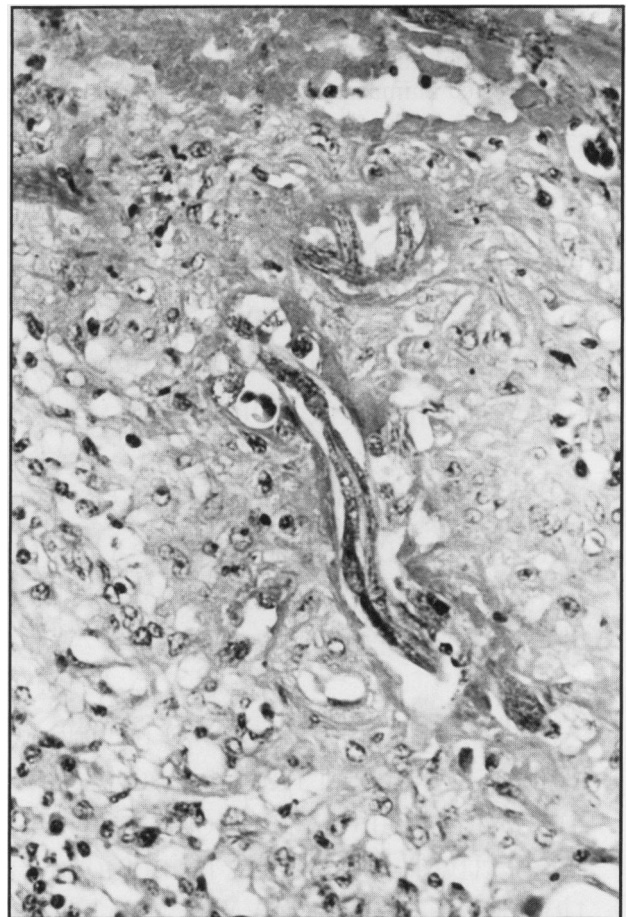
Histologically, the lesions consisted of multiple confluent granulomas surrounding numerous nematodes that were found in the capsule, parenchyma, and within dilated tubules (Figure 2). Usually, both intact and degenerated parasites were surrounded by amorphous, intensely pink-staining exudate and a pleocellular population of epithelioid macrophages, and many lymphocytes and plasma cells intermixed with eosinophils, as well as interstitial fibrosis.



**Figure 1.** Female *Micronema deletrix* dissected from the kidney of a horse. B = esophageal bulb; O = ovary. Scale bar = 50  $\mu\text{m}$ .

*Can Vet J* 1990; 31: 451–452

Regional Veterinary Laboratory, Animal Health Division, Alberta Agriculture, Postal Bag Service #3014, Lethbridge, Alberta T1J 4C7 (Chalmers); Veterinary Laboratory, Pathology Branch, Animal Health Division, O.S. Longman Building, 6909 – 116 Street, Edmonton, Alberta T6H 4P2 (Kennedy); Agriculture Canada, F.P. and I., Veterinary Inspection Operations, Alsask Processors, Box 6027, Station C, Edmonton, Alberta T5B 4K5 (Martin, Ettrich).



**Figure 2.** Granulomatous reaction surrounding *Micronema deletrix* in the kidney of a horse (H & E).

Multinucleated giant cells of both the Langhans' and foreign-body types were seen scattered throughout the tissue. Normal architecture of the kidney was virtually obliterated by the intense granulomatous response. In the absence of other tissues for examination, it was impossible to evaluate the extent of the infection in this animal.

*Micronema deletrix* is a free-living saprophagous nematode (12) found in association with decaying humus (3,12). It is an opportunistic parasite that usually feeds on bacteria, but is one that may have become somewhat independent of bacteria for its development (12). There are several reports of infection by *M. deletrix* in horses, including those from the United States (3-6), Switzerland (7), and the Netherlands (8). Infections in these animals were found in the nasal passages (3), maxillae and mandible (8), brain (4,5,7), kidney (4-7), lung (5-7), and lymph nodes (6,7), as well as stomach, adrenal glands, and femur (6). Parasitic meningoencephalitis caused by *M. deletrix* has also occurred in humans in Canada (9) and the United States (10,11). In Canada, the infection was believed to have been the result of a farm accident in which deep wounds in a five-year-old boy were contaminated with manure (9). In a 54-year-old male patient in the United States, the parasites were believed to have gained access to the body through decubital ulcers (10). The route of infection in a 47-year-old male patient was unknown (11). The basis for similar infections in horses is unknown but the role of similarly contaminated wounds cannot be discounted.

This is the first published report of *M. deletrix* in domestic animals in Canada. As the identity and origin of the affected animal were not known, it is possible

that the infection by *M. deletrix* may have been acquired in the United States rather than in Canada. CVJ

## References

1. Anderson RC, Bain O. No 9. Keys to genera of the superfamilies Rhabditoidea, Diostophymatoidea, Trichinelloidea and Muspicioidea. In: Anderson RC, Chabaud AG, Willmott S, eds. CIH Keys to the Nematode Parasites of Vertebrates. Farnham Royal: Commonwealth Agriculture Bureaux, 1982: 1-26.
2. Levine ND. Nematode Parasites of Domestic Animals and Man. 2nd ed. Minneapolis: Burgers Publishing Co., 1980: 59.
3. Anderson RV, Bemrick WJ. *Micronema deletrix* n. sp., a saprophagous nematode inhabiting a nasal tumor of a horse. Proc Helminthol Soc Wash 1965; 32: 74-75.
4. Rubin HL, Woodard JC. Equine infection with *Micronema deletrix*. J Am Vet Med Assoc 1974; 165: 256-258.
5. Alstad AD, Berg IE, Samuel C. Disseminated *Micronema deletrix* infection in the horse. J Am Vet Med Assoc 1979; 174: 264-266.
6. Simpson RM, Hodgins EC, Cho D-Y. *Micronema deletrix*-induced granulomatous osteoarthritis in a lame horse. J Comp Pathol 1988; 99: 347-351.
7. Pohlenz J, Eckert J, Minder HP. Zentralnervöse storungen beim Pferd, verursacht durch Nematoden der Gattung *Micronema* (Rhabdita). Berl Muench Tieraerztl Wochenschr 1981; 94: 216-220.
8. Keg PR, Mirck MH, Dik KJ, Vos JH. *Micronema deletrix* infection in a Shetland pony stallion. Equine Vet J 1984; 16: 471-475.
9. Hoogstraten J, Young WG. Meningo-encephalomyelitis due to the saprophagous nematode, *Micronema deletrix*. Can J Neurol Sci 1975; 2: 121-126.
10. Shaddock IA, Ubelaker J, Telford VQ. *Micronema deletrix* meningoencephalitis in an adult man. Am J Clin Pathol 1979; 72: 640-643.
11. Gardiner CH, Koh DS, Cardella TA. *Micronema* in man: third fatal infection. Am J Trop Med Hyg 1981; 30: 586-589.
12. Poinar GO. The Natural History of Nematodes. Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1983: 114-115.



## Convention Corner

Halifax '90 is quickly approaching. Have you sent in your registration form? Convention Corner brings to you the latest news on the Convention.

Registrants should note that the Scientific Session on Regulatory Medicine was incorrectly listed in the Convention Program (Can Vet J 30: A-10) as being held on Wednesday, July 11. In fact, this session will take place on Tuesday morning, July 10.

Additional accommodation for the convention is available at Dalhousie University's Shirreff Hall, a short 20 minute drive away from the Convention site. Single and twin rooms can be booked at a cost of \$29.70 and \$44.00 respectively; breakfast is included in the room rate. To obtain your registration form call the CVMA at 613-236-1162.