

Studies on this parasite include:

1. Bourque, A. et al. 2002. *Angiostrongylus vasorum* infection in 2 dogs from Newfoundland. Can Vet Journal 43: 876-879.
2. Jeffery, R. et al. 2004. *Angiostrongylus vasorum* and *Crenosoma vulpis* in red foxes from Newfoundland, Canada. Canadian Journal of Zoology 82: 66-74.
3. Bourque, A. et al. 2005. *Angiostrongylus vasorum* infection in a coyote (*Canis latrans*) from Newfoundland and Labrador, Canada. Journal of Wildlife Diseases 41 (4): 816-819.

Written in cooperation with the Newfoundland and Labrador Veterinary Medical Association.

Links

Canadian Cooperative Wildlife Health Center

<http://www.ccwhc.ca/>

Department of Environment and Conservation (NL)

<http://www.env.gov.nl.ca/env/wildlife/default.htm>

Newfoundland & Labrador Veterinary Medical Association

<http://www.nalvma.ca/>



For more information on this and other diseases of dogs, please contact your local veterinary clinic.

For more information on diseases of foxes and other wildlife, please contact the Animal Health Division or the Wildlife Division (Department of Environment and Conservation).

Other information pamphlets are available online from the Department of Natural Resources at:

<http://www.nr.gov.nl.ca/nr/publications/agrifoods/>

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French Heartworm Infection of Dogs and Foxes in Newfoundland



French Heartworm is the common name for a parasitic disease affecting foxes, dogs, coyotes and other members of the dog family. Caused by the nematode (worm) *Angiostrongylus vasorum*, this disease was first discovered in France during the mid 1800's. It is now known to exist throughout Europe. With the exception of infected animals imported from Europe and diagnosed in North America, the Island of Newfoundland is the only place in North America reported to have this parasite and its consequent disease.



The first recorded case of **French Heartworm** in Newfoundland was found in Aquaforte (Avalon Peninsula) in 1973. Exactly when and how it might have arrived from Europe is unknown. Red foxes from Europe may have been imported to the Island of Newfoundland for hunting purposes during the last hundreds of years, thus allowing infected animals to mix with the local wild foxes and introduce the parasite to the shared living environment. Likewise, the parasite may have been introduced by infected, imported domestic dogs, snails, or slugs by early settlers from Europe. Why this would not also have happened at other sites on the eastern coast of North America as well is unknown.

In late March 2003, the Island's first recorded case of French Heartworm in a **coyote** was discovered in an adult female that was hit by a vehicle in Witless Bay.

Recent research has shown the distribution of this parasite in Newfoundland. It has also suggested that the final distribution of the parasite on the Island may be limited by climate. Those areas, shown in the map (Figure 1), where the temperatures generally stay above -4°C may be most hospitable to this parasite.

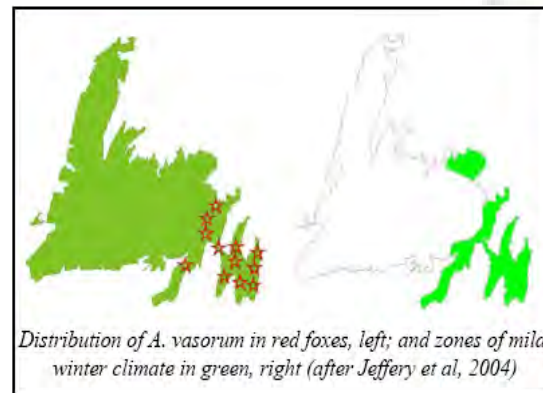


Figure 1

Life Cycle

This parasite goes through different stages of development; from an egg shed by the adult worm, through a number of larval stages, to the adult form. To complete its life cycle, the nematode must live in two different animals or *hosts*. The *final host* is the fox or dog (or coyote), and the *intermediate host* is a slug or snail. The final host houses the adult, and egg-laying part of this parasite's life cycle. The intermediate host, provides the parasite a place to develop through the three the immature (larval) stages of growth.

As an example, we will use the fox as final host and the slug as intermediate host. To become infected, a fox eats a slug which is infected and contains the immature larvae. The larva is released from the slug during the digestion process and penetrates the wall of the fox's stomach or intestine. Within a period of approximately 10 days, larvae migrate to the right ventricle of the heart. It is in the heart (and associated large blood vessels), the parasite becomes an adult and the females shed eggs. Blood vessels transport these eggs to the lungs where these eggs hatch to release immature larvae (referred to as L1). The fox coughs up these immature larvae which are then swallowed, passed through the body and released into the fox's environment in its feces.

Snails and slugs feed on the contaminated feces, become infected, the larvae develops within the intermediate host and the cycle begins again.

The Disease

The level of infection and factors that affect the animals' ability to defend itself against infection (species and breed variation, age and general health of the animal, or other existing diseases) are conditions that affect the severity of this disease. Clinical signs of French Heartworm infection are usually chronic, often seen months after initial infection by general problems such a decreased tolerance to exercise, laboured breathing, coughing, loss of appetite, and weight loss. It has been noted, when worms directly or indirectly go to other parts of the body including the kidneys and brain, more rapid and dramatic changes occur. In infected geographic areas, dogs kept together in kennels, or packs of hunting dogs have a greater chance of spreading the disease amongst themselves.

Dogs can be examined for this disease quite easily through the laboratory analysis of fresh feces. A single sample with no evidence of worms does not guarantee freedom from infection (as the worms are not shed on a continual basis). A series of tests will be able to indicate whether the animal is infected or not. Treatment is possible; however, care is taken to assure that the killing of the parasite does not cause further problems as they are cleared out of the body.