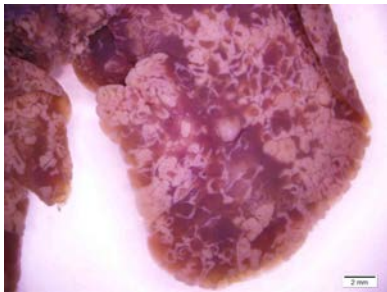




# Liver Worms in Rats: It's a rat eats rat world!

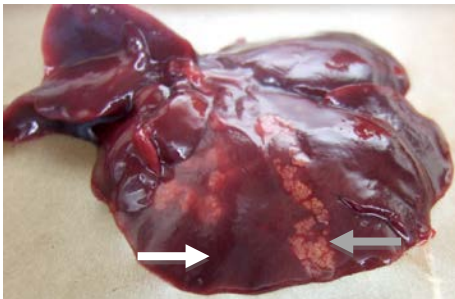
## What was the study about?

*Capillaria hepatica* is a parasitic worm that infects the liver of rats and other rodent species throughout the world.



Rat liver infected with *Capillaria hepatica* worms (white areas are areas of infection)

*C. hepatica* infection in rats causes inflammation and scar tissue formation in the liver. This parasite can infect people, although human infection is very rare.



Liver from a rat infected with liver worm *Capillaria hepatica* (grey arrow). Normal liver is indicated by the white arrow.

A rat becomes infected with *C. hepatica* when it accidentally eats eggs produced by the parasite. Since eggs are in the liver, the only way for eggs to reach the outside environment (and be available for consumption) is through decay of the rat's body after death or when predators or other rats eat the liver.

## How was the study conducted?

The goal of the study was to determine if rats collected in Vancouver are infected with *C. hepatica*, and to understand how this parasite circulates in rat populations.

Using humane methods, we trapped 725 wild rats and inspected the livers for small, white spots consistent with *C. hepatica* infection (see examples at left). Samples of these livers were further examined using light microscopy to confirm the presence of the worm (see image at right).

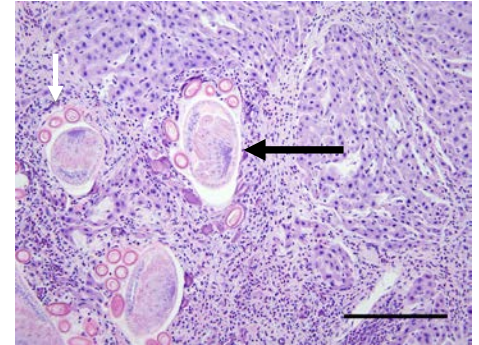
Knowing the location where each rat was trapped allowed us to analyze the frequency of liver worms among the different rat colonies.

## What did the study find?

Of the 725 rats collected, 250 were infected with *C. hepatica* (34%). However, the proportion of rats infected varied remarkably among the different city blocks (from 0 – 81%).

Rats trapped in the winter, spring, and summer were less likely to be infected compared to rats trapped in the fall.

The rats that were mature or had bite wounds were also more likely to be infected.



A microscopic image of a rat liver with worms. The black arrow indicates a worm cross-section while the white arrow points to eggs.

## What do these findings mean?

The association between infection, season, maturity, and bite wounds could suggest that specific social interactions/behaviors, possibly including cannibalism, may be important for parasite transmission.

We know that most urban rats only live for about a year but we don't know what happens to the bodies of these rats when they die.

Given that *C. hepatica* can be transmitted through cannibalism, we wonder if it is common for rats to eat their deceased brethren and if this helps to remove rat carcasses from the burrow system.

What we don't understand is why some blocks had lots of infected rats and others had none. This could indicate that different rat colonies have different behavioral characteristics (e.g., some colonies are more likely to engage in cannibalism than others).

**This document is a summary of the article:** Rothenburger JL, Himsworth CG, Chang V, Lejeune M, Leighton FA. *Capillaria hepatica* in wild Norway Rats (*Rattus norvegicus*) from Vancouver, Canada. *Journal of Wildlife Diseases*