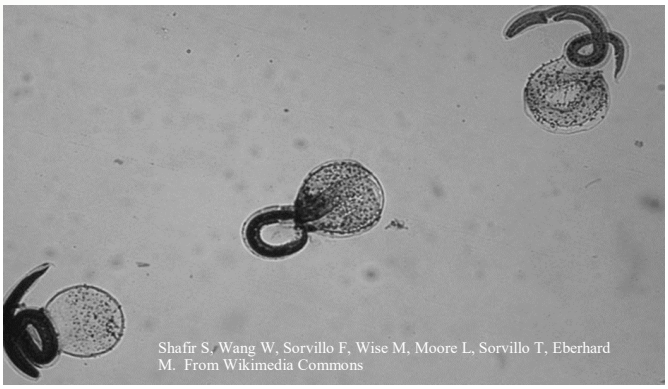
The Repulsive Racoon Round Worm

Racoon Roundworm - What is it?

Baylisascaris procyonis, more commonly known as the Racoon Roundworm, is a parasitic nematode found in the small intestines of racoons.[1] At first glance, these worms appear rather drab and unexciting. They have no pronounced or defining external features and are typically off-white or tan in colouration. Females of this species can grow to become 7-8 inches in length, while males only reach lengths of 3-4 inches.[2] Such a boring outward appearance may deceive many into thinking this worm is harmless, however, it can pack a mean punch if you are unfortunate enough to be infected by it.



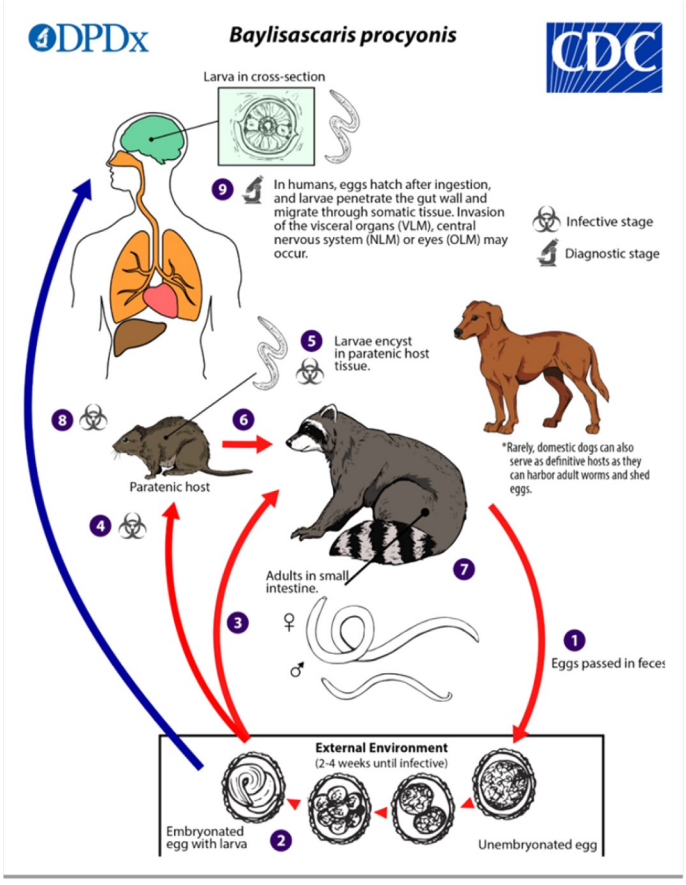
A microscope image of *B. procyonis* larvae hatching from their eggs.

Life cycle and Mode of Infection

Female worms can lay an astounding 100,000 eggs per day, which are shed from the intestines of infected racoons when they defecate.[1] One study published in the *Journal of Emerging Infectious Diseases* has shown that the hardy eggs of *B. procyonis* are capable of surviving in dry environments, sweltering temperatures of up to 62ºC, and freezing temperatures of -15ºC or lower.[3] The eggs can withstand these extreme environmental conditions for long periods of time, so even our harsh Manitoba winters do not necessarily kill these eggs.

Once shed from their racoon host, the worms begin to develop within the eggs over the course of two weeks into the infective larval stage.[4] At this point, the eggs can take a short cut through their own life cycle and directly infect their normal definitive racoon host, or they can infect what is called a paratenic host, such as a mouse or squirrel. A paratenic host is an organism that can serve as a host to a parasite, however no further development of the parasite occurs within that host.[5] The paratenic host is also not required by the parasite to complete its life cycle.

The paratenic host becomes infected after consuming feces contaminated soil, food, or water. From here, the eggs hatch within the small intestine, releasing the infectious larvae. These larvae then burrow through the intestinal wall and enter the blood stream, where they are able to migrate to different parts of the body and are commonly referred to as larval migrans.[1]



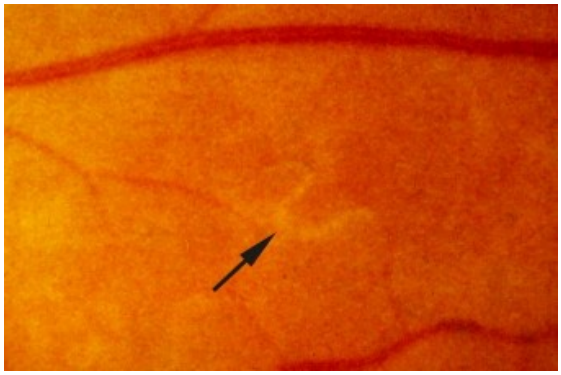
The life cycle of the Racoon Roundworm, *B. procyonis.* This parasite requires racoons to complete it's life cycle. Other animals, such as humans and mice can serve as paratenic hosts for this worm.

Life cycle continued...

The infected animal's body will encapsulate the larval migrans in a cyst in an attempt to isolate the parasite and prevent it from spreading to other tissues. If the infected paratenic host is then consumed by the definitive host (i.e. racoon), the larvae resume development in the mucosal lining of the racoons intestine, where they develop into adults and eventually produce eggs and the cycle repeats.

Why you Should be Leery of These Worms

This worm is of concern to humans, as an infection can prove to be fatal. Humans serve as paratenic hosts, meaning the larvae do not inhabit the gut, but rather migrate out of the intestine and into other tissues.[2] There are three potential locations where the larvae invade within the body; the eyes (ocular larval migrans), which can result in permanent blindness, visceral organs such as the liver (visceral larval migrans), or the nervous system and brain (neural larval migrans). The larvae invade and disrupt the normal function of the tissues they migrate to, resulting in severe complications. Ocular and neural migrans tend to cause the most severe and irreversible damage to humans.[1]



Larval migrans found in the eye of an individual infected with *B. procyonis*.[7] Larvae can migrate within their host to the eyes, visceral organs, and nervous system, often causing irreversible damage to the tissues.

According to the CDC, there have been 25 reported human cases of *B. procyonis* infections in the United States, however this number could be much greater due to misdiagnosis or asymptomatic cases. As of 2018, there have been six reported fatalities in humans from this parasite.

Symptoms, Diagnosis, and Treatment

Symptoms

The symptoms of infection begin to develop roughly one week after the eggs are consumed.[2] The severity of the infection depends on where the larvae migrate to, as well as how many eggs were consumed. Symptoms of a *B. procyonis* infection can include:

- Nausea
- Loss of muscle control and coordination
- Decreased energy levels and attentiveness
- Blindness
- Coma
- Death.

Photo source: Campanha de combate ao tracoma, CEMEB Maria Zibina, from Flickr

Albendazole is a drug used to treat some people with *B. procyonis* infections. This drug, however, has limited success in curing the infection.

Diagnosis

Diagnosis of an infection is difficult, as the symptoms often mimic other conditions and so are easily misdiagnosed. Tissue and blood analysis can be used to diagnose an infection, however, since it is relatively uncommon, doctors do not often test for this parasite.[2]

Treatment

Treatment options for a *B. procyonis* infection are limited, as there is no known cure for this parasite. A drug known as Albendazole can be used in some cases to treat this infection, however it is not 100% successful.

Who is at Risk?

Racoons are known as peridomestic animals, which means that they thrive in environments close to human populations.[2] As urbanization increases and we expand our cities into wildlife habitats, the risk of a *B. procyonis* infection increases.[6] Racoon populations tend to defecate in areas known as latrines, which are most typically found in the leaf litter at the bases of trees, decks, children's sandboxes, and poorly sealed attics of houses where racoons can hide within.[2] These latrines are hot spots for *B. procyonis* eggs, as they are passed in the feces of racoons.

Certain subsets of the population tend to be more at risk for an infection with this worm due to higher chances of exposure to racoons and their latrines.[2] The individuals with highest incidence of infection are young children, as they often consume eggs by putting contaminated objects in their mouths. High incidences of infection are also seen in individuals with professions that place them in direct contact with infected racoons, such as wildlife rehabilitation workers, hunters and trappers.

B. procyonis infections are most commonly reported in children, as they are most likely to put contaminated toys and objects in their mouths.

How to Minimize Your Risk of Infection

Although the instance of *B. procyonis* infections are relatively low, you should still be cautious and try to minimize your risk of infection as much as possible. You can minimize your risk of infection by creating environments that are not appealing to racoons. Sealing trash cans, removing standing water, covering children's sand boxes, closing off attics and sheds, cleaning up leaf litter, and removing brush from your property can discourage racoons from setting up camp near your home.[2] If you find a racoon latrine on your property, do not attempt to clean it up by yourself if you are not familiar with proper and safe cleaning procedures (cleaning instructions can be found here https://www.cdc.gov/parasites/baylisascaris/prevent.html). Lastly, do not try to pet or lure wild racoons into your home, no matter how cute they may be! These trash bandits may be harbouring this nasty worm underneath their cute and fluffy exterior.

You can lower your risk of infection by sealing trash cans, covering children's sand boxes, removing standing water, closing off attics and sheds, clearing brush and leaf litter from your property, and by avoiding contact with racoons.

References

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