



THE NORTHEAST WILDLIFE DISEASE COOPERATIVE

<http://sites.tufts.edu/nwdc>

Raccoon Roundworm

Cause

Raccoon roundworms (*Baylisascaris procyonis*) are common large parasitic worms known as ascarids that inhabit the small intestines of raccoons. The adult worms are white to tan in color and range from about 10 to 20 cm (4-8 in) in length.

Significance

Baylisascaris causes disease in humans when infective eggs (eggs that contain a fully formed larvae) are ingested and the larvae, the immature form between the egg and the adult, migrate throughout the body. This disease, also known as Larval Migrants (LM), can result in skin irritation, vision problems, or neurological disease that can be fatal. This disease is more likely to occur in children who may put soil or animal waste in their mouths. A great tragedy of LM in children occurs when an eye is removed because a larva has entered the eye and is mistaken for a cancerous condition. Hunters, trappers, wildlife rehabilitators, and other people who may handle raccoons or spend time in raccoon habitats are also at risk. To avoid contracting *Baylisascaris* (as well as other diseases), people should avoid contact with raccoons or raccoon feces, and should wash their hands after working or playing outdoors.



Photograph courtesy of the Michigan Department of Natural Resources

Hunters, trappers, and others who must handle raccoons should wear gloves while doing so, and should wash their hands afterwards.

Species Affected

Many species of mammals (including humans) and birds can become infected with *Baylisascaris* larva; small vertebrates including mice, rats, squirrels, rabbits, and birds are commonly infected with the larval form of the raccoon roundworm. Raccoons are the primary host for this parasite, so adult worms typically only develop within raccoons and closely related species such as ringtails, kinkajous, and coati mundis. Adult raccoon roundworms are occasionally found within the small intestines of domestic dogs. Fatal or severe central nervous system disease due to *Baylisascaris* has been observed in several species including woodchucks, nutria, beaver, mice, squirrels, foxes, armadillos, porcupines, pigeons, and turkeys.

Distribution

Raccoon roundworm is found in the United States, Europe, and Japan. There is some evidence that it may also occur in South America. This parasite is known to infect raccoons in the mid-Atlantic, northeastern, and Midwestern United States as well as in California and Texas, though the disease should be suspected wherever raccoons are found. Raccoon roundworms are most common in the mountains of Virginia, Kentucky, and West Virginia. The highest prevalence of raccoon roundworm (at 72%-82% or higher) in the United States occurs in the northeast, Midwest, and west coast regions, while the lowest prevalence (0-22%) occurs in the southeast.

Transmission

Baylisascaris eggs are shed in the feces of infected raccoons. An infected animal may shed millions of eggs each day. The eggs are extremely resilient and can survive in the environment for several years. Once the eggs are excreted in feces, larvae will develop inside of

the eggs within 11 to 14 days under adequate environmental (temperature and humidity) conditions. These eggs are then known as “embryonated”, and can infect a new host. Raccoons can become infected by ingesting embryonated eggs, which will develop into adult worms within the small intestine. Young raccoons may ingest infective eggs that are attached to the mother’s teat or fur. If another animal, such as a rodent or bird, ingests the embryonated eggs, the larvae will wander in the animal’s body (see previous reference to Larval Migrans or LM) and can encyst (create and live in a protective structure) within tissue, but will not develop into adult worms. These animals are known as intermediate hosts because the hosts themselves do not develop disease, but raccoons can become infected by ingesting animals containing encysted larvae.

Like these other animal species, humans can experience larval migrans following ingestion of infective *Baylisascaris* eggs.

Clinical Signs

Clinical signs are rarely observed in raccoons infected with *Baylisascaris*. However, intestinal obstructions and subsequent ruptures may occur in raccoons infected with large numbers of roundworms.

Small mammals and birds acting as intermediate hosts may show clinical signs due to tissue damage caused by migrating larvae. Infected animals may exhibit unusual behavior and even fatal neurological disease when larvae migrate through the brain and spinal cord. These animals may initially develop a head tilt and have difficulty walking, which may progress to a loss of fear, circling, recumbency, coma, and death. Lung and liver damage may occur as a result of larval migration. Eye disorders may also be observed. Animals infected with small numbers of migrating larvae may not show any clinical signs.

Diagnosis

In raccoons, *Baylisascaris* may be detected either by observation of the eggs in feces using fecal

floatation methods, or by observation of adult worms in the small intestine upon necropsy. In intermediate hosts, larvae may be observed microscopically in tissues during post-mortem examination.



Unembryonated and embryonated (respectively) *Baylisascaris procyonis* eggs
images courtesy of dpd.cdc.gov

Treatment

Raccoons and domestic animals can be treated successfully with anthelmintics (de-wormers). There are currently no medications that reliably kill migrating larvae, so treatment of intermediate hosts involves supportive care if necessary.

Management/Prevention

Management of raccoon roundworm should focus on prevention of transmission to humans and pet animals. It is unlikely that this disease will be eliminated because the parasite commonly infects wild raccoons without causing clinical illness, and the eggs are highly resistant in the environment. Raccoons also use latrines (a communal defecation site repeatedly used by many raccoons), resulting in build-ups of large amounts of feces and a high density of *Baylisascaris* eggs. These latrines are often located in attics, on rooftops, in woodpiles, under decks and on lawns, increasing the chances of human infection. Placing baits containing anthelmintics in these latrines is being explored in hopes of decreasing the prevalence of *Baylisascaris* infection in wild raccoons. Areas contaminated with raccoon feces should be cleaned thoroughly and the feces should be burned. Wildlife rehabilitators working with raccoons should remove and burn feces promptly before the eggs have time to embryonate. Rehabilitators may also consider treating raccoons with anthelmintics.

Suggested Reading

Centers for Disease Control and Prevention (CDC). 2011. Parasites– *Baylisascaris* infection.

www.cdc.gov/parasites/baylisascaris

Kazacos, K. R. 2001. *Baylisascaris procyonis* and related species. Pages 301–340 in W. M. Samuel, M. J. Pybus, and A. A. Kocan, editors. Parasitic diseases of wild mammals. Iowa State University Press, Ames, USA.

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