

Hookworms

Another common intestinal parasite is the Hookworm. The two most common species of this parasite that affect dogs are *Ancylostoma caninum* and *Uncinaria stenocephala* while the most common species to affect cats is *Ancylostoma tubaeforme*. The “head” end has a large mouth cavity that is lined with either teeth or cutting plates while the tail end of an adult hookworm is bent giving it a fishing hook appearance. Adult worms can range in size from 10 to 20 mm long by 0.4 to 0.5 mm wide. Hookworm eggs range in size from 55 to 90 nanometers depending on the species.



Adult hookworms live in the small intestine of the host animal and their eggs are shed in the animal's feces. Once the eggs are shed into the environment they develop and hatch into infective larvae. This stage takes approximately 2 to 9 days depending on environmental conditions such as temperature and humidity. The ideal environment for this stage of the hookworms' life cycle is in warm, moderately moist, aerated soil that is not in direct sunlight. Freezing temperatures will kill *Ancylostoma* species' eggs but *Uncinaria* species' eggs are hardier and can survive in lower temperatures. Hookworm larvae cannot persist in the environment long term like other intestinal parasites can. Under ideal conditions they can survive in the soil for a few months.



Dogs and cats become infected with hookworms several different ways such as ingesting infective larvae from a contaminated environment, through the larvae penetrating their skin, or through the ingestion of other hosts including cockroaches that have the larvae present. Puppies can become infected with hookworms when they ingest larvae while nursing from their mothers while kittens do not become infected with hookworms in this manner. Once ingested some of the hookworm larvae can lie dormant in tissues other than the GI tract and can become active after a while and either reinfect the animal or migrate to the mammary tissue in a nursing dog to infect the puppies. When hookworms penetrate the skin they move via the lymph system to the veins and lungs. They then penetrate the lung tissue and migrate up the respiratory tract to the trachea where they are then swallowed and travel through the GI tract to the small intestine where they attach and mature. Respiratory signs and pneumonia can be seen in animals with large numbers of larvae passing through the lungs. When the hookworms penetrate the skin they can cause dermatitis with redness, itching and papules which can be seen on the animal's feet, particularly in between the toes. The host animal will start shedding eggs in their feces after 2 to 3 weeks, however puppies that ingested hookworm larvae while nursing can start shedding eggs after 10 to 12 days.

Once in the small intestine the hookworms attach with their large mouth cavity. They then start to secrete enzymes and anticoagulants to digest the lining of the intestine which allows the hookworms to digest blood. Because the hookworms have a hard time absorbing hookworm burden is high chronic anemia due to blood of the intestine and reattach the worms have previously the host's intestine.



damage the lining of the small intestine the host animal nutrients and can also experience diarrhea. If the host's enough they can suffer from either sudden onset or loss. Hookworms can also detach, move to a different area starting the process all over again. Ulcers will form where been. An adult hookworm can live for 4 to 24 months in

The only way to determine if a dog or cat has hookworms is to check a fecal sample for intestinal parasites. Checking a stool sample annually is recommended to ensure that no intestinal parasites are present. Signs of hookworm infections can mimic the signs of several different diseases and conditions. Signs include failure to gain weight, weight loss, poor hair coat, dehydration, dark tarry diarrhea, anemia, anorexia, weakness and pale mucous membranes. A severe hookworm infection can be a life-threatening condition due to

the amount of damage done to the intestine and the amount of blood loss. Treatment of hookworms is with dewormers, but it can be hard to completely clear the dog or cat of hookworms because of the dormant larvae present in other tissues and persistence in the environment. Today most heartworm preventative products such as Heartguard and Revolution also have deworming components to them. Monthly heartworm preventatives for both dogs and cats is highly recommended and effective. Puppies and kittens should receive routine dewormings every 2 weeks starting at 2 weeks of age. Puppies and kittens require more frequent dewormings because of two reasons; first they are being frequently reinfected with hookworms through nursing and environmental exposure and second they often have hibernating larvae present in tissue other than the GI tract. With a severe worm burden supportive therapies such as electrolyte and fluid therapy, iron supplementation, keeping the patient warm, feeding a high protein diet and possibly even blood transfusions may be necessary.

Having an appropriate deworming schedule for young puppies and kittens will help to minimize the number of hookworm larvae that contaminate the environment. Also keeping cats indoors and dogs on leashes will reduce their opportunities to hunt and ingest of infected prey and reduce contact with contaminated environments. Promptly removing feces of pets from the back yard or litter box will help to prevent hookworm eggs from hatching and larvae developing and migrating to contaminate the environment. This is especially important if your pet has been diagnosed with hookworms.

Hookworms are considered to be a zoonotic parasite meaning that animal hookworms can infect humans. They do not mature to adults or produce eggs in humans. They most commonly cause cutaneous larva migrans in humans. The larvae migrate in the skin resulting in very itchy serpentine lesions that are usually self limiting. People most commonly come into contact with the hookworms of dogs and cats through direct skin penetration of infective larvae. Occasionally *Ancylostoma caninum* can migrate to the intestine and infected people may experience severe abdominal pain. Most cutaneous larva migrans and other hookworm associated syndromes are seen in the southeastern and Gulf Coast states and affect people that commonly come into contact with contaminated soils such as electricians, plumbers, exterminators, and other workers who crawl beneath buildings as well as farmers, gardeners and sunbathers. Cutaneous larva migrans is also the most common travel related skin infection of tourists that travel in tropical areas. To prevent contact with hookworms people should cover childrens sand boxes when they are not in use. Also people who like to garden should wear shoes and gloves. People whose job requires occasional contact with moist soil for extended periods of time can cover contact areas with waterproof liners.



For more information contact Cedar Grove Veterinary Services at (920) 668- 6212. You can also find out more at <http://www.petsandparasites.org/dog-owners/hookworms/> or <http://www.veterinarypartner.com/Content.plx?P=A&S=0&C=0&A=1530> .