

## **Parasitic Zoonoses and Diagnostics for Dogs**

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Roundworms, hookworms, Giardia and Campylobacter are 4 of the most common pathogens of dogs that could find their way into human health, making them potential zoonotic diseases. From the standpoint of a veterinary clinician, the front line of defense against them is knowing when, where and how to look at a canine fecal sample to learn if they are present. From the standpoint of a dog owner, or the general public, knowledge is also the frontline of defense against infection. If the general public were more aware of these issues, there would be greater acceptance by the public at large of the responsibility to clean up after their dogs in public places as well as doing the same thing in their own backyards.

Roundworms--often called ascarids(*Toxocara canis*) and hookworm (*Ancylostoma*) , are common intestinal parasites of dogs and cats. Not only can ascarids and hookworm cause disease in their respective hosts, they are also well known causes of larva migrans in humans, especially children. Roundworms cause ocular larva migrans (OLM) a preventable blindness usually in children.

Ascarids, because of the occurrence of both Transplacental and Transmammary transmission, puppies are usually born with or acquire ascarid infections early in life. Kittens do not become infected in utero, but like puppies can acquire ascarids through the queen's milk. Infections can develop within the first two and a half to three weeks of life. It is thought that this left untreated can also cause fading puppy syndrome. Left untreated, this can lead to widespread contamination of the environment with infected eggs. Each roundworm female will pass 100,000 eggs per day, and they will remain in the soil for a decade or more. Three weeks to three months is when there is major shedding of these eggs. This is why one must prevent them from getting into the soil first by picking up stool immediately -- before rain is able to wash the eggs into the soil...and they can also be carried by earthworms.

Puppies will have a "pot belly" appearance, and should be dewormed beginning at two weeks of age--repeated at four, six and eight weeks of age then monthly heartworm preventative medication. Roundworms are essentially a puppy to juvenile infection.

One must remember, if the puppy has loose stool, diarrhea, worming treatment will be less effective due to passage through the intestine too quickly.

Hookworms are a life long problem and the "larval leak" phenomenon is usually forgotten after vet school. Hookworm eggs start at two weeks. Both puppies and kittens acquire hookworm infestations through ingestion of or skin penetration by infective larvae, or from infective larvae passed on in their dam's milk. Hookworms suck large amounts of blood from their hosts and infected puppies can develop a rapidly severe anemia. Intestinal infections can occur as early as two to three weeks of age, leading to environmental contamination with infected larvae.

Once treated, the puppy should remain on monthly heartworm medication year round.

Coccidia--can be a big problem, but is usually just a nuisance and is expected.

Host immune response in older dogs is another problem.

Coccidia are small protozoa's that multiply in the intestinal tracts of dogs and cats most common in kittens and puppies less than six months of age. A puppy is not born with coccidian organism in its intestine. However, once born the puppy can be frequently exposed to it...they are swallowed when a pet grooms, licks the dirt off itself.

Stress plays a role in the development of coccidiosis. It is not uncommon for a healthy puppy to arrive at its new home and develop diarrhea several days later leading to the diagnosis of coccidia

This should be told to the new owners.

Coccidia in puppies can be treated with albion, but do not mistake treatment as a complete riddance. Drugs knock back host immune response.

Sulfas or ponazuril. Ponazuril is marketed for horses with EPM and is effective against coccidian of puppies, but it is not licensed for use.

Whipworms (Trichuris) infections do not appear until at least three months of age. Contaminated soil is the source of infection. Eggs passed by females remain in the soil, where they can survive for years. Whipworm eggs are impossible to attack chemically in the ground..Trichuris eggs are heavier than roundworms and coccidia, thus often missed by poor fecal exams, such as the passive float method. Infestations are usually difficult to prove since the female whipworm only periodically lays eggs. So an examination of even several stool samples may not reveal the presence of whipworm.

## Heartworm

- Heartworm Microfilariae are ingested by feeding female mosquitoes and after going through 2 molts are infective in approximately 2 weeks.
- They are deposited on the skin during subsequent feeding, migrate through the bite wound into the host, molting again within 2 weeks (1 to 12 days) postinfection to the subcutaneous, adipose and muscular tissues.
- This immature adult (1 to 2 cm in length) soon enters the vascular system, migrating to the heart and lungs, where final maturation and mating occur. Mature male adults range from 15 to 18 cm and females from 25 to 30 cm.
- Under optimum conditions, completion of the life cycle takes 184 to 210 days.
- The canine host typically becomes microfilaremic 6 to 7 months after infection.
- These microfilariae are then ingested by feeding mosquitoes, completing the life cycle.
- Heartworms live approximately 5 to 7 years in the dog.

## Site of Infection

- Infective larvae (L3) enter the skin of the potential host through the bite wound of the female mosquito.
- Heartworm infection can be easily prevented with a number of macrocyclic lactone preventives
  - Current available preventives include:
    - Heartgard for dogs by Merck
    - Interceptor by Ciba-Geigy --raised dosage for whip and hook worm
    - Heartgard plus by Merck
    - Sentinel by Novartis--added flea control
    - Revolution by Pfizer.
    - Selamectin heart worm, round worm, hookworm, fleas and ticks..but not 100% . It is the only company to acknowledge that it is not 100% against heartworm. This could

be used by breeders to reduce transplacental and trans mammary transmission of round and hookworm. The label does not state control of these.

- The FDA cannot decide if others are 100% effective.
- Ivermectin is effective for heartworm control as well as roundworm and hookworm.  
Does not get whipworm
- Misconception: Being a monthly program makes people think the treatment is 30 days, which it does not.
- Treatment kills what is on board since the last treatment 30 days ago. This is why it is strongly recommended for year round treatment.
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