

Roundworms in Dogs and Puppies

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Toxocara Canis and *Toxascaris Leonina*: Roundworms of Dogs and Puppies

There are two species of roundworms affecting dogs and puppies: *Toxocara canis* and *Toxascaris leonina*. Both are treated with the same medication protocol, so when eggs are seen on a fecal flotation exam, it may not be necessary to determine which species is present.

While *T. canis* infects only dogs, *T. leonina* is also able to infect cats and kittens. Treatment protocols for both worm species are the same, but if there are feline household members, it may be useful to specifically identify the roundworm species involved so as to determine which pets are potentially at risk. We will cover each species of roundworm separately, even though treatment is the same for each, their biology is different.

Fresh feces are not infectious. Fresh feces do not contain the infectious stage of *T. Canis*. Worm eggs require 30 days to become infectious, meaning it is contaminated dirt that is infectious to people and animals.

Toxocara Canis: How Infection Occurs

T. canis is the most common roundworm of the domestic dog, and it is not able to infect cats. Its presence can go completely without symptoms although more likely it is going to create some degree of diarrhea and possibly vomiting or general unthriftiness in its canine host. Its life cycle is somewhat complicated, as we are about to see.

- Consuming infective worm eggs from soil in the environment (generally through normal grooming//self-licking).
- Nursing from an infected mother dog.
- Consuming a prey animal (usually a rodent) that is carrying developing worms.
- During embryonic development when an infected mother dog is pregnant (most puppies are infected this way).

Cats cannot be infected with *Toxocara canis* but [humans can](#).

Life as a Roundworm

Toxocara Canis has one of the most amazing life cycles in the animal kingdom. It is helpful to understand this life cycle if effective treatment and prevention are to be pursued. It gets complicated so we'll start with a short synopsis.

It all starts with an infected dog pooping on the ground, with an infected pregnant dog, or with an infected prey animal. In each of these scenarios, an uninfected dog or puppy comes into contact with a roundworm larva that has developed to its infectious stage. The uninfected dog becomes infected by licking contaminated dirt from its feet, from eating an infected prey animal, from developing in its infected mother's womb, or from nursing its infected mother's milk. The young roundworm migrates through the new host's body, ultimately settling in the intestine where it mates and new eggs are produced. The cycle begins again.

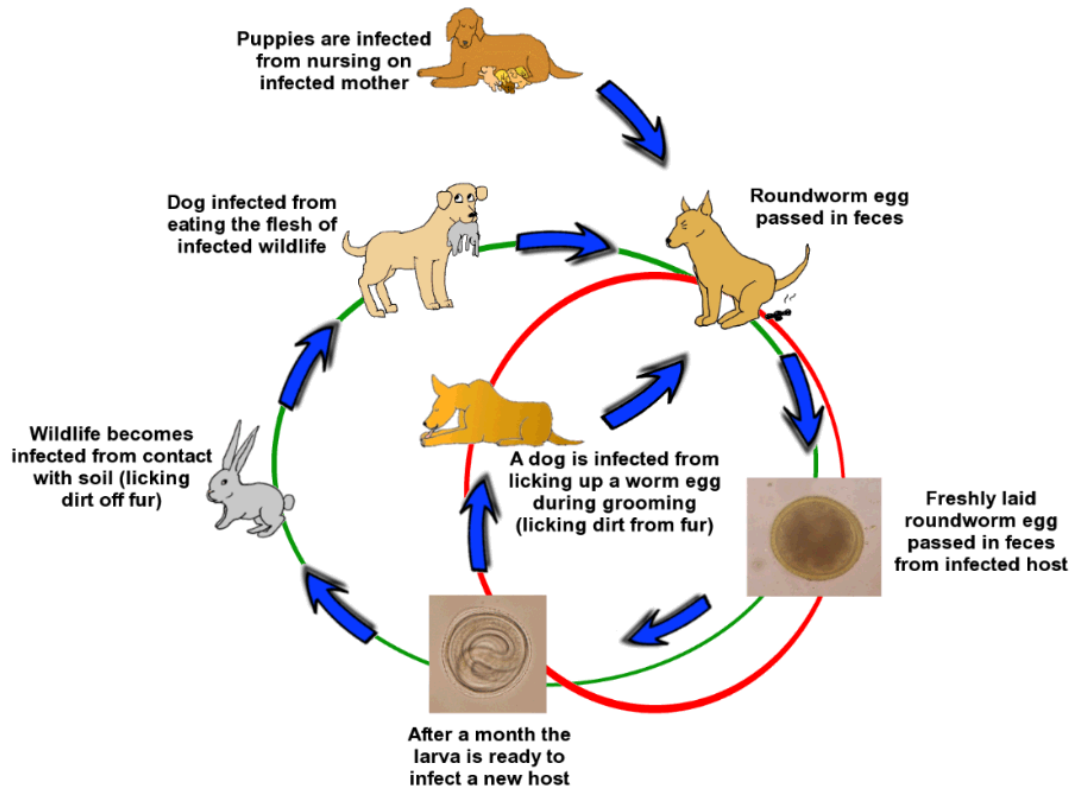
The biggest "take-home" points are these:

- Fresh feces on the ground are not infectious, at least with regard to *Toxocara*, because the worm egg out in the world needs a good month to develop to an infectious stage.
- Because the whole body migration drops worms into the intestinal tract over time, one deworming is not enough. Be sure not to skip the second (or even third) treatment. Even better, use a monthly parasite control product that includes a dewormer.
- Puppies can be assumed to be infected with roundworms when they are born.
- Worm eggs can live months to years in contaminated soil.

Step

One: Eggs

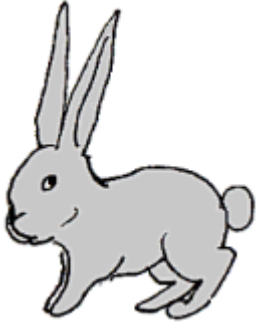
Contaminate



Photocredit for fresh egg: Joel Mills via Wikimedia Commons; Photocredit for developed egg: Flukeman via Wikimedia Commons; all the rest: original graphics by marvistavet.com

Environmental Soil

Toxocara eggs are passed in the host's feces where they can be detected if a fecal sample is tested. Feces, and any worms eggs therein, are deposited on the ground where they are rained on, dried by the sun, stepped on, etc. The worms are developing during this time and are not infectious to new hosts until they have developed for



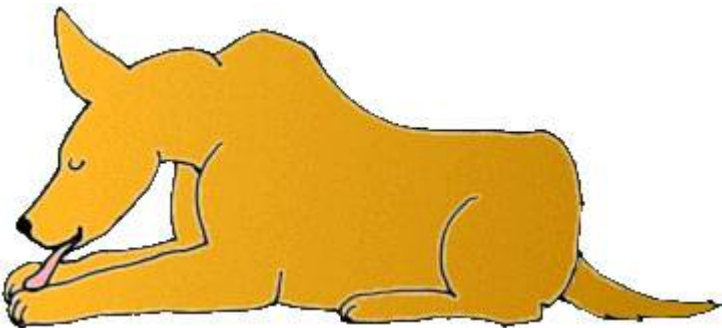
Graphic by MarVistaVet

about a month. By that time, the original feces has long since melted away into the ground and is no longer evident. It is the dirt that contains infectious eggs. *Toxocara* eggs are famous for weathering harsh environmental conditions. Eggs can remain infective for months to years.

Fresh feces are not infectious. Soil contaminated with feces is infectious.

Step Two: A Host Eats an Egg and the Larva Encysts

The egg containing what is called a second stage larva is picked up from the dirt by a dog or by some other animal, usually in the course of normal self-grooming. The egg hatches in the new host's intestinal tract and the young worm burrows its way out of the intestinal tract to encyst in the host's other body tissues. If the new host is a dog, the life cycle proceeds. If the new host is a member of another species, the larvae wait encysted until the new host is eaten by a dog.



Graphic by MarVistaVet.com

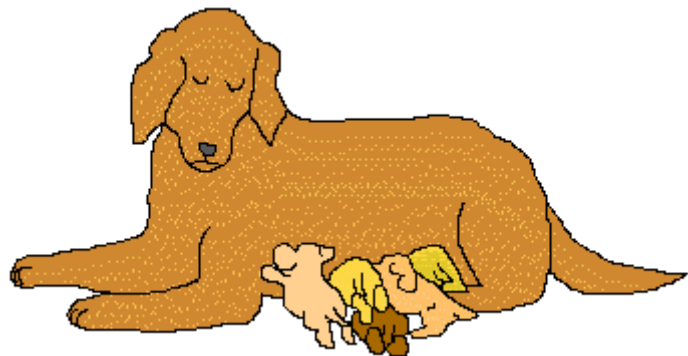
Step Three: The Larva Awakens and Migrates Through the Host

These second stage larvae can remain encysted happily for years. If the host is a puppy under age 6 months of age, the larvae mostly encyst in the host's liver. In older dogs, the larvae encyst all over the body. When the time comes to move on, the larvae excyst and migrate to the host's lungs where they develop into third stage larvae. They burrow

into the small airways and travel upward towards the host's throat. A heavy infection can produce a serious pneumonia. When they get to the upper airways, their presence generates coughing. The worms are coughed up into the host's throat where they are swallowed thus entering the intestinal tract for the second time in their development.

If the host is pregnant, the larvae do not migrate to the lung after they excyst; instead they home to the uterus and infect the unborn puppies. The second stage larvae make their way to the puppies' lungs to develop into third stage larvae.

If the host is a nursing mother, she secretes third stage larvae in her milk for the first 3 weeks after giving birth. These larvae simply find themselves in the puppy's intestinal tract where, at this stage, they do not need to migrate but can settle in and begin mating. Puppies can be infected by drinking their mother's milk, though, due to the intrauterine cycle described above, the litter would probably already be infected.



Graphic by MarVistaVet

Note: When dogs are dewormed with traditional dewormers, this affects only worms in the intestinal tract. It does not affect encysted larvae. It is difficult to prevent mother-to-puppy

transmission and routine deworming is not adequate. It is possible to prevent infection in unborn puppies by using a specific daily protocol of [fenbendazole](#) (your veterinarian can provide details) or with [selamectin](#) (Revolution®).

Step Four: Finally Back in the Intestine and Ready to Settle Down

Once back in the intestine, the larvae complete their maturation and begin to mate. The first eggs are laid about one week after the larvae have arrived in the intestine and finished molting into their adult stages (about 4 to 5 weeks after infection has first occurred). From here the cycle repeats.

Why Is Infection Bad?

Roundworm infection can have numerous negative effects. It is a common cause of diarrhea in young animals and can cause vomiting as well. Sometimes the worms themselves are vomited up which can be alarming as they can be quite large with females reaching lengths of up to seven inches. The worms consume the host's food and can lead to unthriftiness and a classical "pot-bellied" appearance. Very heavy infections can lead to pneumonia as the worms migrate and, if there are enough worms, the intestine can actually become obstructed.

It should also be noted that human infection by this parasite is especially serious (see below). It is important to minimize the contamination of environmental soil with the feces of infected animals so as to reduce the exposure hazard to humans and other animals. In other words, dog feces should be removed and discarded promptly before worm eggs permanently contaminate the local dirt.

How Do We Know If Our Dog Is Infected?

Of course, there are ways to find out if your dog is infected. If a dog or puppy vomits up a worm, there is a good chance this is a roundworm (especially in a puppy). Roundworms are long, white, and described as looking like spaghetti. Tapeworms can also be vomited up, but these are flat and obviously segmented. If you are not sure what type of worm you are seeing, bring it to your veterinarian's office for identification. You may not know if your dog is infected, and this is one of the arguments in favor of regular deworming. Regular deworming is especially recommended for dogs that hunt and might consume the flesh of hosts carrying worm larvae. Puppies are frequently simply assumed to be infected and automatically dewormed.

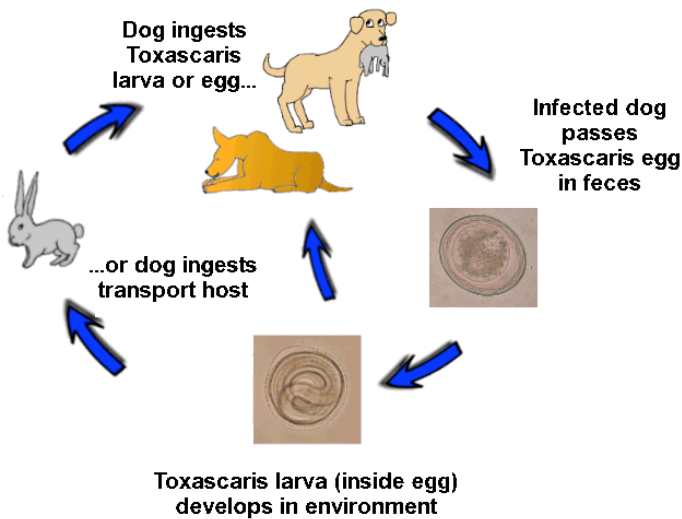
Fecal testing for worm eggs is a must for puppies and a good idea for adult dogs having their annual checkup. Obviously, if there are worms present, they must be laying eggs in order to be detected (and there are many reasons why they might not be laying eggs) but, by and large, fecal testing is a reliable method of detection.

How Do We Get Rid Of Roundworms?

Numerous deworming products are effective. Some are over-the-counter and some are prescription. Many flea control and/or heartworm prevention products provide a monthly deworming that is especially helpful in minimizing environmental contamination. Common active ingredients include:

- Febantel (active ingredient in Drontal and Drontal plus)
- Pyrantel pamoate (active ingredient in Strongid, Nemex, Heartgard Plus and others)
- Piperazine (active ingredient in many over the counter products)
- Fenbendazole (active ingredient in Panacur)

- Milbemycin oxime (active ingredient of Interceptor, Sentinel, and Trifexis)
- Moxidectin (active ingredient in AdvantageMulti).



Photocredit for developed egg: Flukeman via Wikimedia Commons;
the rest: original graphics by marvistavet.com

There are two important concepts to keep in mind about deworming. Medications essentially anesthetize the worm so that it lets go of its grip on the host's intestine and passes out with the stool. Once it has been passed, it cannot survive in the environment and dies.

This means that you will likely see the worms when they pass, so be prepared as they can be quite long and may still be alive and moving when you see them.

The other concept stems from the fact that all the larvae in migration cannot be killed by any of these products. After the worms are cleared from the intestine, they will be replaced by new

worms completing their migration. This means that a second and sometimes even a third deworming is needed to keep the intestine clear. The follow-up deworming is generally given several weeks following the first deworming to allow for migrating worms to arrive in the intestine where they are vulnerable.

Do not forget your follow-up deworming.

Toxascaris Leonina

The life cycle of *Toxascaris leonina* is not nearly as complicated. *T. leonina* does not migrate through the body in the way that *Toxocara canis* does. Instead, the fresh egg is passed by the host in feces, develops into an infectious embryo in the environment, and is swallowed by the new host. The *Toxascaris* egg develops much faster in the environment than the *Toxocara* egg and can be infectious for its new host as soon as one week from the time it was passed. Once inside the host, however, *Toxascaris* development becomes slower. The young worm lives in the host intestine without migrating through the body and becomes a mature worm in 2-3 months. Like *Toxocara*, *Toxascaris* can be picked up by wildlife, and the canine or feline host can be infected through hunting and consuming prey. The same dewormers listed above can be used on *Toxascaris* and must be repeated similarly.

Note: *Toxascaris leonina* can infect both dogs and cats alike. Unlike the *Toxocara* situation, unborn puppies cannot be infected by *Toxascaris leonina*.

The Same Rules Apply

Basically, the same products listed above will kill *Toxascaris leonina*. As with *Toxocara*, removing feces from the environment promptly will greatly minimize contamination and the potential for new infections. Regular use of deworming products are preventive. *Toxascaris leonina* tends not to produce diarrhea and disease as badly as *Toxocara* but we still want to get rid of *Toxascaris* anyway.

For More Information



Photo by MarVistaVet

The Companion Animal Parasite Council has an educational site for pet owners on roundworms. See [Pets and Parasites](#) for more information.

See more on [roundworms in cats](#), and on [roundworms in people](#).



Photo courtesy of U.S. Fish and Wildlife Service

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