

WORMS AND DEWORMING

Guidelines and advice for Boxer owners

Compiled by the FBCSA Breeders Panel

Introduction

One of the most basic pet care responsibilities is to ensure that your dog/s are free from internal parasites. Worms are a major component of this category of parasites. Two important reasons for controlling worms are:

- the debilitating physical effect on the animal, and death, especially in puppies
- to minimize or eliminate the risk of human infections with some of the parasites

Many different worms affect dogs and numerous organ systems can be involved. However, most pet owners are familiar with worms where the adult is found in the gastrointestinal tract namely, ascarids (often referred to as roundworms or "spoelwurms" in Afrikaans), hookworms, tapeworms and whipworms.

The purpose of this discussion is to focus primarily on *ascarids* and *hookworms* and include mention of tapeworms and whipworms under symptoms and control. Worms affecting other organ systems such as the respiratory tract (lungworm) will not be discussed.

Insight into the life cycles of these worms will clarify the suggested deworming schedules and will explain why deworming programs differ for puppies, adults and brood bitches.

Adult hookworms attach themselves to the wall of the intestine, where they suck blood. Thus, one of the obvious symptoms of hookworm infestation is anaemia.

HOOKWORM

The effects of hookworm on puppies are far more severe than on adults. Hookworms are the most virulent worms in suckling pups. In heavy infestations, pups can lose up to a quarter of their circulating red blood cells per day.

Symptoms of hookworm infestation in puppies

Anaemia

Bloody diarrhea with lots of mucous

Weakness

Weight loss

Death

LIFE CYCLE

Hookworm females in the intestines produce numerous eggs daily. The eggs are passed with the faeces of the dog. The eggs "hatch" in the environment and after a development period of a few days, the larvae can infect dogs.

The larvae are highly sensitive to desiccation, but resistant to cold and heat and can survive for a couple of months. Hookworm is a major problem in moist warm

conditions. Good hygiene with frequent removal of faeces will ensure that fewer larvae survive.

ROUTES OF INFECTION

The most important route of infection is lactogenic (transmammary). Most puppies are infected this way.

The most common route of infection in **adult dogs** is via the skin. Infective larvae can also enter the body of the adult dog via the mouth. Contact with infective larvae usually results from poor environmental hygiene and exposure to faeces through stepping in it, or contact per mouth.

The infective larvae penetrate the skin and often result in severe irritation and dermatitis under the paw. Most pet owners have seen dogs furiously biting the underside of a paw. This behavior must be distinguished from generalized irritation as a result of other contact irritants or allergies.

Common symptoms of hookworm infestation in adult dogs after larvae penetrated the skin

Moist dermatitis between pads

Licking/biting

Ulceration

Self-mutilation

Limping

The larvae will enter circulation and reach the smaller blood vessels of the lungs after 2-7 days. They develop and burst through the walls of the alveoli (little air sacks in the lungs). As part of the lungs' normal clearing mechanisms, the larvae are coughed up and swallowed. These larvae complete their development on reaching the small intestines and develop into adults producing eggs. From infestation to egg production takes 2-3 weeks. With infestation via the mouth, this period is 15-17 days.

Puppies can be infected via the milk (most often), the skin, the mouth.

Bitches can become infected as a pup or any time thereafter. Some of the larvae become dormant in the tissues of the bitch after repeated infection and immunity developing. Under the influence of the hormonal changes associated with whelping, larvae migrate to the mammary glands and appear in the milk for the first 20 days of lactation. These "re-activated" larvae might also result in the bitch becoming infected. This is known as endogenous auto-infection.

More than 95% of pups are infected via the milk. It is important to note that first litters are most heavily infested. In each subsequent litter, the degree of infestation becomes less. After 15-17 days the larvae have developed to adult worms (producing eggs in the faeces of the puppy).

If puppies become infected while in the uterus, the developmental period is 13 days

after birth. Most bitches are still very meticulous "cleaners" at this age and the potential for the bitch to become infected per mouth is obvious.

ASCARIDS ("ROUNDWORM")

Ascarids are one of the most important worms in dogs. They feed on what has been ingested into the small intestines. The adult female worm is very fertile. A single worm produces 100 000 eggs per day. Eggs are very resistant and can survive and remain infective for years.

As in the case of hookworm, most mature otherwise healthy dogs can "cope" with an ascarid infestation. Puppies on the other hand are very severely affected.

Symptoms of ascarid infestation in puppies.

Enlarged abdomen - pot-bellied

Unthrifty

Diarrhoea alternating with constipation

Vomiting

Occasionally nervous symptoms - convulsions

Heavy infestations: obstruction of the intestine

Obstruction can lead to bowel perforation

LIFE-CYCLE AND ROUTES OF INFECTION:

The most important source of infection is pre-natal.

Larvae in the tissues of the **brood bitch** can remain there for years.

- These dormant larvae are "released" and puppies are infected during foetal stages in the uterus. Larvae migrate to the liver of the pups and from there to the puppies' lungs. After birth, the larvae continue their migration until they develop to adults in the intestines. 21-23 days after birth, the puppy is producing ascarid eggs. Bitches licking puppies during cleaning often become re-infected. This infestation can result in an ascarid infestation in the bitch.
- Oestrus may also trigger dormant larvae to continue their migration and development in the bitch herself. This may result in adult ascarids in the bitch from 3-4 weeks before whelp to 1-7 weeks after whelp.

In puppies infested before 21 days of age, the larvae often develop to adult. In infestations later than 5 weeks of age, the larvae often become dormant.

The bitch acting as a reservoir, and pups as a source of infection, combined with a complicated life-cycle and various routes of infection, make ascarid control difficult.

WHIPWORM

Most pet and kennel owners are not as familiar with whipworm as with the previous two worms. Whipworms are more common along coastal areas, although cases have been reported in Gauteng. Symptoms may be confused with that of hookworm.

Symptoms of whipworm infestation in dogs

Profuse bloody mucoid diarrhoea

Constipation

Faeces covered in fresh blood

Anaemia

Adult worms can survive up to 16 months, and the eggs for up to 5 years. Animals confined to small spaces will constantly become re-infected.

TAPEWORM

In South Africa, there are three different genus or "groups" of tapeworms. The most important consideration in controlling tapeworm infestation is to prevent human infestation.

The life cycle of tapeworms involve an intermediate host. This means that at least one stage of the life cycle is completed in another animal or organism. For example, for one group of the tapeworms, flea larvae act as intermediate hosts. Larval stages of the flea will ingest/eat the tapeworm egg from the environment where it was passed by the dog. The flea thus "carries" the tapeworm larvae. During bad flea infestations, biting irritated areas often results in the ingestion of fleas (together with the tapeworm larvae inside the flea). Tapeworm larvae are released in the dog.

In the other groups of tapeworms, the intermediate hosts are herbivores (sheep and cattle) or pigs. Never feed dogs raw offal, always cook it thoroughly. To err on the side of safety: always cook any animal protein fed to your pet.

Most of the broad-spectrum dewormers are effective against adult tapeworms, although there are differences in the effectiveness against all three groups.

PREVENTING HUMAN INFECTIONS

Both hookworm and ascarid larvae can infect humans:

Hookworm larvae penetrating human skin cause "creeping eruption" under the skin. This is known as cutaneous larval migrans.

Ascarid larvae infecting humans migrate to the lungs and liver where they form granulomas. This is known as visceral larval migrans. They normally don't develop any further. Aberrant (deviating from the normal) migration can result in reaction in the affected tissues. Larvae migration to the eye can cause blindness.

Most Boxers are treated as part of the family, with physical contact the rule and not the exception. Good hygiene and a practical deworming regime will ensure that the potential for transmission to humans is minimised.

CONTROL

Pet owners should discuss the proposed deworming guidelines with veterinarians attending to their animals for confirmation that the approach is suitable to their individual circumstances.

From the introductory discussion, it should be clear that we could divide dogs into three groups of animals when looking at worming schedules or programs:

- Puppies
- Brood bitches

- Other adult dogs

DEWORMING PRODUCTS:

1. The majority of deworming tablets (regardless of the active ingredients) is “gut-active”. This means that once a tablet is dosed at the normal recommended dose rate, it is usually only effective against the stages found in the intestines and have little or no effect on larvae elsewhere in the body.
2. Most tablets, unless prescribed otherwise, should be dosed with or after a meal. Dosing on an empty stomach will normally lead to the product passing too rapidly through the intestines with not enough contact time with the worms. Food ensures delayed passage and prolonged contact time.
3. How do these products work? Most of the active ingredients in deworming tablets work in one of three ways:
 - a. They cause the protective layer around the worms to “dissolve”. The worm is then digested as with any protein.
 - b. They paralyze the worm. Worms attach to the intestinal wall to avoid being moved out with the normal contractions and movements passing food along. Once paralyzed, they are passed.
 - c. They interfere with some of the vital metabolic processes in the worm resulting in the death of the worm.
4. Deworming products may cause side effects such as vomiting. Ask your vet what to expect and strictly adhere to veterinary recommendations on how to administer the product/s.
5. Avoid deworming bitches during the early stages (first trimester - 3 weeks) of pregnancy. Although none of the South African registered products contain any contra-indication warnings, this does not imply safety.

FREQUENCY OF DEWORMING REQUIRED

The frequency with which owners should deworm their dogs depends on:

1. Group of animal (puppy, adult, brood bitch)
2. Size of property and number of animals kept on the property

A large breeding kennel with numerous dogs and a single pet on half an acre will definitely not require the same deworming program. The size of the property and the number of dogs will determine the potential for contact with faeces.

However, dogs often “pick a corner” and maintain their toilet behavior in that corner. This allows for frequent contact with faeces regardless of the property size.

Puppies

Deworm every 2 weeks: from 2 weeks to 12 weeks. (At twelve weeks the puppy should also have had its final puppy vaccination). It is very important that the puppy be dewormed 2-3 weeks after weaning. The above recommendation will normally ensure this.

Adult dogs

Two possible approaches:

1. Ideally, submit a stool sample to your veterinarian for testing every six months and treat if required according to the result.

or

2. Deworm once a year at the time of annual vaccination boosters. Submit a faecal sample to your veterinarian to check for worm eggs and/or other intestinal parasites whenever your animal/s presents with abnormal stools lasting more than 24 hours. If worm eggs are present in the stool, indicating the presence of egg producing adults in the intestines, follow the deworming program prescribed by your veterinarian.

Brood bitches

It is vital that future brood bitches are very thoroughly dewormed as puppies (see above).

During lactation, deworm bitches intensively, following the same schedule as for the puppies.

During the last 14 days of pregnancy deworm with fenbendazole at 50mg/kg for 5 days. (*)

14 days after whelping, deworm with fenbendazole at 50mg/kg. Deworm for at least 5 days. (*)

(*) Refer to the life cycles of hookworms and ascarids to understand the importance of this period. The purpose of deworming at this time is not adult worms in the intestines, but migrating larvae moving to the mammary glands (hookworm) and to the placenta (ascarids). Fenbendazole is known to reach high tissue levels (absorbed from the intestines into the blood and distributed to other body tissue), but despite this characteristic, the dosage required to kill migrating larvae is far greater than the dosage level to kill adults in the intestines. **A daily fenbendazole dose of 50mg/kg from day 40 of gestation (pregnancy) up to 14 days after whelping is required.** This regime is both impractical to administer and almost financially prohibitive. Products containing the active ingredient, intended for cattle and sheep, are often used to overcome the financial hurdle. However, most of these products are very unpalatable, making dosing very difficult.

It is important to note that you should discuss the above recommendation with your veterinarian before embarking on this program.