

# Understanding worm infestations – environmental factors and education

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**Endoparasite infections in dogs and cats are a familiar concern for pet owners. This article will look at common helminths (both gastrointestinal and cardiorespiratory worms) and their associated clinical signs – some of which can cause significant health concerns.**

It will then discuss how practices can implement effective preventive strategies, including advice about controlling environmental factors, giving readers the ability to educate clients about the risks of helminth infection and, subsequently, to reduce those risks for pets and their owners.

## **Considerations – which worms are a worry?**

TABLE 1. Common worms in dogs and cats		
Type	Name	Animal(s)
Roundworms	<i>Toxocara canis</i>	Dogs
	<i>Toxascaris leonina</i>	Dogs and cats
	<i>Toxocara cati</i>	Cats
Hookworms	<i>Ancylostoma caninum</i>	Dogs
	<i>Uncinaria stenocephala</i>	Dogs
	<i>Ancylostoma tubaeforme</i>	Cats
Threadworms	<i>Strongyloides stercoralis</i>	Dogs
Whipworms	<i>Trichuris vulpis</i>	Dogs
Tapeworms	<i>Dipylidium caninum</i>	Dogs and cats
	<i>Taenia</i> species	Dogs and cats
	<i>Echinococcus</i> species	Dogs and cats
	<i>Mesocestoides</i> species	Dogs and cats
Heartworms	<i>Dirofilaria immitis</i>	Dogs and cats
Lungworms	<i>Angiostrongylus vasorum</i>	Dogs
	<i>Filaroides osleri</i>	Dogs
	<i>Filaroides hirthi</i>	Dogs
	<i>Crenosoma vulpis</i>	Dogs
	<i>Aelurostrongylus abstrusus</i>	Cats
Eye worms	<i>Thelazia callipaeda</i>	Dogs and cats

Some pet owners are, understandably, concerned about worm infestations; however, many are unaware of the risks worms can pose, both to their pet and the wider human community. Several types of worms can affect dogs and/or cats – **Table 1** shows examples of the most common. Of these worms, the following are examples of those that have the potential to affect humans (that is, they pose a “zoonotic” risk):

- *Dipylidium caninum*
- *Echinococcus granulosus*
- *E multilocularis*
- *Ancylostoma* species
- *Toxocara* species

## Roundworms

Roundworms are the most common type of intestinal worms affecting dogs and are especially common in puppies. *Toxocara canis* is transmitted from a bitch to its pups almost exclusively via the transplacental route during late pregnancy; a small number of larvae may also be shed in milk.

Because they can cause gastrointestinal disturbances (vomiting or diarrhoea), a pot-bellied appearance, coughing, weight loss, general ill thrift and possibly death (through gastrointestinal obstruction, for example), owners should be encouraged to implement an effective worm prevention strategy to protect their own animals from disease (see later).

However, perhaps more importantly, *Toxocara* species also pose a zoonotic risk, meaning humans, especially young children or immunosuppressed individuals, can be infected with this roundworm. This can lead to a very serious condition called visceral larva migrans, which can cause blindness, as well as many other damaging clinical signs. The potential for such serious human disease makes implementation of effective control strategies very relevant for all pet owners.

Hygiene precautions, such as clearing up dog faeces immediately while wearing gloves, and avoiding areas affected by dog faeces should be implemented; however, ensuring all faeces are cleared from infected outdoor cats is clearly more problematic and this may be relevant as *T cati* roundworm are also capable of causing visceral larval migrans in people. Worryingly, studies have shown a high proportion of public parks (up to 67% of those sampled) and sandpits (up to 75% of those sampled) are potentially contaminated with roundworms and their eggs (Abe and Yasukawa, 1997; Ruiz de Ybáñez et al, 2001).

It is anticipated by highlighting these potential worm infection risks, owners will be more likely to adhere to a preventive strategy in dogs and cats, and clean up dog faeces immediately.

## Hookworms



**Figure 1.** With outdoor areas, such as parks, carrying potentially high burdens of roundworm contamination – the most common type of intestinal worms affecting dogs – owners should dispose of faeces immediately in designated bins. IMAGE: ©fcl1971/freeimages.

Hookworms are also relatively common intestinal worms. They latch on to the small intestinal wall

and feed on blood, which can lead to clinical signs such as diarrhoea, lethargy, weight loss and anaemia (that may manifest as pale mucous membranes and/or weakness/lethargy), although infections may also be asymptomatic. *Uncinaria stenocephala* is much less pathogenic than *Ancylostoma* species.

*A. caninum* and *A. braziliense* are not commonly found in the UK, although it is worth understanding these species can cause disease in people. Humans may pick up hookworm by walking barefoot on contaminated sand/soil, which can lead to skin disease and/or intestinal problems.

## Whipworms

Whipworms live in the large intestine of dogs and high burdens can cause diarrhoea or anaemia and reduced growth in puppies. They are relatively rare in the UK, although they may be more common in high-density canine populations (such as rescue kennels). They are no risk to humans.

## Cestodes (tapeworms)

*Dipylidium caninum* is the most common tapeworm in the UK. Adult tapeworms live in the small intestine and produce segments containing eggs that are passed in the faeces (these segments can be seen with the naked eye as small moving rice grains. As such, they are a common reason for owners to present their pets for veterinary attention).

The intermediate host is the flea (or less commonly, the louse) and hence appropriate flea prophylaxis is important in control of this parasite. This tapeworm does not generally cause clinical signs, but can cause an itchy bottom (“bum scooting”) or gastrointestinal upset.



**Figure 2.** Pets that eat slugs and snails may be at increased risk of acquiring lungworm infection. IMAGE: ©nkzs/freeimages.

*Taenia* species are associated with minimal clinical signs, although the segments in faeces can be a worrying concern for owners. Several species have been identified, each with their own intermediate hosts, and dogs are infected if they eat prey or undercooked meat.

Regarding *Echinococcus* species, *E granulosus* can infect dogs (occurs in the UK, but is thought to be more common in select areas such as South Wales) and *E multilocularis* can infect dogs and cats (but does not occur endemically in the UK).

Both these tapeworms pose a zoonotic risk and can form potentially serious cysts in people, but *E multilocularis* infection in humans is much more serious than *E granulosus* and is potentially life-threatening.

As such, dogs should not be allowed to scavenge any potentially infected carcasses and not be fed raw meat that could be potentially infected. Humans should be cautious and wear gloves and wash carefully if handling the faeces of any potentially infected dogs/other carnivores.

The pet travel scheme means dogs need to have a tapeworm treatment before entering the UK, unless they are coming directly from Finland, Ireland, Malta or Norway. The treatment is given within one day and five days before entering the UK in an attempt to prevent the introduction of *E multilocularis*.

## **Lungworm**

### Panel 1. General tips on worm prevention

- “Scoop that poop” – ensure faeces are removed immediately on a walk and from the garden or surrounding outdoor environment daily.
- Ensure regular hand washing for all the family (pets’ coats may contain worm eggs).
- Avoid kissing your pet and don’t let your pet lick your face (or any open wounds).
- Keep cats’ litter trays clean (emptying once daily as a minimum).
- Avoid feeding pets raw meat and discourage scavenging behaviour.
- Avoid children putting soil/dirt or other items that have dropped on the floor in their mouths.
- Cover children’s sandpits when not in use.
- Wash all food before consumption (especially fresh fruit and vegetables).
- Use an effective flea control.
- Take your pet to the vet regularly for advice regarding effective parasite control.
- Worm your pet regularly – even the most effective treatments don’t offer long-term protection, so it’s important to treat pets four times a year minimum.

*Filaroides osleri* is a canine lungworm that does not require an intermediate host for transmission. Clinical signs of infection may include lethargy and coughing, and it has been associated with poor race performance in greyhounds. *Filaroides hirthi* is a rare lungworm in the UK.

*Crenosoma vulpis* lungworm can cause coughing, respiratory distress and lethargy. Like *Angiostrongylus vasorum*, it has a life cycle involving foxes and snails.

*A. vasorum*, which, because of its life-threatening nature and evidence that prevalence may be increasing, often appears in the veterinary and public media. It has a life cycle involving foxes and snails, cannot be transmitted on a dog-to-dog basis and does not affect humans. However, it can affect dogs of all ages and breeds, although younger dogs appear to be at an increased risk.

Clinical signs vary and may include:

- coughing
- breathing difficulties
- exercise intolerance
- coagulopathies
- seizures/“fits”

- ataxia
- behavioural changes

Of course, many other (possibly more common) diseases can also cause these problems, so advise owners if they are worried to seek immediate veterinary advice.

To prevent or reduce the risk of dogs being infected with lungworm, owners should be educated to keep up a regular anti-worming regime (note imidacloprid/moxidectin and milbemycin are the only veterinary products licensed to prevent *A. vasorum*), immediately dispose of dog faeces from their gardens or other dog walking areas (as mentioned previously, this is all part of being a responsible pet owner) and be made aware of the risks and clinical signs to look out for.

## Environmental factors

**TABLE 2.** Examples of available anthelmintics for dogs

Active ingredient(s)	Presentation	Product examples
Moxidectin/ imidacloprid	Spot-on	Advocate, Endectrid, Multi-parasite
Pyrantel or pyrantel embonate/ febantel/ praziquantel	Flavoured tablet	Cazitel Plus, Cestem, Drontal Plus, Endoguard Flavoured Plus, Prazitel Plus
	Tablet	Endoguard Plus XL
Fenbendazole	Granules, suspension, paste	Panacur
	Granules	Granofen
Milbemycin oxime, praziquantel	Tablet	Milbactor
	Chewable tablet, tablet	Milbemax
Milbemycin oxime, spinosad	Chewable tablet	Trifexis
Milbemycin oxime, lufenuron	Tablet	Program Plus
Selamectin	Spot-on	Stronghold
Oxantel, pyrantel, praziquantel	Tablet	Dolpac
	Chewable tablet	Plerion 5 and 10

Given the information presented, it is clear several environmental factors impact on the likelihood of a pet acquiring worm infestation. The following summarises some of the most important factors.

- **Parks and playgrounds/soil and sand:** these areas can carry a high burden of roundworm contamination so owners should be advised to dispose of faeces immediately in designated bins (**Figure 1**). Children's sandpits should always be covered or stored indoors when not in use. Good hand hygiene should also be a priority for all pet owners.
- **Flea and lice infestation:** fleas (and lice) are intermediate hosts for *D caninum*, so it is therefore important to recommend good ectoparasite control alongside regular anthelmintics.
- **Other pets:** it is important to treat all pets in a household, so untreated pets don't serve as a reservoir for disease.
- **Kennels:** some worm infestations are very common in areas of high animal density, so regular anthelmintic programmes are especially relevant in this setting.
- **Travelling pets:** pets travelling may be at risk of acquiring parasite infections that are not yet a problem in the UK. An important example is the potential zoonotic tapeworm *E multilocularis*. Advice should be available for owners who wish to take their pets abroad, to minimise risk of disease transmission.
- **Rodents/other scavenging behaviour:** rodents may serve as a reservoir for disease, so pets that hunt regularly may need a slightly more intensive anthelmintic programme.
- **Slugs and snails:** eating slugs and snails is a risk factor for acquiring infection with *A vasorum* (as well as other lungworms). If pet owners witness pets eating these molluscs then vets should pay particular attention to including anthelmintics to prevent lungworm in a pet's worming programme. Usually, steps to rid the environment of slugs and snails are not effective and, moreover, can be very dangerous (given slug and snail bait is potentially very toxic to pets; **Figure 2**).

## Effective worm prevention

It is important to recommend responsible pet ownership and lifting dog faeces immediately is key (particularly to reduce the risk of the spread of roundworm and lungworm). However, even the most diligent of owners may leave small amounts of faeces behind, which can contaminate the soil with worm eggs, posing a risk to human and animal health. In addition, outdoor cats and wildlife will hide their faeces, hence effective environmental control is almost impossible.

As such, the only way to break the cycle is to implement an effective anti-worm prophylactic plan. General tips for owners can be found in **Panel 1**.

A number of products are available (ranging from tablets to spot ons and injections).

It is hard to quantify the exact risk to a particular pet and its family; however, taking time to chat with owners can help to obtain an overview of their situation.

The answers to the following questions may be of use, to formulate tailor-made plans.

- How old is your pet?
- Does your pet live indoors or outdoors?
- Does your pet frequently mix with other animals?
- Have you travelled, or do you plan to travel, abroad with your pet?
- Do you have an effective anti-flea management plan?
- Have you used any over the counter pet health products?
- Do you have young children?
- Does your pet come into contact with any people who may be immunocompromised?
- Does your pet eat slugs/snails?

**TABLE 3.** Examples of available anthelmintics for cats

Active ingredient(s)	Presentation	Product examples
Moxidectin/ imidacloprid	Spot-on	Advocate, Endectrid, Multi-parasite, Prinovox
Pyrantel embonate, praziquantel	Tablet	Drontal Cat
Fenbendazole	Granules, suspension, paste	Panacur
	Granules	Granofen
Milbemycin oxime, praziquantel	Chewable tablet, tablet	Milbemax
Praziquantel	Tablet, spot-on	Droncit
Selamectin	Spot-on	Stronghold
Emodepside, praziquantel	Spot-on	Profender

Overall, frequency of administration depends on a dog's or cat's age; younger animals should be wormed more frequently. Hence, to prevent clinical disease from roundworm infections, puppies should be wormed from a young age.

Recommendations are to administer an anthelmintic from two weeks of age, then every two weeks until puppies are three months of age, then monthly until six months of age.

However, most anthelmintics are not licensed from such a young age, so vets should pay close attention to product data sheets when making exact drug choices.

Animals older than six months should be wormed at a minimum interval of once every three months, except for prevention of *A vasorum* where licensing indicates dogs should be wormed every four to six weeks.

Owner factors such as a human pregnancy, immuno-compromised people or young children in the

household may also prompt more frequent administration of anthelmintics.

To make sure a worming regime is effective, it's important to follow the manufacturer's guidelines and seek veterinary advice.

Vets and nurses should also consider the practice's geographical location when trying to work out the potential of risk to the pets it treats.

For example, *Angiostrongylus* infection is at much higher levels in south-east England compared to the Highlands of Scotland and, as such, the approach to preventing this parasite may differ between these locations (as an example).

## Products available

Many products are available in today's vast veterinary marketplace. It is beyond the scope of this article to give exact details of all available products; however, **Tables 2** and **3** summarise some of those available.

Readers are referred to the [VMD website](#) for further details about individual drugs.

## Conclusion

It is hoped this article illustrates the need for educating cat and dog owners about the risks of worm infection – both for their pets and wider family. It is important to incorporate an effective anthelmintic regime alongside guidelines about promoting worm control in the environment.

Exact guidelines should be based on an individual's risks and environmental factors play an important role in tailoring these guidelines.

## References

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