

## Internal parasites of rabbits

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**Glen Cousquer** BVM&S, BSc, CertZooMed, MRCVS discusses the common endoparasites found in rabbits and how to treat them

**BRITISH pet owners will be familiar with the idea that their dogs and cats need regular worming. It is not just our carnivorous friends that require worming – horses also require regular worming and horse owners will even collect their horses' faeces in order to prevent worm build-up on pasture. But what of rabbits?**

This feature will discuss the common internal parasites of rabbits and the steps required to control them.

Before launching into a discussion about internal parasites, it is worth reminding the reader of the reasons why a regular worming programme is strongly recommended in our companion dogs, cats and horses.

Dogs and cats carry the roundworm *Toxocara canis* and shed eggs of this parasite in their faeces. Faecal contamination of playing fields, sandpits and other play areas can result in children coming into contact with, and ingesting, *Toxocara* eggs. The larvae that hatch from these eggs can migrate within human tissues and are responsible for two clinical syndromes: visceral larval migrans and ocular larval migrans.

The implications of larval migration within a human can be very serious, especially where the eyes are involved. It is primarily for this reason, in order to minimise the health risks to humans, that the BVA recommends that dogs and cats are wormed every three to four months.

Where horses are grazed intensively on pasture, there is likely to be a build-up of internal parasites, leading to heavy worm burdens developing within the exposed horses. These worm burdens can cause a range of health problems, including colic, weight loss and anaemia. Good pasture management, together with a regular worming programme, are the only ways to control internal parasites in the horse and are now part of good horse husbandry.

So, what of rabbits? Rabbits are known to be parasitised by a number of different internal parasites. These can be divided into round worms (nematodes), tapeworms (cestodes) and protozoa.

## Roundworms

Roundworms, or “nematodes” as they are more properly known, do occur both in wild and domestic rabbits. The only round worm to occur commonly in domestic rabbits is the oxyurid worm, or *Passalurus ambiguus* – also known as the “pin worm” because of its small size. Adult worms of this species measure five to 10mm and are found in the caecum and large intestine. They do not generally cause clinical problems in the adult rabbit but may be associated with poor haircoat, weight loss and a perineal dermatitis.

By contrast, young rabbits may be affected by heavy infestations of this worm, particularly at the time of weaning when the microflora of the hindgut has yet to establish itself. Affected young rabbits may show signs of diarrhoea, lethargy, anorexia and weight loss.

The pin worm has a direct life cycle and as such has no intermediate host. Eggs are ingested by the rabbit when grazing on contaminated food. The environment can be heavily contaminated with pin worm eggs where large numbers of rabbits are kept under intensive conditions. Farmed rabbits and breeding colonies may therefore experience problems with pin worms, which may be seen as dips in productivity and poor reproductive performance.

Where a pin worm problem is diagnosed, the infection is easily treated with an anthelmintic such as piperazine or fenbendazole. Ivermectin is thought to be ineffective against pin worms in rabbits. Routine worming is often indicated in breeding colonies and on rabbit farms.

## Tapeworms

The rabbit acts as the intermediate host for a number of tapeworms, otherwise known as cestodes. The definitive host of these tapeworms is usually a dog, cat or fox. Where dogs, cats and foxes visit a rabbit owner's garden the potential exists for the rabbit's grazing area to become contaminated.

The lawn becomes contaminated when an infected definitive host passes tapeworm segments packed with eggs in its faeces. Grazing rabbits can then ingest these eggs and become infected.

The tapeworm eggs hatch in the rabbit's intestine and then migrate within its body. They have the potential to produce cystic structures within the rabbit's tissues. *Cysticercus pisiformis* is the larval stage of the dog and fox tapeworm *Taenia pisiformis*. Large numbers of oval-shaped cysts may then be deposited within the rabbit's abdomen. These can cause abdominal discomfort and swelling.

*Coenurus serialis* is the larval stage of the tapeworm *Taenia serialis*, which also has the dog and fox as its definitive host. The larval stages of this tapeworm migrate to the subcutaneous tissues where they form cysts under the skin. These may be felt as soft, fluctuant swellings.

As is so often the case, prevention is better than cure. Dogs and cats accessing a rabbit's grazing area should be regularly wormed (three to four times per year) and their faeces picked up and disposed of. Foxes should be excluded from gardens where possible, and any fox faeces should be removed from the lawn at the earliest opportunity.

Currently, there is no reason to routinely treat pet rabbits for roundworms and tapeworms. Pasture and environmental contamination can be minimised by rotating the grazing area, cleaning the hutch environment regularly, preventing faecal contamination of food bowls and hay, keeping the rabbit population density low and avoiding pasture contamination with cat, dog and fox faeces.

## Protozoa

There are three main protozoal parasites of rabbits: *Eimeria*, *Toxoplasma gondii* and *Encephalitozoon cuniculi*.

### •*Eimeria*

While there are some 16 species of eimerial parasites affecting rabbits, they rarely pose a problem to the domestic rabbit. Eimerial parasites are responsible for causing coccidiosis. Infection is acquired following the ingestion of oocysts found within the environment. Heavy environmental contamination may be seen in farmed rabbits and breeding colonies and is usually the primary cause of clinical coccidiosis. Young rabbits are usually most severely affected as they are unlikely to have built up any immunity to the disease.

Hepatic coccidiosis is caused by the rabbit-specific protozoan parasite, *Eimeria steidae*. This parasite is unusual in targeting the rabbit's liver, whereas other species of *Eimeria* infect the rabbit's intestinal tract. Clinical signs of hepatic coccidiosis may vary as a function of the severity of infection and the immune status of the individual. Signs include weight loss, ascites, jaundice, diarrhoea and an enlarged liver.

Treatment may be required in the face of disease outbreaks, but the condition is preventable through good husbandry. In the domestic rabbit, sensible hutch hygiene and low stocking densities

will ensure that faecal build up is kept to a minimum and coccidiosis avoided.

- ***Toxoplasma gondii***

*T gondii* is an intracellular coccidian parasite and causes one of the most common parasitic diseases of animals and man. The disease produced by *T gondii* is called toxoplasmosis. The definitive hosts for the parasite (the only animals in which the organism reproduces sexually) are members of the *Felidae* family. Almost any other warm-blooded mammal, including rabbits, can, however, act as an intermediate host.

Cats usually become infected by *T gondii* following ingestion of encysted organisms present in the tissues of a chronically infected intermediate host. The oocyst wall is digested by the cat, releasing infectious organisms into the intestinal lumen. The organisms penetrate through the intestinal wall and replicate throughout the body.

Simultaneously, the organisms invade and replicate within the intestinal epithelial cells (entero-epithelial cycle). This entero-epithelial cycle culminates in sexual reproduction and the formation of oocysts, which are excreted in the faeces within three to 10 days. Shedding continues for approximately 10 to 14 days, during which time the environment is contaminated with many millions of oocysts.

Intermediate hosts, such as the rabbit, become infected following ingestion of sporulated oocysts from the environment. As in the cat, a cycle of infection occurs throughout the body, and the subsequent immune response results in the development of tissue cysts. The tissue cysts probably remain viable (contain infectious organisms) for the life of the animal. Unlike infection in the cat, an enteroepithelial cycle (with oocyst production) does not occur in intermediate hosts.

The incidence of toxoplasmosis in rabbits will reflect the degree of contamination of their environment and their food matter, particularly from cat faeces. Acute onset toxoplasmosis may be seen in young rabbits and is characterised by lethargy, anorexia, fever (more than 104°F), a raised respiratory rate, oculonasal discharge and the development of central nervous signs. Adult rabbits are likely to recover from toxoplasmosis. Infections obtained during pregnancy are likely to result in the loss of the foetuses.

As with roundworm and tapeworm infections, the most important piece of advice that can be given to a rabbit owner is: do not allow cats to contaminate your rabbit's environment.

- ***Encephalitozoon cuniculi***

This protozoal parasite is now known to be widespread within the British domestic rabbit population. The parasite can infect a number of mammals and has been recorded in rabbits, cats, dogs, foxes, sheep and goats as well as in humans.

Infective spores are shed in the rabbit's urine and transmission typically occurs following the ingestion of contaminated food and water. Following ingestion, the parasite is carried to a range of organs by the white blood cells. Organs, including the kidneys, liver, central nervous system, lungs and heart are all targeted.

A wide range of clinical signs can arise in the rabbit. These include neurological signs, such as head tilt, hindlimb weakness, paralysis, tremors, convulsions and urinary incontinence. The rabbit's eyes may develop cataracts and an inflammation of the inside of the eye (uveitis).

Prevention of infection may not be possible given the prevalence of the parasite within the domestic rabbit population. Where a breeder wishes to establish a disease-free colony, this can be achieved through an extensive testing programme.

Good hygiene practices will help reduce the incidence of infection. Food bowls can be raised to reduce the possibility of them becoming contaminated with urine, while water should be provided in drinking bottles rather than bowls.

The use of prophylactic fenbendazole in feed has not been fully evaluated. It is currently mainly used as a treatment for infected individuals.

## General recommendations

- Dog, cat and fox faeces may be sources of tapeworm and *Toxoplasma gondii*. Owners should worm their dogs and cats regularly and take all reasonable steps to prevent faecal contamination of the rabbit's grazing and food. Where possible, foxes should be excluded from the garden.
- Young rabbits may be vulnerable to pin worm infection and coccidiosis at weaning. Any signs of diarrhoea, weight loss and anorexia in rabbits should be brought to the attention of the vet and investigated.
- Good husbandry practice will ensure that stocking density is kept to a minimum, areas of lawn are not overgrazed and that the hutch environment is cleaned regularly.
- The rabbit's food bowl should be raised to prevent faecal and urinary contamination. Soiled hay should be removed regularly and access to clean hay ensured.
- Clean water should be provided in a water bottle rather than in a water bowl.
- *E cuniculi* can be transmitted to humans. Rabbit owners should, therefore, wear gloves when cleaning out rabbit hutches and should wash their hands thoroughly before eating.
- Unlike for dogs, cats and horses, the routine use of a wormer in rabbits is not indicated.

- Faecal analysis using flotation techniques can be used to identify and quantify parasite burdens. They are suitable for the diagnosis of nematodes, cestodes and coccidian.
- Serological tests are relied on for the diagnosis of cases of toxoplasmosis and encephalitozoon infections.

## References and further reading

- Harcourt-Brown F (2002). *Textbook of Rabbit Medicine*. Butterworth-Heinemann, Oxford, UK.
- Hill, D and Dubey, J P (2002). Toxoplasma gondii: transmission, diagnosis and prevention, *Clin Microbiol Infect* **8**(10): 634-640.



Diarrhoeic juvenile rabbit with severe hepatic coccidiosis.



Unwormed cats are likely to be carriers of tapeworms. The tapeworm segments, also known as proglottids, are passed in the faeces and contaminate the environment with tapeworm eggs. These eggs may then be ingested by, and infect, a grazing rabbit.



