

Intestinal parasite antigen testing— the next generation of fecal testing

Introduction

In order to ensure the health of patients, a fecal examination for intestinal parasites is an important part of a regular checkup. Regardless of the fecal procedure used, there can be some limitations on accurately identifying infections with some parasites. Detection of hookworm, roundworm and whipworm can be difficult with the current diagnostics. Now IDEXX Reference Laboratories has added fecal antigen testing as an additional tool for detecting these common parasites.

Background

In small-animal practice, hookworms, roundworms and whipworms are commonly encountered intestinal parasites in canine and feline patients. They each have a unique life cycle, and their prepatent period, the time in which they infect a host before laying eggs, may range from 14–21 days in hookworms, 14–30 days in roundworms, to as long as 74–90 days in whipworms. This prepatent period may allow infections to go undetected on fecal flotation, increasing the chance for the appearance of clinical signs prior to evidence of eggs in the stool.

Prevalence

In dogs and cats, the prevalence of infection with each intestinal parasite varies from region to region and tends to occur more frequently in shelter animals than in well-cared-for dogs and cats that visit the veterinarian on a regular basis. Outdoor pets and those that consume prey with possible infective larvae in their tissues are also more likely to be infected.

Studies have shown that hookworm and roundworm prevalence in pet dogs was 2.5% and 2.2% respectively¹ and 20.2% and 15.2% in shelter dogs.² One study of approximately 1,500 feline fecal specimens found that 7.5% of the cats were shown to be infected with *Toxocara cati*.³

The whipworm prevalence in dogs in the U.S., based on detection of eggs in feces, ranges from 1.2% in pet dogs¹ to 14.3% in shelter dogs.² In North America, whipworm infections in cats are rare.⁴

Clinical signs

Some dogs and cats infected with these common intestinal parasites may be asymptomatic, but others may develop a variety of gastrointestinal signs that depend on the parasite and age of the patient. Symptoms may range from mild diarrhea, vomiting and ill thrift to severe bloody diarrhea, anemia and occasionally death.

Current diagnostics

Currently, the most common method for diagnosing intestinal parasite infections is fecal flotation, either passive or by centrifugation. There are many issues that may complicate the diagnosis of infections with this method. One possible complication is misidentification. Pollen and other debris may be misidentified as eggs. In addition, the inappropriate identification of eggs from

other species as a result of coprophagy may also occur. One study researching this occurrence found that 31.5% *Toxocara*-positive canine fecal specimens were in fact *T. cati* eggs.⁵

Another common problem concerns the varying density of the different eggs, which makes it difficult for a clinician to select the ideal fecal flotation solution to ensure adequate recovery of eggs from all potential parasites.

Yet another challenge with fecal flotation is that this method of egg identification lacks the ability to detect infections during the prepatent period or with single-sex infections, when eggs are simply not present in the infected animal.

Finally, fecal flotation may not always be reliable as a single test. Because many parasites shed eggs intermittently, a specimen from an infected animal may still generate a false-negative diagnosis if only a single fecal flotation is examined. For all these reasons, there is a need to find a better tool for the diagnosis of the most common intestinal parasites found in dogs and cats.

New testing options from IDEXX Reference Laboratories

Antigen detection is commonly used today to diagnose heartworm and *Giardia* infections, and now it is available for these additional parasites. IDEXX Reference Laboratories has developed enzyme-linked immunosorbent assays (ELISAs) for the detection of hookworm, roundworm and whipworm antigens in feces. These antigens are secreted from the adult worm and are not present in their eggs, which allows for detection of prepatent stages as well as the ability to overcome the challenges of intermittent egg laying. This early detection during the prepatent period will also reduce the frequency of environmental contamination with potentially infectious eggs.

Detect more infections

Over 225,000 IDEXX Reference Labs fecal results, consisting of both canine and feline specimens, were analyzed for positive nematode results. These samples were submitted for testing for both fecal flotation by centrifugation (fecal O&P) and fecal antigen ELISA methods for hookworm, roundworm and whipworm.

Hookworm eggs were detected in 1.7% of the specimens.

The hookworm-specific antigen ELISA was positive in an additional 2.0% of specimens that were negative for hookworm eggs, thus bringing the total hookworm detection with the combined O&P and ELISA testing to 3.7%.

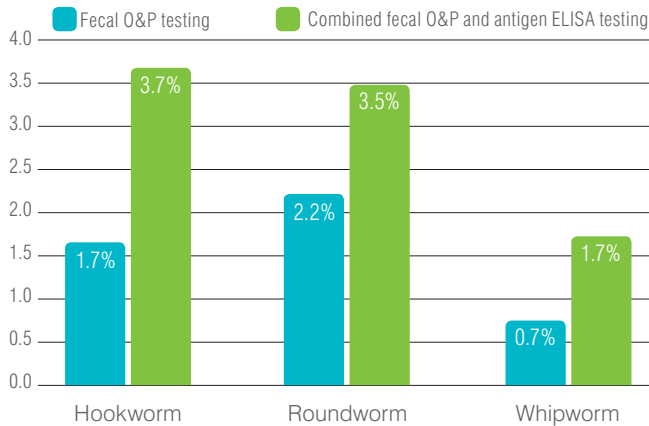
Roundworm (ascarid) eggs were detected in 2.2% of the specimens. The roundworm-specific antigen ELISA was positive in an additional 1.3% of specimens that were negative for roundworm (ascarid)

eggs, thus bringing the total roundworm detection with the combined O&P and ELISA testing to 3.5%.

Whipworm eggs were detected in 0.7% of the canine specimens.

The whipworm-specific antigen ELISA was positive in an additional 1.0% of specimens that were negative for whipworm eggs by fecal O&P testing, thus bringing the total whipworm detection with the combined O&P and ELISA testing to 1.7%.

Intestinal parasite detection

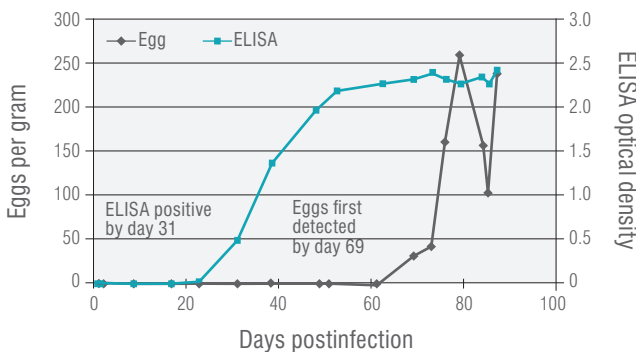


Detect infections earlier

Because of the lack of egg detection with fecal O&P testing during the prepatent period and single-sex infections, many parasite infections may go undetected for a period of time and, therefore, create a difficulty in correlating clinical signs to fecal test results. In an experimental infection study conducted at IDEXX, the fecal antigen ELISAs were able to detect infection during this prepatent stage.

The graph below illustrates the identification of a whipworm infection approximately 30 days before fecal O&P testing when using the whipworm-specific antigen ELISA.

Prepatent infection detection



Treatment

There are a variety of anthelmintic products available for both treatment and control of hookworm, roundworm and whipworm infections. Please see the current Companion Animal Parasite Council (CAPC) for recommendations for guidance.⁶

Public health considerations and preventive measures

Because of the zoonotic potential of these parasites, most commonly hookworm and roundworm, immediate disposal of feces is important. This will also reduce the likelihood of reinfections and prevent the long-term contamination of the environment. Monthly anthelmintic medications can be helpful in preventing the continuation of the cycle.

Ordering information

Test code	Test name and contents
24639	Fecal Panel (Comprehensive) Fecal ova and parasites, <i>Giardia</i> antigen by ELISA, reflex hookworm, roundworm and whipworm antigens by ELISA if indicated. If the fecal ova and parasites are negative for hookworms, roundworms or whipworms, the fecal antigen by ELISA for the respective parasite will be automatically performed at no additional charge. • 3–5 g fresh feces in a clean plastic container
5013	Fecal Panel (Standard) Fecal ova and parasites, reflex hookworm, roundworm and whipworm antigens by ELISA if indicated. If the fecal ova and parasites is negative for hookworms, roundworms or whipworms, the fecal antigen by ELISA for the respective parasite will be automatically performed at no additional charge. • 3–5 g fresh feces in a clean plastic container
5199	Fecal Antigen Panel Hookworm, roundworm and whipworm antigens by ELISA • 3–5 g (0.2 g minimum) fresh feces in a clean plastic container
5299	Fecal Antigen Panel with <i>Giardia</i> <i>Giardia</i> , hookworm, roundworm and whipworm antigens by ELISA • 3–5 g (0.2 g minimum) fresh feces in a clean plastic container

Turnaround time: Next day by 10:00 a.m.

Contacting IDEXX

Laboratory Customer Support

If you have any questions regarding test codes, turnaround time or pricing, please contact our Laboratory Customer Support Team at 1-888-433-9987.

Expert feedback when you need it

Our team of internal medicine specialists is always available for complimentary consultation. Please call 1-888-433-9987 if you have questions.

Recommended reading

Elsemore DA, Geng J, Flynn L, Cruthers L, Lucio-Forster A, Bowman DD. Enzyme-linked immunosorbent assay for coproantigen detection of *Trichuris vulpis* in dogs. *J Vet Diagn Invest*. 2014;26(3):404–411.

References

1. Little SE, Johnson EM, Lewis D, et al. Prevalence of intestinal parasites in pet dogs in the United States. *Vet Parasitol*. 2009;166(1–2):144–152.
2. Blagburn BL, Lindsay DS, Vaughan JL, et al. Prevalence of canine parasites based on fecal flotation. *Compend Contin Educ Pract Vet*. 1996;18(5):483–509.
3. Gates MC, Nolan TJ. Endoparasite prevalence and recurrence across different age groups of dogs and cats. *Vet Parasitol*. 2009;166(1–2):153–158.
4. Bowman DD. *Georgis' Parasitology for Veterinarians*. 9th ed. St Louis, MO: Saunders; 2009:224.
5. Fahrion AS, Schnyder M, Wichert B, Deplazes P. *Toxocara* eggs shed by dogs and cats and their molecular and morphometric species-specific identification: is the finding of *T. cati* eggs shed by dogs of epidemiological relevance? *Vet Parasitol*. 2011;177(1–2):186–189.
6. Companion Animal Parasite Council. Current advice on parasite control: intestinal parasites. www.cpcvet.org/capc-recommendations. Accessed March 24, 2015.

The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment, you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical presentation and complete laboratory data. With respect to any drug therapy or monitoring program, you should refer to product inserts for a complete description of dosages, indications, interactions and cautions.