

# Identifying Nematode Larvae in Feces of Dogs and Cats

by J. H. Greve, DVM, PhD\*

Identifying larvae that may be found in the feces of dogs and cats offers a diagnostic problem to the veterinarian. Some larvae may be from free-living nematodes instead of those from parasites, and some "larvae" may actually be plant structures. The purpose of this article is to discuss the recognition and identification of nematode larvae found in fecal specimens from dogs and cats.

Many plant structures found in fecal flotations can be confused with nematode larvae (Figure 1). Features used to recognize such plant structures are: bumpy or glassy-smooth surfaces, core of the plant structure may be filled by black-appearing air bubbles, a stiff appearance because of a thick wall, or having an unusual structure (such as being in a tight coil or a star-like cluster). Some plant hairs have what appears to be a large cup-shaped mouth, but actually it is the point where it was attached to the plant.

Instead of these characteristics, nematode larvae have a barely perceptible annular striation of the cuticle. This striation sometimes is the clue needed to recognize a badly crenated larva for what it is. The cuticle is thin and supple, not rigid. A muscular esophagus is followed by the gut, which is lined by large, granular cells, and an air bubble is never present. The mouth is either a simple, insignificant pore or a narrow cylinder, never a well developed, cup-shaped structure (Figure 2).

The most important parts of the larvae to examine for identification are the mouth, esophagus, and tail. These structures are best seen by closing the iris diaphragm of the microscope almost completely to increase contrast. By viewing these 3 structures, the following illustrated key can be used to identify

larvae of *Strongyloides*, *Filaroides*, *Angiostrongylus*, *Aelurostrongylus*, *Crenosoma*, and free-living rhabditoid nematodes that sometimes contaminate fecal specimens. If the feces are old enough, hatched hookworm larvae (*Ancylostoma*) may also occur, so *Ancylostoma* is included in the key.

*Strongyloides*, rhabditoid contaminants, and hatched *Ancylostoma* will be encountered moderately often, while *Filaroides* and *Aelurostrongylus* are seen frequently. *Crenosoma vulpis* (the "fox lungworm") and *Angiostrongylus vasorum* (the "French heartworm") have been reported only sporadically from dogs in North America, and neither has been found in cases seen in the Department of Veterinary Pathology at Iowa State University.

Nematode larvae in feces may be overlooked, because the hypertonicity of the flotation medium kills the larvae and usually causes them to become crenated, obscuring much of the structural detail needed for recognition and identification. This, coupled with the fact that only a small percentage of the larvae will float, indicates that flotation is not the best technique for recovering larvae.

The best technique for recovering larvae from feces is the Baermann method, which takes advantage of the nematode larva's predilection to migrate into water. Fresh feces are wrapped in a cheesecloth pouch and suspended in tap water in a jar or funnel. After several hours, the sediment in the water is centrifuged and examined microscopically, using a coverslip. Larvae collected in this way usually are sluggish, making their examination easy. If they are too active, a drop of iodine solution added at the edge of the coverslip will kill them rapidly as the iodine diffuses through the water.

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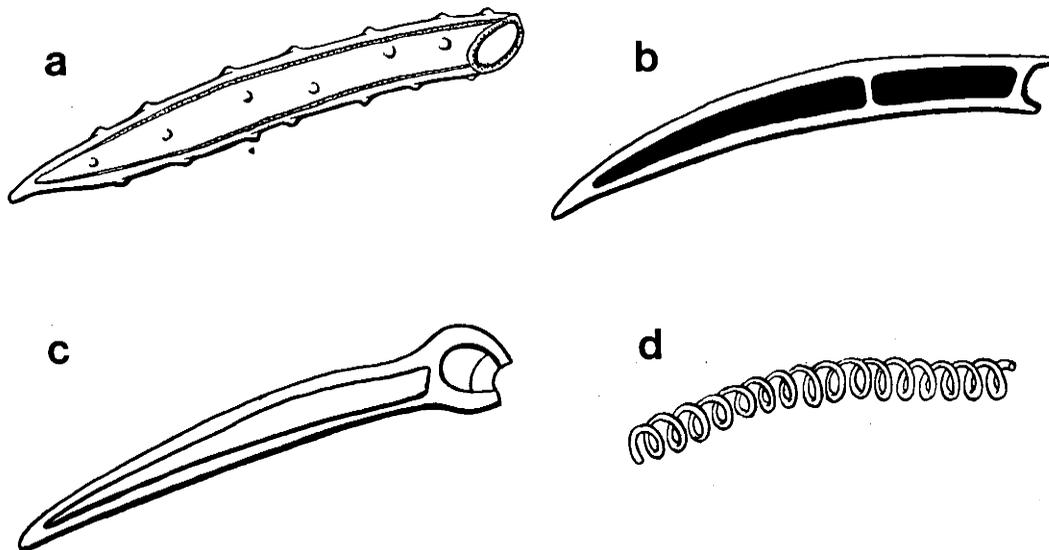


Figure 1. Pseudoparasitic plant structures: a, bumpy, cucumber skin-like surface; b, 2 black-appearing air bubbles fill cavity of plant hair; c, large, cup-shaped point of attachment; d, spiraled vascular structure.

Identification of larvae in fecal specimens is simplified if it is known that the feces are fresh and uncontaminated by contact with the ground or grass. The use of rectal feces collected by suppository or swab will eliminate contamination by extraneous larvae. Contamination of a specimen can be suspected if small, egg-bearing adults (free-living rhabditoid nematodes) occur. Contamination of the feces can also happen after the dog or cat has eaten something containing free-living rhabditoids. This kind of contamination is not apt to occur with regularity, so re-examination of the feces another day probably would be free of the contaminants.

If the key does not assist in the identification of the larvae found in a fecal specimen, you should seek the counsel of your favorite parasitologist. Feces shipped in tight containers usually arrive in the laboratory in good condition.

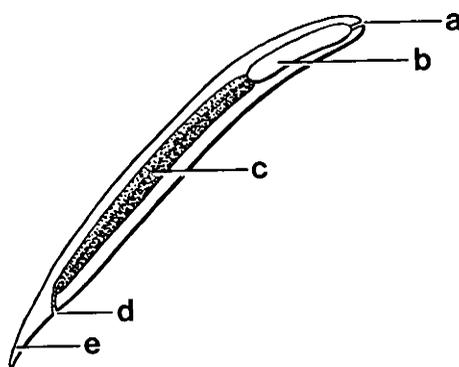
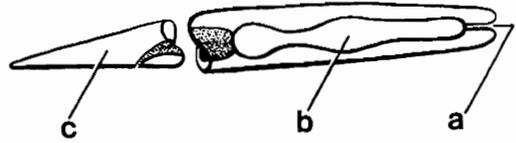


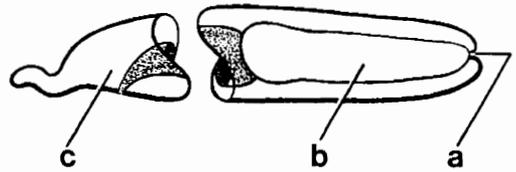
Figure 2. Basic structures in a nematode larva: A, mouth; B, muscular esophagus occupies 20–40% of larval length; C, granule-laden cells comprise gut; D, anus defines start of tail; E, tail.

**Key to first-stage  
nematode larvae  
in dog and cat feces**

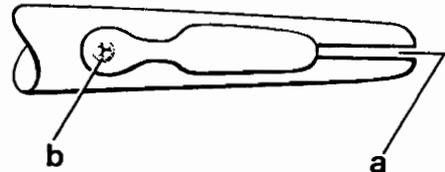
1. a. Esophagus rhabditiform (with narrow, long segment between posterior bulb and slight midlength swelling); mouth cavity tubular; tail conical and pointed (figures 3,5,6) ..... 2
  - b. Esophagus nearly cylindrical, with only minor posterior swelling; mouth cavity insignificant; tail S-shaped (Figure 4) or conical and pointed ..... 4
2. a. Rhabditiform esophagus has strongly sclerotized valve in posterior bulb; mouth tubular, at least as long as larval body is wide (Figure 5) .....  
..... rhabditoids (contaminant)
- b. Rhabditiform esophagus has weakly formed valve in posterior bulb; mouth tubular, not longer than larval body is wide ..... 3
3. a. Tubular mouth is as long as larval body is wide (Figure 3) ..... *Ancylostoma* (hatched in stale fecal specimen)
- b. Tubular mouth is distinctly shorter than the width of the larval body (Figure 6) .....  
..... *Strongyloides*
4. a. In cats; tail with small dorsal "thumb" on first bend in S-curve (Figure 7)....  
..... *Aelurostrongylus*
- b. In dogs ..... 5
5. a. Mouth opens obliquely at anterior end (Figure 8); tail conical and pointed ...  
..... *Crenosoma* ("fox lungworm")
- b. Mouth opens symmetrically in middle on anterior end; tail S-shaped or conical and pointed (Figures 2,4)..... 6
6. a. Tail conical and pointed. ....  
..... *Filaroides hirthei*
- b. Tail S-shaped ..... 7
7. a. Tail short and blunt, no small dorsal "thumb" on first bend in S-curve (Figure 4).....  
..... *Filaroides osleri*
- b. Tail pointed, with small dorsal "thumb" in first bend in S-curve; small bleb in cuticle over mouth opening.....  
.. *Angiostrongylus* ("French heartworm")



**Figure 3.** Nematode larva with tubular mouth (a), rhabditiform shape of esophagus (b), and conical, pointed tail (c).



**Figure 4.** Nematode larva with insignificant mouth cavity (a), cylindrical shape of esophagus (b), and S-shaped tail (c).



**Figure 5.** Nematode larva with long tubular mouth (a) and a strongly sclerotized valve in posterior bulb of esophagus (b).

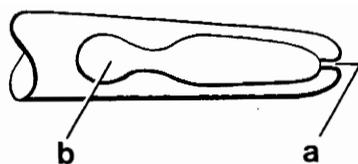


Figure 6. Nematode larva with short tubular mouth (a) and the lack of a strongly sclerotized valve in posterior bulb of esophagus (b).

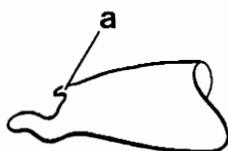


Figure 7. Nematode larva with dorsal "thumb" (a) on first bend in S-shaped tail.

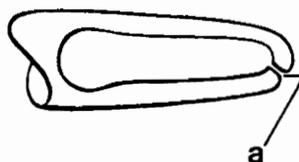


Figure 8. Nematode larva with mouth (a) opening obliquely on anterior end.

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