**OESOPHAGOSTOMIASIS**

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<th>Animal Group(s) Affected</th>
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<td>Old World monkeys, great apes; ruminants, camelids, and suids.</td>
<td>Fecal-oral: ingestion of third-stage larvae (L3); direct life cycle.</td>
<td>Diarrhea, anorexia, weight loss, lethargy, and abdominal pain.</td>
<td>Variable, but severe infection can result in death.</td>
<td>Ivermectin, pyrantel pamoate, or a benzimidazole. Surgical removal of mass effect.</td>
<td>Quarantine of new individuals; isolation of affected animals; parasite monitoring programs.</td>
<td>Yes, only for some parasite species that infect non-human primates.</td>
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**Fact Sheet compiled by:** Ginger L. Takle; **updated by:** Karen Terio  
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**Fact Sheet Reviewed by:** Guilherme G. Verocai; Stephanie McCain

**Susceptible animal groups:** Great apes, Old World monkeys, suids, camelids, ruminants

**Causative organism:**
- **Primates:** Oesophagostomum bifurcum, O. (Conoweberia) apiostomum, O. (Conoweberia) stephanostomum, O. aculeatum  
- **Ruminants:** O. columbianum, O. venulosum, O. radiatum and other species may be found in wild ruminants  
- **New and Old World camelids:** O. venulosum, Oesophagostomum sp.  
- **Suids:** O. dentatum, O. brevicaudum, O. quadrispinulatum, and other species may be found in wild suids.

**Zoonotic potential:** Yes (Oesophagostomum bifurcum and O. stephanostomum).

**Distribution:** Worldwide, but most commonly occurs in the tropics and subtropics.

**Incubation period:** Ova passed in feces hatch to infective L3 in approximately 2-7 days, depending on environmental conditions. After ingestion, the L3 enter the intestinal submucosa and forms small cystic nodules in which the nematodes molt into fourth-stage larvae (L4). The L4 can then remain in the nodules or return to the intestinal lumen where they develop to the adult stage. Generally, pre-patent period is considered 32-42 days.

**Clinical signs:**
- **Primates:** Clinical signs can range from intermittent diarrhea to inappetance, severe mucoid bloody diarrhea, pale mucous membranes, weakness, lethargy, weight loss, vomiting, abdominal pain and death.  
- **Ruminants and Suids:** Fetid diarrhea, anorexia, weakness, emaciation, and death. If chronic infection is present, clinical signs may be seen that are consistent with decreased intestinal motility, stenosis, or intussusception.

**Post mortem, gross, or histologic findings:** Oesophagostomins are also known as nodular worms due to their gross appearance. The L3 penetrate deep into and encyst in the lamina propria, submucosa, muscularis of the small and large intestine and in some cases the adjacent mesentery. Granulomas (nodules) form around the larvae primarily within the large intestine and mesentery that can be 5-50mm in diameter. These granulomas may contain reddish brown fluid and a central nematode. In some sections, inflammation is associated with migration tracts and abdominal adhesions or peritonitis may be present. Mesenteric lymph nodes are often enlarged.

**Diagnosis:** Identification of ova on fecal examination but these are confused easily with ‘hookworm’ eggs; identification of larvae or adults during intestinal biopsy; morphological identification of adult specimens collected at necropsy, PCR, PCR-RFLP, semi-nested PCR.
OESOPHAGOSTOMIASIS

Material required for laboratory analysis: Fecal sample, larvae or adult worms, nodular intestinal tissues.

Relevant diagnostic laboratories: Any diagnostic laboratory with routine parasitologic capabilities should be able to diagnose this infection. These diagnostics are readily available, as in-house fecal flotation or any laboratory performing fecal exams.

Treatment: Ivermectin, pyrantel pamoate, or benzimidazole can be administered. Where possible, surgical excision of the nodules may be performed.

Prevention and control: Quarantine of new animals, parasite monitoring program, isolation and treatment of affected animals, proper sanitation and waste removal can assist with prevention. Free-living larval stages (L1 - infective L3) survive in the environment (moisture and temperature).

Suggested disinfectant for housing facilities: Commonly used disinfectants can be used after removal of feces from the area.

Notification: None.

Measures required under the Animal Disease Surveillance Plan: None.

Measures required for introducing animals to infected animal: Treat infected or potentially infected animals prior to introduction to non-infected animals.

Conditions for restoring disease-free status after an outbreak: Negative fecal examinations can be used to identify persistent infections that should be resolved before introductions.

Experts who may be consulted:
Sharon Patton, MS, Ph.D.
Department of Comparative Medicine
College of Veterinary Medicine
University of Tennessee
2407 River Drive
Knoxville, Tennessee 37996
865-974-5645
spatton@utk.edu

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