**BAYLISASCARIA**

**Infectious Disease Committee Manual 2013**

**BAYLISASCARIASIS**

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<th>Animal Group(s) Affected</th>
<th>Transmission</th>
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<td>Avian mammals, including human</td>
<td>Ingestion of embryonated eggs or infected carrier hosts</td>
<td>Depression, lethargy, agitation, tremors, head or body tilt, circling, ataxia, lateral recumbency, coma</td>
<td>Asymptomatic to fatal</td>
<td>Early aggressive treatment with albendazole and high dose steroids have shown to be effective, ocular larva migrans can be killed using laser treatment</td>
<td>Personal/ environmental hygiene, wear gloves when working with potentially infected animals/equipment</td>
<td>Yes</td>
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**Fact Sheet compiled by:** Emily L. Blizzard  
**Sheet completed on:** 27 May 2011; updated 1 October 2012  
**Fact Sheet Reviewed by:** Sarah Bevins, Kerri Pedersen, Michael J. Yabsley

**Susceptible animal groups:** avian; mammal, including human

**Causative organism:** Recognized species of *Baylisascaris*

**Parasite** | **Primary Definitive Host(s)**
---|---
*B. procyonis* | Raccoons and other procyonids (e.g., kinkajou)
*B. columnaris* | Skunks
*B. melis* | Badgers
*B. devosi* | Martens, fishers
*B. transfuga* | Bears
*B. Schroederi* | Giant pandas
*B. tasmaniensis* | Tasmanian devils, quolls, native “cats”
*B. laevis* | Marmots, ground squirrels

**Zoonotic potential:** Yes

**Distribution:** *Baylisascaris procyonis* is a common parasite of raccoons (*Procyon lotor*) in several regions of the US and Canada and has been introduced by raccoons to Japan and several countries in Europe. In the US, the highest prevalence rates occur in the Midwestern, Northeastern, and Western states. In the Southeastern US, infections are most common in mountainous regions (Tennessee, Kentucky, and North Carolina). Surveillance has also detected the parasite in several regions of Texas, Georgia, Florida, and North Carolina. In Canada, *B. procyonis* is found in British Columbia, Nova Scotia, Ontario, Prince Edward Island, and Quebec. Current distribution maps are unavailable for the majority of other known *Baylisascaris* species. Within the US and Canada, *B. columnaris, B. melis,* and *B. transfuga* likely pose a zoonotic risk to humans and are probably found throughout the range of their natural hosts.

**Incubation period:** Once ingested, larvae may migrate through numerous tissues, including the central nervous system (CNS), as early as 3 days post infection. In susceptible species, clinical disease or death can
be observed 9-10 days post-infection. In more resistant species (or if low numbers of larvae are ingested), CNS symptoms may not appear until 2-4 + weeks post-infection.

**Clinical signs:** Clinical signs in intermediate hosts, including humans, vary based on number of larvae ingested, the tissues through which larvae migrate, and host. Pathogenicity varies among *Baylisascaris* species. *Baylisascaris procyonis* and *B. melis* are the most pathogenic, followed by *B. columaris*, but little is known about other *Baylisascaris* species. Clinical signs may include, but are not limited to, depression, lethargy, tremors, partial paralysis, head or body tilts, ataxia, circling, cognitive deficits, easy agitation/irritability, and death.

**Post mortem, gross, or histologic findings:** Many infected animals will have no gross lesions. However, inflammation and traumatic damage may be observed through the liver, lungs, and other organs of animals infected with large numbers of larvae. In these hosts, granulomas may be grossly visible in many tissues such as the liver, lungs, heart, diaphragm, pancreas, spleen, kidneys, mesentery, mesenteric lymph nodes, intestinal wall, skeletal muscles, brain, and eyes. Histologically, extensive inflammatory tracts and larvae may be observed.

**Diagnosis:** Humans: Suspect *Baylisascaris* infections can be diagnosed using serologic methods such as ELISA and Western blotting.

**Material required for laboratory analysis:** Adult nematode specimens may be examined microscopically and identified morphologically although adult males are needed to determine species. Genetic identification may be needed for larva migrants found in intermediate hosts and/or immature nematodes in definitive hosts.

**Relevant diagnostic laboratories:** Veterinary clinics can run routine fecal exams to diagnose infection in definitive hosts. In intermediate hosts, veterinary diagnostic laboratories capable of PCR analysis and/or histology should be able to perform diagnostic testing on suspected animal cases. Human cases should be referred to the Health Department or the CDC for testing.

**Treatment:** Aggressive treatment with albendazole (400mg/day regardless of weight) given as a single dose or in short courses combined with high doses of steroids is recommended in humans. Ocular larva migrans can be killed using lasers followed by a regime of anti-inflammatory drugs and steroids to aid in the possible recovery of any remaining visual acuity. Raccoons, other procyonids, skunks, domestic dogs, and bears can be successfully treated with common antihelminitics such as pyrantel pamonate (20 mg/kg), ivermectin (1 mg/kg), moxidectin (1 mg/kg), albendazole (50 mg/kg x 3 days), fenbendazole (50 mg/kg x 3 days), and flubendazole (22mg/kg x 3 days). Animals should be monitored regularly after treatment to ensure complete clearance of worms.

**Prevention and control:** Continued education of the public, human health, wildlife, and veterinary professionals should be made a priority. Recent research using anthelmintic baits combined with the removal of latrine sites has shown to decrease prevalence rates among intermediate hosts. Further research is needed to determine the exact distribution, potential for spread, transmission dynamics, and impacts on wildlife.

**Suggested disinfectant for housing facilities:** Areas should be cleaned immediately to avoid accidental ingestion of eggs by children or pets. Eggs are not immediately infectious and must develop in the environment for a period of time (11-14 days up to several months) before becoming infective. Frequent sanitation will limit the buildup of eggs on these surfaces. However, eggs will continue to accumulate in the surrounding environment and once the eggs embryonate, they can remain viable for several years. Currently few methods are available for decontaminating areas infested with *B. procyonis* eggs. Highly concentrated caustic chemicals such as a 50/50 mixture of xylene and absolute alcohol, boiling lye, or boiling
Lysol may be used to decontaminate potentially infected areas. The most effective way of decontaminating an area is flaming. Although burning is the most effective way to kill eggs, it is not feasible for flammable areas such as roofs, decks, etc. In the laboratory, exposing infectious eggs to water heated to 62°C for 1 minute has been shown to inactivate larvae.

Notification: *Baylisascariasis* in humans is reportable in some states; check your local requirements. Infection in animals is not reportable, except in Washington State where infections in animals, other than raccoons, is reportable.

Measures required under the Animal Disease Surveillance Plan: None

Measures required for introducing animals to infected animal: Animals displaying neurologic symptoms are not infective to other intermediate hosts. However, impaired intermediate hosts are likely to become prey for various carnivore or omnivore species. If ingested by an appropriate definitive host, the parasite cycle within a system could be perpetuated. Definitive hosts known to harbor infections should be quarantined, placed on an anthelmintic regime, and monitored regularly for infection. Before placing susceptible animals in cages that had contact with infected animals, the cages should be decontaminated.

Conditions for restoring disease-free status after an outbreak: None

Experts who may be consulted:

Michael J. Yabsley
Associate Professor
589 D.W. Brooks Drive
Southeastern Cooperative Wildlife Disease Study
College of Veterinary Medicine
University of Georgia
Athens, Georgia 30602
Office: (706) 542-1741
myabsley@uga.edu

References