Lernae cyprinacea Infestation in an Axolotl

Raffaele Melidone, Dr med vet; Jennifer A. Chow, DVM; Mario Principato, Dr med vet

A pet axolotl (Ambystoma mexicanum) was presented for white finger-like structures extending out of the body wall (Fig 1). According to the owner, these projections had increased in number during the previous 4 weeks. The appetite and attitude of the axolotl were unaffected.

The axolotl was housed in an aquarium with a water purifier, small stones on the bottom of the aquarium and a small light source (not UVA-UVB lamp). No heat source was provided (optimal temperature for axolotls is 14-20°C [57-68°F]). The axolotl had been in the home for 3 months and had been fed only mealworms. During the first office visit, whole small fish were recommended for the diet.

The parasites were removed manually using surgical forceps (Fig 2). The only parasites that could not be removed were those that were too small or too deeply attached to the skin.

Following the removal of most of the parasites from the external surface, ivermectin (Ivomec® - Merial) was administered orally at a dose of 0.2 mg/kg, which was repeated in 2 weeks. The owner was advised to place the axolotl in a new clean aquarium to eliminate the potential for reinfection.

The parasite was sent to the Department of Parasitic Disease, School of Veterinary Medicine, University of Perugia for analysis, where it was identified as Lernae cyprinacea Linnaeus (Crustacea: Copepoda). Lernae cyprinacea, the anchor worm, is a widely distributed copepod parasite of freshwater fish and frogs. It can reach epidemic proportions in restricted environments, and heavy infestations may be fatal. Secondary bacterial infections may develop at attachment sites.

No antibiotics were administered to the axolotl nor were any local antiseptic solutions used. The axolotl was kept under observation for 1 week to monitor for bacterial overgrowth. After 15 days, when the axolotl was presented for a recheck, it was almost completely free of parasites. One parasite was found on the dorsum, but it was dead and readily detached from the skin.

The axolotl owner had not seen any parasites on the animal when she bought it, and the parasites did not start to appear until 2 months later. Eggs may have been present in the water used to transport the axolotl from the pet store, or perhaps the parasites were too small to be noticed. On a follow-up visit, the parasites were seen on a fish that had been housed in the same pet shop aquarium as the axolotl. This parasite is common in cold water fish, but it is not common in amphibians.

Although it is thought by some that ivermectin may not be effective in treating an infestation of L. cyprinacea in axolotls, the author believes that the ivermectin in combination with

About Anchor Worms

During the life cycle of Lernaeae, the young are free swimming but they need a temporary host. The parasites copulate while they are still in the larval stage. After copulation, the male dies and the female abandons the temporary host to become a free-swimming form again. Metamorphosis occurs when the female finds and becomes attached to a definitive host. Hemorrhage and ulcers can occur at the site of penetration.

About Axolotls†

The axolotl (Ambystoma mexicanum) is a large salamander native to Lake Xochimilco, Mexico. It belongs to a group known as mole salamanders, which includes the tiger salamander (Ambystoma tigrinum) and the spotted salamander (Ambystoma maculatum).

The wild-type axolotl is dark colored with greenish mottingling. Sometimes there are silvery patches on the skin. The eyes have yellow, iridescent irises. Adult axolotls can reach 30 cm (about 12 inches) or more in length from nose to tail tip, and they can weigh as much as 300 g. They are known for their blunt snouts and large mouths. Axolotls are neotenic, keeping their feathery external gills and tail fin their entire lives and maintaining their aquatic lifestyle.

In their native habitat, axolotls eat small fauna, including snails, worms, crustaceans, various small invertebrates such as Daphnia, and small fish and amphibians. In the laboratory, young are fed larvae brine shrimp and juveniles and adults are fed pelleted food.

† From The Indiana University Axolotl Colony Web Site (www.indiana.edu/~axolot)
environmental cleaning and disruption of the anchor worm life cycle contributed to the resolution of this disease in such a relatively short period of time.

**References and Further Reading**


**Treatment for L. cyprinacea in Fish**

Because vermectin cannot be used in fish, the following drugs are recommended for treatment of an aquarium housing fish infested with *L. cyprinacea*.

1. Diflubenzuron: 0.01 mg/ml tank water for 48 hours every 6 days for 3 treatments.
   (Inhibits chitin synthesis; drug persists in the water for long-term, see page 26).
2. Potassium permanganate: 100 mg/L for 30-60 minute bath (For freshwater fish/protozoan crustacean ectoparasites; toxic in water with high pH; do not mix with formalin; can be toxic for goldfish.)
3. Trichlorfon: 0.5 mg/L tank water every 10 days for 3 treatments. (Crustacean ectoparasites; change 20-30% of water 24-48 hours following each treatment.)

**Recommended Resources for More Information**

According to Kevin Wright, DVM, co-editor of Amphibian Medicine and Husbandry, the following website is the best single information source about axolotls:

- [www.indiana.edu/~axolotl](http://www.indiana.edu/~axolotl)

A short husbandry guide is available at [www.indiana.edu/~axolotl/axolotlts/shortguide/guide.html](http://www.indiana.edu/~axolotl/axolotlts/shortguide/guide.html)

Dr. Wright's recommended books include:

- de Vosjoli P: Popular Amphibians. Irvine, CA, Bow Tie Press, 2004. ("I haven't seen this new book, but it does include axolotls and he usually has spot-on information.


- Petranka, James W: Salamanders of the United States and Canada. Smithsonian Institute Press, 1998. ("Nothing on axolotls but plenty on related ambystomatid salamanders including some