

## SAFETY OF FEEDING ANADROMOUS FISH TO POLAR BEARS

*Holly Reed, DVM*

*Point Defiance Zoo & Aquarium, 5400 N. Pearl St., Tacoma, WA 98407*

### Abstract

Fish are a standard part of polar bear diets in zoos and aquaria. Though most fish are frozen and thawed for feeding, some institutions have access to fresh fish such as salmon and trout. Recently, animal managers have encouraged the feeding of live fish for enrichment purposes. In 1982 two polar bears living in a Pacific Northwest zoo were thought to have died of salmon poisoning. More recently, sun bears in a west coast zoo were treated for an active case of salmon poisoning. Concern for polar bear health has lead institutions to question the feeding of anadromous (fish that swim up stream) fish, like salmon and trout, which can carry the fluke and rickettsial organism responsible for the disease. Investigation of this issue has lead to new recommendations for feeding live or fresh anadromous fish from the Pacific Northwest to polar bears.

Salmon poisoning is caused by rickettsial agents, Neorickettsia helminthoeca and Neorickettsia elokominica, which live in the fluke Nanophyetus salmincola. This fluke is found only in the Pacific Northwest because its host, the Oxytrema plicifer snail, can only live in the coastal areas of Washington, Oregon and northern California. All anadromous fish (AF) can be carriers of this fluke in these locations, but 99% of the fish found to be infested are salmon. This infestation rate could include hatchery raised fish. Trout, bluegill, and even Pacific salamanders have also been found to carry the fluke with these Neorickettsia.

The snails carrying the flukes are ingested by the fish, the fluke cercariae encyst in the muscle of the fish. A carnivore who eats the fish becomes infected if the fluke carries the rickettsia. The adult fluke penetrates the mucosal lining of the gut and releases/injects the rickettsial agent into the bloodstream of the host. This step is critical to initiating an infection. Dead flukes (in frozen or cooked fish) cannot spread the rickettsia causing salmon poisoning. Carnivores become infested because they are considered the natural host for the fluke. Normally they adapt to the presence of the fluke, the body can fight the rickettsial infection and the animal doesn't succumb to the disease. It is reported that cats, raccoons, black bears and grizzly bears eat infested/infected fish but do not experience salmon poisoning<sup>2</sup>. The canid family, though, is a well known exception where untreated rickettsial infections can act quickly and be fatal.

A paucity of salmon poisoning cases in wild or zoo housed ursids and recommendations from some veterinary pathologists have lead to some level of comfort in feeding fresh Pacific Northwest anadromous fish (PNWAF). The 1982 report of salmon poisoning in 2 female polar bears<sup>1</sup> and the 2004 case in sun bears have raised some questions with regard to the feeding of PNWAF and will require further investigation. Until the details of these cases are known, it is recommended that when feeding AF it is safest to feed fish that have been completely frozen (3 days of freezing for large salmon – longer for larger fish) if they are harvested from any Pacific

Northwest location. Anadromous fish from locations other than the Pacific Northwest may be feed fresh if deemed fit for human consumption.

#### **LITERATURE CITED**

1. Cutting, A., (2004) Personal communication
2. Hoggan, S., Salmon Poisoning Disease: Pet Health topics from the College of Veterinary Medicine, Washington State University. 2001 via search on Veterinary Information Network on 24 February 2005