SALMINCOLA IN COLORADO

(*Salmincola californiensis/edwardsii*) Biosheet

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Description

Salmincola, often called gill lice, are parasitic crustaceans that attach to trout and kokanee in both free-ranging and hatchery populations in Colorado. It is an obligate parasite, meaning it cannot live independently of its host. The parasites attach to and damage the gills so the fish cannot properly exchange gases and waste products. This causes the fish to be very susceptible to stresses such as angling and catch-and-release activities.

Gill lice have no intermediate hosts, but have several stages of development occurring without a host. Adult females attached to the fish produce eggs which are released into the water. The eggs hatch into free-swimming larvae which rapidly develop through several more stages until they find a susceptible fish species. The male gill louse attaches to and fertilizes a female. The male remains attached to the female for the rest of its life, while the female finds a suitable site on the fish to attach and produce eggs.

The species found in Colorado have not been determined, with the exception of the population at Crystal River and Poudre Hatcheries (*Salmincola californiensis*). There are two possible species in Colorado:

- *Salmincola californiensis* is native to the western United States, including Colorado, but has spread via fish transfers as far east as New Jersey. It has been documented to infest rainbow trout, Chinook salmon, lake trout, Kokanee salmon and cutthroat trout (Hoffman 1999).
- *Salmincola edwardsii* is located in habitats found throughout the northern continents and affects primarily char, but can infect and has been reported from cutthroat trout, rainbow trout, sockeye salmon, mountain whitefish, arctic char, Dolly Varden trout, lake trout and arctic grayling (Hoffman 1999).

Salmincola infections of fish are not to be confused with *Nanophytes salmincola,* which is a parasitic fluke with a snail being the first host, salmonid fish being the second host, and carnivorous and omnivorous mammals, members of the cat family, members of the weasel family, bear, and humans as the final host.

Range in Colorado

Within the Colorado Division of Wildlife (CDOW) State Hatchery system, gill lice were found at Chalk Cliffs State Fish Hatchery in the late 1990s, at the Poudre State Fish Hatchery in 1995 and 2007, and in the Crystal River Hatchery in 2009. In free-ranging fish, it has been documented in the Blue, Rio Grande, Yampa, and Arkansas Rivers; in the South Platte drainages near Jefferson and Evergreen and in kokanee in Elevenmile Reservoir; and the North Fork of the Cache la Poudre River (Walker, 1995). It was also seen in broodstock rainbows at Mt. Massive Lakes in 2008. It has been found in the North Fork of the South Platte River and in Eleven Mile, Green Mountain and Gross Reservoirs (Walker, pers. comm.) and the Blue River below Green Mountain Reservoir. It is known to have occurred in Woody Creek and the Upper Roaring Fork for 20 years (Walker, pers. comm.). It has also been found in Cheesman Reservoir in kokanee during the spawn (Johnson, pers. comm.), and in Pinewood and Flatiron Reservoirs (Ingram, pers. comm.). It was identified in Catamount Reservoir near Steamboat Springs in 2010.

Known hosts in Colorado

In Colorado, *Salmincola* has been found on kokanee salmon and rainbow trout. Although not reported, other fish are susceptible, including those listed above that occur in the state.

Prevention, Control and Treatment

The adult females have an impermeable cuticle rendering them quite resistant to common chemical agents, but larval stages can be killed with some chemical treatments. The larvae that are exposed to the chemical are killed; however more larvae are continually produced from the adult females causing a very steady source of new larval stages. Treatment at the larval stage has to be very frequent to be effective. Severity of infestation may be decreased by this method but complete removal of the parasite is unlikely.

Prevention

Secure water sources, prevention of introduction of infected fish, and eliminating bird and animal vectors are all first-line prevention measures. By using well and spring water sources, the organism is prevented from entering a facility. Placing covers and nets over raceways helps get rid of animal vectors. Some hatcheries are on surface water, and that is the main way for a facility to become infected, besides direct introduction of infested fish.

Treatment

Currently in the United States there are no Food and Drug Administration-approved drugs available for eliminating *Salmincola* in food fish. Emamectin benzoate (SLICE™) is a pesticide for control of parasitic copepods, but has only been approved in countries other than the US. The pesticide has been carefully tested so that is it safe to use on fish and only kills the parasite by interfering with the animal's nervous system. Currently, fish can be treated with SLICE ™ only under the Investigational New Animal Drug program. Sea lice, another crustacean parasite, which have been treated with SLICE™ for several years, have recently started to develop resistance to the effects of SLICE™.

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References cited:

Hoffman, G. L. 1999. Parasites of North American Freshwater Fishes, 2nd edition. Comstock Publishing Associates, Ithaca, New York and London.

Walker, P. G. 1995. The "Trout Louse," *Salmincola sp.*, a Parasitic Copepod. The Fishline, Colorado Aquaculture Association, Vol. 7, No. 4, pp. 1-5.

Adult female with two egg sacs and attachment to gill filament – C. Gunn photo