Control of the Parasitic Flagellate *Ichthyobodo salmonis*, a Causative Agent of Marine Mortalities of Juvenile Chum Salmon

Shigehiko Urawa

Hokkaido National Fisheries Research Institute, FRA
Sapporo 062-0922, Japan (E-mail: urawa@affrc.go.jp)


Chum salmon infected with *I. salmonis*

PARASITE

Ichthyobodo salmonis (=*I. necator*) is a common ectoparasitic flagellate infecting the skin and gills of juvenile chum salmon at hatcheries (Fig. 1).

Infection experiments indicated that the heavy parasite infection causes severe erosion in the skin epidermis of juvenile chum salmon (Fig. 2), resulting in high mortality of anadromous fish due to the osmoregulatory failure when they migrate into the coastal ocean (Urawa 1993*).

A bath with dilute formalin solution is the most effective way to treat the infected fish (Fig. 3A). In Japan, however, the formalin bath for hatchery fish is restricted since the revision of Pharmaceutical Affairs Law in 2003.

Alternative effective treatment methods are currently not available for hatchery salmon, and some hatchery managers believe that the recent decrease of chum salmon returns in Japan might be partly caused by parasite infections. The present project aimed to develop a safety method to control *I. salmonis* infections on juvenile chum salmon.

CONTROLS

Various concentrations of salt and vinegar solutions were tested for juvenile chum salmon heavily infected with *I. salmonis*.

A 10-min bath with the high concentration (5%) of salt water decreased the parasite density, while it had a high risk to kill juvenile chum salmon, because the parasite infections reduced their tolerance to salt water (Fig. 3B). Since *I. salmonis* on anadromous salmon can survive even in sea water, low concentrations of salt water are not effective to control the parasite infections.

A bath with 0.4-1.0% corn vinegar could control the parasite, while 1% corn vinegar (pH 3.9) bath over 15 minutes weakened or killed the treated fish (Fig. 3D). The present treatment study suggested that a one-hour bath with the low concentration (0.4%, pH 4.5) of corn vinegar is a safe method to control *I. salmonis* on juvenile chum salmon at hatcheries (Fig. 3C).

*Urawa, S. 1993. Effects of *Ichthyobodo necator* infections on seawater survival of juvenile chum salmon (*Oncorhynchus keta*). Aquaculture, 110: 101-110.

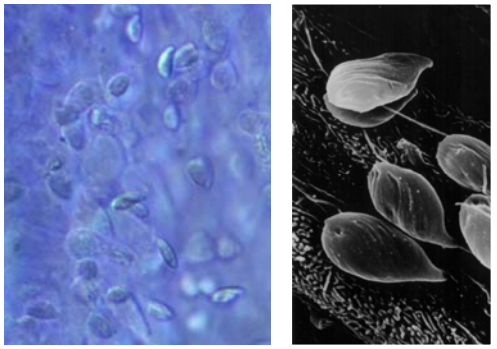

Fig. 1. *Ichthyobodo salmonis* on the fins of chum salmon. The parasite is a small flagellate ranging 10-12 µm in body length.

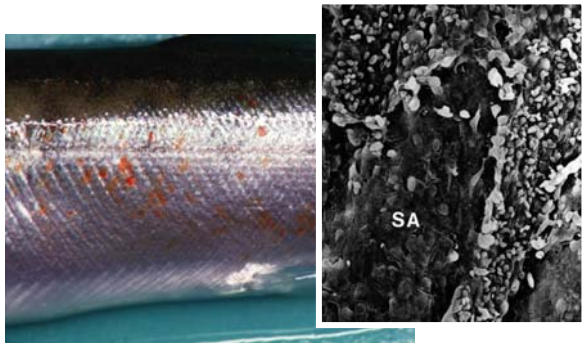

Fig. 2. The heavy parasite infection caused severe erosion and hemorrhage in the skin epidermis, and large area of the epidermis was sloughed off (SA).

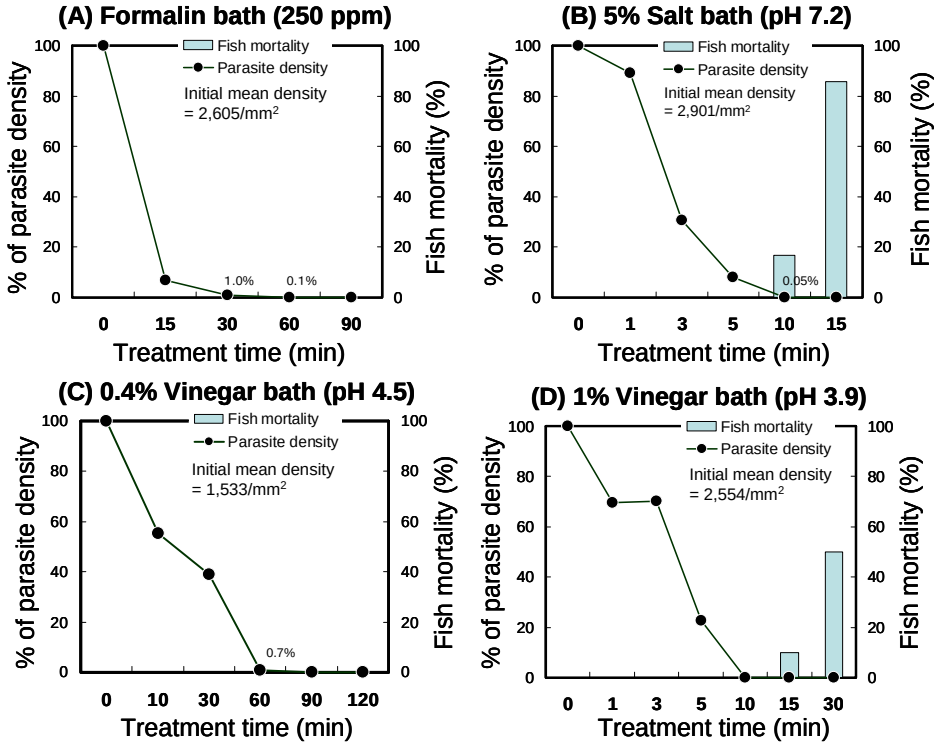

Fig. 3. Effects of various bath treatments on the density of *Ichthyobodo salmonis* on the fins of juvenile chum salmon.