



Section:	Fish Health Management
Title:	Bacterial Coldwater Disease Protocols
Original Effective Date:	June 30, 2010
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Purpose: *Flavobacterium psychrophilum*, the causative bacteria of Bacterial Coldwater Disease (BCWD), has become a major fish health issue not only in Wyoming, but across the western United States. Although mortalities typically range from 5-30% at our facilities, up to 80% losses have been documented in other states.

Rainbow trout brood stocks appear to have the highest infectivity level of BCWD although other species are showing increasing signs. Anecdotally, the bacteria appear to be introduced from the brood stock and are carried by the eggs to the incubator and hatchery.

Fish Culture personnel are proactively working to minimize the bacteria throughout the fish rearing life cycle to reduce BCWD outbreaks. The following protocols were initially developed during a facilitated discussion at the June 2010 Fish Culture Supervisors meeting. Antibiotic treatments are not considered a protocol and are the last resort to combat BCWD.

1. Spawning

- a. Use a fresh (first use) water supply to rinse and water harden eggs. Do not use water from the spawning runs or directly from any rearing units.
- b. Green eggs from captive brood stocks shall be treated after water hardening with iodine (100 ppm for 10 minutes) prior to shipment, then rinsed and shipped in fresh water. If the brood facility is the receiving incubator, this step is not required since they will be treated twice on site before incubation.

2. Incubator

- a. Green eggs shall be treated twice with iodine, 100 ppm for 10 minutes, before placing in the incubator, rinsing with fresh (first use) water between treatments.
- b. If practical, treat incubating and eyed eggs with alternating treatments of formalin (1,000 ppm – 2,000 ppm for 15 minutes) and hydrogen peroxide (500-1,000 ppm for 15 minutes). Formalin is not effective in reducing *Flavobacterium psychrophilum*.
- c. Eyed eggs shall be treated five (5) straight days with hydrogen peroxide (500-1,000 ppm for 15 minutes) prior to shipment to reduce the bacterial load as much as possible.
- d. Eyed eggs shall be treated twice with iodine (100 ppm for 10 minutes) and rinsed with fresh (first use) water between treatments before measuring into the hatchery rearing units; even if the incubating station is the receiving hatchery.

3. Proactive Fish Rearing

- a. Salt Treatment (two treatments are preferable).
 - i. If initial signs of BCWD are noted with sac-fry, treat with a salt bath at 0.5 to 1.0%. (cutthroat and grayling, consider lower concentration)
 - ii. For small feeding fish, treat with a salt bath up to 2.0%.
- b. Feed – all feed to size #3 will be supplemented with probiotics at the feed mill.
- c. To reduce any bacterial loading in a rearing unit or downstream rearing, remove dead and moribund fish promptly, especially if the lot in question is assumed to be infected with BCWD.
- d. If practical, thinning a lot may be beneficial if an infection is detected early. However, a thinned lot does not always prevent BCWD, but may reduce the severity of an infection.

4. Proactive Fish Distribution

- a. Salt Treatment for fish transfers between stations.
 - i. Receiving station sets up treatments, 0.5% initially, increasing the total concentration to 1.5 to 2.5% in transit or upon arrival (20 minutes to 1 hour based on fish behavior).
 - ii. Exact treatment time and salt concentration depends on the experience noted with various species at each station.

5. Bio-Security

- a. Hand sanitizers shall be used between rearing areas (e.g. incubator to hatchery, hatchery to outside rearing units) and utilized between handling each lot. It is not feasible to employ hand sanitizers for outside rearing units or unheated buildings.
- b. Virkon[®] foot baths are to be placed in hatchery entries and doorways for incubators and isolation facilities.
- c. It is recommended all equipment shall be disinfected with Virkon[®] between uses, especially between lots (use weed sprayer and small buckets for dipping). It is preferable to have separate brushes etc. for each lot if disinfection is not feasible in outdoor environments. If an infection is noticed in one rearing unit of a lot, equipment shall be either isolated to that unit or disinfected before using in remaining lot rearing units.
- d. Incubators, jars, baskets and rearing units shall be emptied, cleaned with an approved cleaning compound, and air dried when possible. Each unit shall be disinfected with Virkon[®] before repopulating.
- e. Distribution tanks shall be rinsed and disinfected with Virkon[®] (spray on application) or chlorine (under standard disinfection protocols) prior to using for transfers between stations. Chlorine disinfection is still the standard protocol for out-of-state trip procedures.