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CONTROL OF FURUNCULOSIS BY TOPICAL DISINFECTION OF FISH EXTERNALLY INFECTED WITH *AEROMONAS SALMONICIDA*

We developed procedures for nonlethal detection of *A. salmonicida* from mucus and innovations in treatment protocols so that hatchery biologists could reduce the effects of furunculosis in externally infected stocks of fish. Adding nonlethal sampling to a regular monitoring program allowed the pathogens to be detected at early stages of infection. If detected as a predominantly external infection, application of topical disinfectants could prevent the progression of systemic infection.

THREE COMPOUNDS WERE EVALUATED FOR DISINFECTANT ACTIVITY

Sixty-minute bath treatments in formalin (250 ppm), salt (3%), and Chloramine-T (sodium para-toluene-sulphonchloramide; 15 ppm) were evaluated for efficacy against external infection by *A. salmonicida*. Bacterial density during communal challenge of experimental fish averaged 1×10^5 colony forming units (cfu) of virulent *A. salmonicida* per milliliter of aquarium water. Our results indicated that Chloramine-T was more effective against *A. salmonicida* than either salt or formalin. After 24 h, bacterial prevalence was 1.7×10^3 to 8.0×10^4 cfu of *A. salmonicida* per gram of mucus among 8 of the remaining 10 untreated control fish. Eight of the formalin-treated and seven of the salt-treated fish also remained infected, with concentrations of 2.0×10^3 to 3.8×10^5 cfu per gram of mucus. By contrast, the pathogen was detected in only two of the Chloramine-T treated fish with prevalences of 2.0×10^3 and 1.0×10^4 cfu of *A. salmonicida* per gram of mucus. The pathogen was not recovered from the kidneys of any fish sampled at 24 h after treatment.

EXPERIMENTAL EFFICACY OF CHLORAMINE-T

Results of two further tests with brook trout (*Salvelinus fontinalis*) substantiated the therapeutic value of a single, 15-ppm treatment of Chloramine-T against *A. salmonicida*. Statistical analysis for both experiments verified that pathogen prevalence on treated groups was significantly different from untreated control fish.

FIELD EVALUATION OF CHLORAMINE-T AS A TOPICAL DISINFECTANT IN ATLANTIC SALMON

Among two pools of Atlantic salmon (*Salmo salar*) at the White River National Fish Hatchery (Bethel, Vermont), *A. salmonicida* was detected on the mucus from 17 of 27 presmolts in the first pool and bacterial prevalence was 1.0×10^3 to 4.4×10^6 cfu of *A. salmonicida* per gram of mucus. Two of these fish were also infected systemically with concentrations of 5.0×10^3 and 8.0×10^4 cfu of *A. salmonicida* per gram of kidney. A similar infection existed in the second pool, although the pathogen was detected only on the mucus from three fish; bacterial prevalence was 1.0×10^3 to 2.0×10^3 cfu of *A. salmonicida* per gram of mucus. Seven days after treatment, 27 fish from each pool were again examined. About 1.0×10^4 cfu of *A. salmonicida* were cultured from the mucus of one fish in the first pool, which had sustained the highest pretreatment prevalence. *Aeromonas salmonicida* was not isolated from the mucus of any fish in the second pool nor was it isolated from kidney samples of fish in either pool.

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CHLORAMINE-T IS NOT REGISTERED FOR USE ON FOOD FISH

Salt and formalin are routinely used to treat Atlantic salmon and other fish infected with external parasites and fungi. Our results suggested that neither salt nor formalin was as effective as Chloramine-T against *A. salmonicida*. The Chloramine-T treatments we applied in laboratory and field studies effectively reduced *A. salmonicida* in the mucus of fish. Maximum benefit was achieved when Chloramine-T was applied by static bath to control external infection. In other studies, no benefit was achieved by treating fish with Chloramine-T once systemic infection was established in the population. Chloramine-T is not registered for use on food fish, and the work performed in the present study was conducted under an Investigational New Animal Drug Permit issued to the U.S. Fish and Wildlife Service by the U.S. Food and Drug Administration.

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