

Pathogenic effects of some common bacteria on trout in hatchery systems

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Abstract

Compared to investigations involving later life stages, there are relatively limited reports of the effects of bacteria on egg hatching and very early survival of salmonid larvae. The present study investigated the effects of this by exposing eyed eggs of rainbow trout (*Oncorhynchus mykiss*) and Black Sea salmon (*Salmo labrax*) to a selection of bacterial fish pathogens, including *Aeromonas hydrophila*, *Lactococcus garvieae*, *Pseudomonas putida*, and *Yersinia ruckeri*. Mortality rates of 17.66% and 20.3% resulted from exposure to *A. hydrophila* isolates in rainbow trout and Black Sea salmon, respectively, while the mortality rates in their respective control groups were 1% and 2.6%. Further, cumulative mortality rates due to exposure to the other bacterial isolates tested were higher than that of the control group. Blue-sac fry syndrome, spine deformities, darkening of skin color, and hemorrhages were observed in fish exposed to these bacteria. Thus, the present study describes the pathogenic effects of bacterial contamination on the performance of the early stages of trout grown in hatchery systems.

Introduction

The water quality parameters, specific feed rations for different fish species, and the quality of broodstock, along with presence of pathogenic bacteria, are crucial considerations for trout production in hatchery systems (Plumb, 1999). Infections result in a high fish morbidity and/or mortality, marketing problems, and associated economic losses (Woo, 2006; Austin and Austin, 2007; Öztürk and Altınok, 2014). Bacterial, fungal, viral and parasitic diseases have been commonly reported from both wild and reared aquatic systems all over the world (Noga, 2010).

A range of bacterial fish pathogens affect reared salmonids and other species. These include

Yersinia ruckeri (enteric red mouth disease), *Lactococcus garvieae* (lactococcosis), *Vibrio anguillarum* (vibriosis), *Aeromonas salmonicida* and *A. hydrophila* and *Pseudomonas* spp. (Austin and Austin, 2007). In Turkey, and indeed other countries, most reports of the effects of bacterial pathogens concern the effects on fry and older stages of rainbow trout (*Oncorhynchus mykiss*), sea bass (*Dicentrarchus labrax*), and sea bream (*Sparus aurata*) (Öztürk and Altınok, 2014). There are only a few reports on bacterial infections in eggs, alevins, and fry in trout hatcheries. *Flavobacterium psychrophilum*, the aetiological agent of "cold water diseases", is the most reported bacterial pathogen in salmonid hatcheries and it can cause mass mortality. It, besides predominantly affecting trout fry, can also be

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