

**Probiotic strains for disease management in hatchery larviculture of the eastern oyster  
*Crassostrea virginica***

ABSTRACT

Bacterial pathogens are a major cause of mortality in bivalve hatcheries, and outbreaks can result in shortages of seed supply to the grow-out industry. The use of probiotic bacteria is a potential preventative measure to limit the impact of bacterial diseases. Previous research showed that the marine bacteria *Phaeobacter inhibens* S4 (S4) and *Bacillus pumilus* RI06—95 (RI) protect larval eastern oysters (*Crassostrea virginica*) when challenged with the pathogens *Vibrio tubiashii* RE22 (now *Vibrio coralliilyticus* RE22) and *Roseovarius crassostreae* CV919-312<sup>T</sup>. In this study, these probiotic bacteria were tested under hatchery conditions. Daily addition of S4 and RI ( $10^4$  colony forming units (CFU)/ml) to 100-l culture tanks resulted in a significant decrease in the levels of total *Vibrios* in water and tank surfaces ( $P < 0.05$ ), but not in oysters. Larval growth and survival was unaffected by the probiotic treatments. Larvae treated with probiotics in the hatchery showed significantly less mortality than larvae from control tanks when exposed to  $10^5$  CFU/ml of *V. coralliilyticus* RE22 for 24 h in a laboratory challenge. These results suggest that S4 and RI are safe and potentially effective tools to limit disease outbreaks in oyster hatcheries.

**Keyword:** Probiotic bacteria; Oysters; Larvae; *Crassostrea virginica*; Hatchery; Disease