

Bacteriologic Studies of Long Island Shellfish Hatcheries: An Abstract

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High concentrations of bacteria in shellfish hatchery media have been reported as a cause of larval mortality (Guillard, 1959; Malek and Cheng, 1974; Tubiash et al., 1965). This study was undertaken to characterize the dominant bacterial flora of the Long Island, N.Y., shellfish hatcheries. Although the study was initiated at a single hatchery during 1972, the current report covers a 3-year period (1974-76) and includes five hatcheries.

Bacteriologic samples from sick and healthy oyster and clam larval cultures and their ingredients were taken at a standard working dilution onto plate count agar media with synthetic sea salts. Each cultural sample was replicated in triplicate. The hatchery ingredients samples included incoming ultraviolet-treated and untreated bay and well water, stock algal cultures, and pooled algal cultures. Samples were taken throughout the year at regular monthly intervals. Qualitative and quantitative counts were made of the dominant populations of each culture, and isolated colonies were identified as pure cultures.

A total of 1,279 cultures were taken and 710 pure bacterial isolates were

identified. Sixty-six percent of all bacteria isolated and identified from intake water samples were gram negative, and 15.7 percent were gram positive. Well water had a higher percentage of gram-positive organisms than did bay water intake. Thirty-three percent *Pseudomonas*, 10.4 percent *Flavobacterium* or *Cytophaga*, 8.7 percent *Acinetobacter*, 4.9 percent *Aeromonas*, 3.8 percent *Enterobacteriaceae*, 3.2 percent *Vibrio*, and 1.5 percent *Achromobacter* spp. were the dominant gram-negative isolates found in all water sampled. Well water counts were lower but contained a higher percentage of *Aeromonas*, *Vibrio*, and *Flavobacterium* or *Cytophaga*, and less *Enterobacteriaceae* than did bay water. Ultraviolet treatment had no effect on bacterial counts of hatchery water intake. Stock algal cultures were frequently contaminated with a wide variety of bacteria. The percentage of *Acinetobacter* and *Flavobacterium* or *Cytophaga* spp. increased in algal cultures. Sick or dying oyster larval cultures are characterized by a sharp decrease in the percentages of *Pseudomonas*, *Flavobacterium* or *Cytophaga*, *Acinetobacter*, and *Enterobacteriaceae*

spp., and a rise in percent gram-positive bacteria. Sick clam larval cultures were associated with a drop in the percentage of *Flavobacterium* or *Cytophaga*, *Aeromonas*, and *Enterobacteriaceae* spp. The percent of unidentified and lost bacterial cultures increased in sick oyster and clam larval cultures. Each hatchery larval culture medium had its own distinctive bacterial flora. High bacterial counts were associated with warm weather, increased storage and culture time, and high organic content. The frequency and distribution of *Vibrio* spp. during an outbreak of vibriosis is reported. Water quality studies were conducted during the study. The usefulness of routine bacteriologic sampling for diagnostic purposes is discussed.

LITERATURE CITED

- Guillard, R. R. L. 1959. Further evidence of the destruction of bivalve larvae by bacteria. Biol. Bull. (Woods Hole) 117:258-266.
- Malek, E. A., and T. C. Cheng. 1974. Medical and economic malacology. Academic Press, N.Y., 398 p.
- Tubiash, H. S., P. E. Chanley, and E. Leifson. 1965. Bacillary necrosis, a disease of larval and juvenile bivalve mollusks. I. Etiology and epizootiology. J. Bacteriol. 90:1036-1044.

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