Home
About IR
Journals
MEPS
AB
AEI
AME
AME Home
Most Recent Issue
About the Journal
Editors
AME Forthcoming
AME Specials
CR
DAO
ESEP
ESR
SEDAO
Guidelines For Authors
Editorials
Subscription Information 2017
Subscription Information 2018
Terms of Use
Open Access
Contents Mailing Lists
Rights & Permissions
Promotional Posters
Book Series
Ecology Institute
Otto Kinne Foundation
Job Openings
For librarians
Search:
Go

You are at: Inter-Research > AME > v79 > n3 > p197-207

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Effect of heavy metal pollution on the incidence of antibiotic resistance in *Aeromonas hydrophila* isolates obtained from the surface of fish

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ABSTRACT: A large collection of aquatic *Aeromonas* obtained from the surfaces of 5 species of fish in 2 streams with different contamination histories were examined to test hypotheses on the effects of contaminant history, stream habitat and longitudinal location on the incidence of antibiotic resistance (AR) towards 6 antibiotics and levels of multiple antibiotic resistance (MAR). Fish species included an open-water species (*Micropterus salmoides*), 2 mid-water species of centrarchids (*Lepomis auritus* and *L. punctatus*) and 2 species of bottom-dwelling fish (*Ameiurus natalis* and *A. platycephalus*). Metal analysis of the sediments indicated that there was a strong downstream contamination gradient in one stream but not in the other. However, we found that the average MAR level was similar between the 2 streams. Comparisons among fish species found the highest levels of resistance in bacteria isolated from bottom-dwelling fish in the least-contaminated stream. However, there were clear differences in levels of resistance between bacteria isolated from the 2 bottom-dwelling fish, with those isolated from *A. natalis* having significantly higher levels than those isolated from *A. platycephalus*. We suggest that these differences relate to higher concentrations of metals and other contaminants in habitats where *A. natalis* is normally found. For some antibiotics, there was a clear pattern of decreasing resistance among bacteria isolated from bottom-dwelling, mid-water and open-water fish. Unlike culturable sediment bacteria from the same streams in previous studies, these commensal aeromonads did not show the same expected patterns of increasing antibiotic resistance in metal-contaminated vs. uncontaminated streams.

KEY WORDS: Antibiotic resistance · *Aeromonas* · Commensal · Fish · Industrial pollution · Habitat partitioning

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Previous | Next

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