



Title: Identifying host-specific markers of fecal pollution using mixed-genome micro arrays

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Organization: Washington State University

State: WA **Region:** Pacific Northwest

Year of Funding: 2002

Theme: Pollution Assessment and Prevention

Situation: Microbial source tracking (MST) provides needed information for compliance with water quality standards. MST typically requires assemblage and maintenance of large libraries for phenotypic or genotypic (e.g., ribotypes) traits that are correlated with specific hosts. As an alternative, we are applying a recently developed mixed-genome micro array concept to screen for host-specific gene sequences in the genus Enterococcus. These markers are more likely to be ecologically relevant and they should be conducive to simple PCR assays that are library independent.

Objectives: (1) Construct a mixed-genome micro array based on Enterococcus collected from humans, cows, dogs, and waterfowl; (2) hybridize Enterococcus isolates from known hosts to the micro array to identify the initial group of informative probes; (3) validate the putative markers against a panel of Enterococcus assembled from diverse geographic locations and test the markers using water collected from the Yakima River, Washington.

Methods: We have completed development of the four mixed-genome libraries and all probes have been amplified and prepared for micro array fabrication. Once this step is complete, we will begin hybridizing known-host isolates to the micro array and we will report initial analyses and potential markers at this meeting. The long-term objective is to provide the marker sequences and to develop basic and potentially quantitative PCR assays for rapid and relatively low-cost partitioning of microbial flora by specific source (focused on human, cattle, dog, waterfowl).

Partnerships: Once we have identified and validated potential host-specific markers, we will endeavor to engage additional stakeholders including WSU Extension, state agencies (e.g., Washington Dept. Ecology) and US EPA.

Research: At present we have one postdoctoral fellow and three technicians receiving training through this project. Outreach will involve traditional media channels including extension newsletters, university publications, internet website, press releases as well as publication in refereed literature and participation in research conferences.

Results: In the short term, we will identify markers and an assay system that is suitable for apportioning fecal pollution between humans, domestic animals and waterfowl. These efforts are intended to make microbial source tracking much more cost effective and applicable outside of specialized laboratories with the long term goal of improving overall water quality at the community and watershed scale.



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