



USDA-CSREES 2006 National Water Quality Conference

NotI PFGE Source Tracking of Escherichia coli in the New River

The New River (NR) contributes significantly to West Virginia's tourism industry as a well-known destination for whitewater rafting in addition to its many recreational and scenic offerings. The potential impact of fecal pollution on this high-profile area prompted us to extend our studies to the New River. A total of 349 fecal samples, from seven animal species generating 1323 *E. coli* isolates, were used to complete a PFGE database (or library) of known-source isolates. Five independently-collected fecal samples of each species type, generating 17-25 *E. coli* isolates each representing 148 isolates total, were utilized as blind proficiency isolates to test the matching efficiency and accuracy of the New River database. Proficiency isolates were evaluated in 2-way (human versus nonhuman) and 3-way (human, wildlife, and domestic) analysis in the NR database. In addition, these proficiency isolates were also evaluated in single-region foreign, multi-region foreign composite, and NR + multi-region foreign composite databases and the results compared. Overall, in a 2-way analysis, matching efficiency of proficiency isolates achieved the highest average rate of matching efficiency (ARME) at 80% in the NR + multi-region foreign composite database. With respect to 2-way accuracy, the NR + multi-region foreign composite database achieved a 94% average rate of correct classification (ARCC), overall, with the lowest ARME and ARCC observed for human isolates as 11 were classified correctly, 3 incorrectly, with 8 failing to find a match in the NR + multi-region foreign composite database. For 3-way analysis, the highest ARCC (69%) was achieved in the NR + multi-region foreign composite database. Studies are continuing to determine the spatial limitations of this evolving composite database with improvements needed, especially for the 3-way analysis. These results demonstrate the advantage of including foreign isolates in home database(s) to improve performance of library-based BST methods as determined by proficiency testing.

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