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Detection and source tracking of *Escherichia coli*, harboring intimin and Shiga toxin genes, isolated from the Little Bighorn River, Montana

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The Little Bighorn River flows through the Crow Indian Reservation in Montana. In 2008, *Escherichia coli* concentrations as high as 7179 MPN/100 ml were detected in the river at the Crow Agency Water Treatment Plant intake site. During 2008, 2009, and 2012, 10 different serotypes of *E. coli*, including O157:H7, harboring both intimin and Shiga toxin genes were isolated from a popular swim site of the Little Bighorn River in Crow Agency. As part of a microbial source tracking study, *E. coli* strains were isolated from river samples as well as from manure collected from a large cattle feeding operation in the upper Little Bighorn River watershed; 23% of 167 isolates of *E. coli* obtained from the manure tested positive for the intimin gene. Among these manure isolates, 19 were identified as O156:H8, matching the serotype of an isolate collected from a river sampling site close to the cattle feeding area.

Keywords: sewage pollution; river water; water pollutants; water-borne diseases

Introduction

The Little Bighorn River flows through the heart of the Crow Indian Reservation in southeast Montana. With its headwaters beginning in Wyoming just south of the Montana border, the river flows north through the three towns of Wyola, Lodge Grass, and Crow Agency. Members of the Crow tribal community depend on the Little Bighorn River for a variety of purposes. During summer and autumn months, the river is used recreationally by children for swimming and by adults for sport and subsistence fishing. Year round, the river provides drinking water for livestock. The primary source of water for residents in the many homes located close to the banks of the river is often a shallow well that may be hydraulically linked to the river. The Little Bighorn also plays an important role in the spiritual life of the Crow people. The river is used for traditional bathing after sweat lodge ceremonies, and as the source for pouring and drinking water during ceremonies.

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