



Supporting Producers' Food Safety Goals through Research

Alberta Agriculture and Forestry (AF) undertakes a number of research projects to ensure the quality and safety of land, air and water for our food producers. Although long-term monitoring shows the overall quality of Alberta's irrigation water is good or excellent, a study is currently underway to use DNA fingerprinting techniques to determine the sources of contamination of irrigation water. While there are no current concerns – this is an opportunity to improve water quality for the future.

The Water Quality Section of AF is currently working with the Taber Irrigation District on a pilot study to understand the sources of *E. coli* in irrigation water. The study is funded by *Growing Forward 2* a federal-provincial-territorial initiative. The District has made water quality a key part of their mandate to ensure farmers are growing the best quality crops.

Often, irrigators are required to have water quality tests completed to market their produce, and with recent changes in regulations in the United States – this need may increase. In the United States, the Food Safety Modernization Act requires testing of water that is used to irrigate fruits and vegetables which are consumed raw. These regulations may affect Alberta producers with irrigated crops destined for export to the United States.

This study will assist in identifying opportunities to continue to improve water quality and assist producers in meeting their food safety requirements for the global marketplace. The key item being measured in the study is *E. coli*. Generic *E. coli* are present in the intestines of most people and animals and are excreted in feces. *E. coli* are therefore used to measure fecal contamination in water. The testing is complicated, as there are 'naturalized' *E. coli* that occur in the environment and are not indicative of fecal contamination.

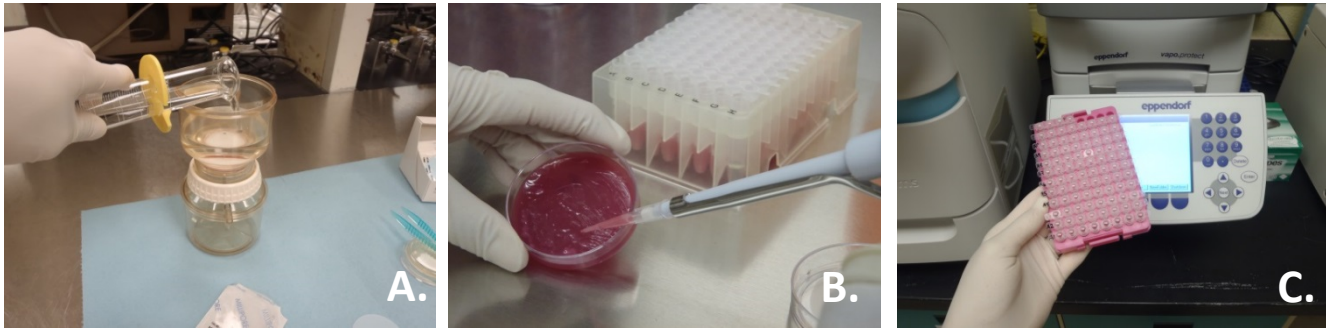
“Research gives us a better understanding on the amount of fecal and naturalized *E. coli* in irrigation water. The discovery of naturalized *E. coli* is very important because food safety is concerned about fecal contamination. If we find *E. coli* in water, we need to determine whether it is fecal or naturalized, which then determines if there is a food safety concern or not,” says Andrea Kalischuk, Director of Water Quality at Alberta Agriculture and Forestry.

“Our study in the Milk River area showed cliff swallows and cattle contaminated some of the water, but a significant proportion of naturalized *E. coli* was also observed.”

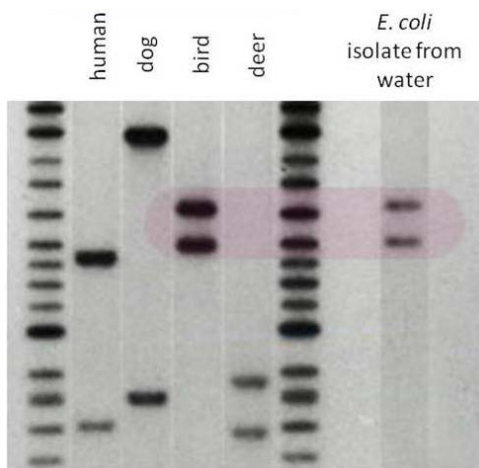
Whatever the study identifies as a source of contamination, the research team and irrigation district will need to work with producers to seek a balanced solution that supports both the agriculture industry and wildlife habitat, while meeting food safety requirements.

This is the final year of a three-year study and a summary report will be shared with producers on Alberta Agriculture and Forestry's website in the fall of 2017.

Testing process . . .



Water samples are filtered to trap bacteria on the surface of a membrane (A). The membrane is transferred to an agar medium that selects for *E. coli* growth (B). DNA is extracted from the isolated *E. coli* and supplies the material for DNA fingerprinting (C).



DNA fingerprinting is a fecal source tracking technique. In this example, the fingerprint of the *E. coli* obtained from a water sample matched the fingerprint of the *E. coli* obtained from bird scat. This indicates that bird feces are present in the water source.

For more information on the pilot, please contact:

Cassandra Jokinen
Water Bacteriology Research Analyst
Phone: 403-381-7109
Email: cassandra.jokinen@gov.ab.ca