

On the Trail of Antibiotic Resistant Bacteria

USDA, ARS, Agroecosystem Management Research Unit, Lincoln, NE



People sometimes think of antibiotic resistant bacteria as being found only in agricultural animals and feedlots, but antibiotic resistance genes can be found almost anywhere, including Antarctic lakes, and the Sargasso Sea. There is a lot of interest in the use of antibiotics in animal agriculture, and how antibiotic resistant bacteria may affect human health. All animals, including cattle and humans, have a large community of bacteria that live naturally in their lower intestines, and that are introduced into the environment via feces.

ARS scientists are using new tools to track the antibiotic resistance genes found in cattle feces. Metagenomics allows them to take an inventory of all of the virulence and antibiotic resistance genes in a sample, and at the same time take an inventory of what bacteria are present in a sample. They can compare the antibiotic resistance in agricultural samples, to antibiotic resistance in other samples. Some antibiotic resistance genes, like resistance to fluoroquinolones, are found in many environments, including not only in cattle feces, but also humans, chickens, farm soil, Antarctic lake water, and the Sargasso sea. By figuring out which genes, and which bacteria from cattle feces are most likely to survive in the environment, we can target our control efforts where they make the most sense.

Determining Natural Levels of Antibiotic Resistance in Prairie Soils

USDA, ARS, Agroecosystem Management Research Unit, Lincoln, NE



The use of antibiotics in agricultural setting is an important issue. ARS scientists are interested in tracking antibiotic resistance, and comparing antibiotic resistance in agricultural settings to antibiotic resistance in non-agricultural settings. Native and virgin prairie sites that are not grazed by cattle can serve as a baseline to determine natural levels of antibiotic resistance in Midwestern soils. By figuring out how ag-impacted and non-ag-impacted samples compare, we can identify agricultural best management practices that work to reduce the transmission of resistance in the environment.

Lisa Durso

Lisa.Durso@ars.usda.gov

402-472-9622