

Livestock

UNL leading effort to corral *E. coli*

By **JIM CARLTON**

UNIVERSITY of Nebraska-Lincoln researchers are deeply involved in a national effort to reduce the public health risks and costs to the livestock industry associated with *Escherichia coli*.

Earlier this year, a \$25 million USDA grant was provided to UNL to lead a multi-institutional, multidisciplinary team of land-grant universities and government agencies for research and education on Shiga toxin-producing *E. coli*, or STEC.

"This is the largest-ever USDA grant to UNL, and one of the largest grants it has ever received," explains Rodney A. Moxley, a veterinarian and professor/researcher at UNL's School of Veterinary Medicine and Biomedical Sciences. "It is called a coordinated agricultural project, or CAP, grant."

The research team ultimately aims to reduce human *E. coli* cases and outbreaks from beef, while preserving an economically viable and sustainable beef industry, says Moxley, project leader of the national research effort.

For beef producers, the research may lead to more effective *E. coli* vaccines for cattle, among other things.

The five main objectives are:

- develop and implement rapid detection technologies for preharvest, posthar-

At a glance

- The UNL is the lead institution in a major study of *E. coli*.
- Several institutions are involved, using a \$25 million USDA grant.
- The project is designed for five years, but it may well go longer.

vest and consumer environments

- characterize the biological and epidemiological factors that drive outbreaks of STEC in preharvest, postharvest, retail and consumer settings

- develop effective and economical interventions to lessen STEC risk from cattle, hides, carcasses, and ground and non-intact beef, and compare the feasibility of implementing these interventions for large, small and very small beef producers

- develop a risk assessment model for STEC from live cattle to consumption to evaluate mitigation strategies and their expected public health impacts

- translate research findings into user-friendly food-safety deliverables for stakeholders, food safety professionals, regulators, educators and consumers

Moxley says that seven STEC serogroups/serotypes — O26, O45, O103, O111, O121, O145 and O157:H7 — have been declared adulterants in ground/non-intact



NEW *E. COLI* TESTS: Rodney Moxley's University of Nebraska-Lincoln laboratory is seeking new diagnostic tests for *E. coli* as part of a national *E. coli* research effort that he also is leading.

raw beef. Another serotype, O104:H4, caused a large outbreak of food-borne illness in Europe in 2011, and will be looked at by researchers even though it has not yet caused problems in the United States.

"Since they can potentially be prevalent in the beef feedlot, processing environment, or grocery cart, this research targets these eight serogroups/serotypes," states Moxley.

Major burden

"These kinds of *E. coli* are a major economic burden to the beef industry," he emphasizes. "They negatively impact public perception of the product as being safe. Whatever we can do to improve beef safety will improve the marketability of beef, as well as to reduce the chances of illness, which is good for the livestock industry."

The research team includes approximately 50 investigators from 11 U.S. institutions. In addition to UNL, other institutions participating are Kansas State University, University of Delaware, Texas A&M, Virginia Tech, North Carolina State, New Mexico State, the New Mexico Consortium (Los Alamos National Laboratory), Mississippi State, University of California and USDA's Agricultural Research Service.

Moxley says the research grant is for a five-year project. "But it would be very realistic to think that the work we are doing will continue on after five years. What typically happens in research is the work you do today leads to more funding opportunities later because with progress, we find

other things that need to be done."

Carlton writes from Lincoln.

Longtime battle

UNL veterinary scientist Rodney Moxley, who is leading the national *Escherichia coli* research project, has been involved with *E. coli* research in both cattle and pigs.

Discoveries from his UNL laboratory have shed new light over the years on *E. coli* and also have led to the development of the first *E. coli* O157:H7 cattle vaccine licensed in the world. While the vaccine is not licensed in the U.S., it has been licensed in Canada and is being used there. "UNL did the field studies which led to licensing of the vaccine."

Moxley says the UNL laboratory will be providing research targeted toward developing and implementing rapid *E. coli* detection technologies for preharvest, postharvest and consumer environments.

One of the research goals is development and validation of tools and methods for detection of the eight Shiga toxin-producing *E. coli* serogroups/serotypes being studied.

"These tests will be optimized to detect, isolate and enumerate STEC from feces, soil, water, feed, hides, flies, hot and chilled beef carcasses, primal and subprimal cuts, trim, and ground beef," says Moxley.

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