



PHOTOS COURTESY U.S. MEAT ANIMAL RESEARCH CENTER

Amidst the Bunkers

MARC director seeks partnerships for research.

by **Troy Smith**

For strangers to south-central Nebraska, it's an odd sight. Rows of little "hills" are conspicuously out of place on an otherwise nearly level plain west of Clay Center. During World War II, it was the site of the U.S. Navy's largest inland munitions manufacturing and storage facility, and beneath those curious sod-covered humps are concrete storage bunkers that once stored torpedoes, depth charges and 40mm shells.

Today, cattle grazing among and over the old bunkers comprise the country's largest beef herd used for scientific research. Since 1964, much of the former ordnance depot's acreage has been home for the Roman L. Hruska U.S. Meat

Animal Research Center (MARC), operated by the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS).

"This was a unique facility from its very beginning, with its large animal populations and sustainable funding that allows for long-term research. MARC is even more unique

today. Not many facilities even come close," states John Pollak, director.

Operating on 34,000 acres, MARC cropland includes 2,800 acres of irrigated corn and 1,600 acres of alfalfa. Remaining acreage is in pasture, including about 1,000 acres of irrigated grass. Beef cattle research utilizes some 6,400 breeding females, representing 18 breeds, but Pollak says the tally is likely to increase to near 8,000. Ten breeds of sheep are represented, with ewe numbers projected to grow from the current 2,500 to 3,400 head. MARC sows produce more than 700 litters of pigs annually.

The large numbers of cattle, sheep and swine also support the work of other research entities.

Partnering, particularly with land-grant universities, is not a new concept at MARC, but it's one that Pollak wants to nurture.

"The objectives haven't changed. MARC still provides comprehensive ARS research from a multidiscipline approach," Pollak states. "But there is greater need to increase

our efforts here, as research efforts in other places dwindle. I want to see MARC become a hub for beef research — for all three species, really. In order to do that, we're trying to encourage more collaboration among our scientists and those in university systems."

A new venue

Pollak took the reins at MARC just a year ago, bringing considerable experience in collaborative effort. After beginning his career at the University of California–Davis, he spent more than 29 years at Cornell University (Ithaca, N.Y.) as a professor of animal science. In addition to teaching, Pollak engaged in research focused on cattle genetics, including development of a model for genetic evaluation — a 24-year project.

While at Cornell, Pollak helped forge the National Beef Cattle Evaluation Consortium (NBCEC), which coordinates related research, identifies new traits and technologies for use in genetic programs and develops decision-making tools for producers to use in genetic selection. NBCEC

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researchers developed the methodologies used in computing expected progeny difference (EPD) values for U.S. beef breeds. They continue to research the integration of EPDs and DNA information. NBCEC also provides independent validation of commercially available DNA tests in North America.

As director of NBCEC, Pollak encouraged interaction among scientists of multiple disciplines and fostered coalitions with beef industry partners to enhance research and industry outreach. While Pollak was at the helm, NBCEC grew from a handful of scientists representing four universities to 25 scientists representing 17 institutions.

Experience with large-scale research projects also came through Pollak's involvement, on behalf of Cornell, with the Carcass Merit Project. This

collaboration among multiple universities and breed associations, as well as MARC, provided data for the calculation of tenderness EPDs and evaluation of DNA markers. Additionally, the project created a large phenotypic database and archive of DNA samples for future use.

"Along the way, I spent more and more time talking with, and learning from people from the beef industry as well as academia. I've had many mentors and advisors. Their input created a great synergism," says Pollak. "I'd like to see that kind of thing grow at MARC, in all areas of research."

Focal points

There are six MARC research groups or units, explains Pollak, including the Animal Health Research Unit with its focus on interactions between disease pathogens and their animal hosts. How genetic variation in livestock affects disease expression is of particular interest.

The mission of the Nutrition Research Unit is development of knowledge and technology for improving the efficiency of feed resource utilization. Scientists in this unit are investigating the influences of genetics, as

well as types of feed, feeding strategies and management. Of real interest to cow-calf producers are the team's efforts to learn more about how the dam's nutrition during gestation and fetal programming influence calf performance.



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Though heavily bent toward swine, the Reproduction Research Unit includes two physiologists working in the area of bovine reproduction. Their efforts target improved conception rate and embryo-fetal development, and discovery of predictors of lifelong productivity.

Pollak says the Meat Safety and Quality Research Unit has developed interventions, applied preharvest through harvest, to reduce potential risk of foodborne illness. MARC meat scientists also developed instruments for determining beef quality

grade. Ongoing research explores methods of improving meat shelf-life and identification of areas of the genome that influence carcass composition and meat quality.

Manure-handling practices are a primary focus for the Environmental Management Research Unit. Scientists within this group evaluate feedlot surface management as it

relates to control of runoff, dust and odor. MARC's farmland provides opportunity to evaluate short- and long-term effects of crop nutrient application. This unit also looks at how climatic conditions affect animal performance and well-being, seeking methods to better manage livestock stress.

The Genetics and Breeding Research Unit seeks the role genetics play in meat animal production. MARC has been a premier source of information on breed differences and heterosis. Breed difference information for cattle has been incorporated into across-breed EPD adjustments currently used by the beef industry. According to Pollak, genomic scientists at MARC have contributed to the identification of DNA sequence differences and discovery of single gene markers (called SNPs). DNA testing for SNPs associated with the calpain gene, which influences beef tenderness, have been adopted by the beef industry.

While they are described as separate units, Pollak says phenotypic information collected from MARC animal populations is shared. And genomics has become part of the research activities of most units.

"MARC has become the ARS center of genomics for beef cattle," states Pollak. "This is the place of major ARS investment in genomics research. MARC is well-poised to make positive impacts."

Pollak's is not the only face that's relatively new at MARC. Many of the scientists that had been most familiar to the beef industry have retired. In fact, says Pollak, MARC's team of researchers has experienced a near 50% turnover in recent years.

"We have a young, energetic and tremendously talented group at work here, and we share enthusiasm for exploring collaborative efforts with others. MARC's partnerships with the University of Nebraska and NBCEC have been pleasing. Just this year, we have been successful in partnering on grants with the University of Missouri and the University of Georgia as well. And we want to build more partnerships," Pollak says.

"As for me, I hope to be a conduit for connectivity and help provide direction for the use of the very unique resource that is MARC."



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