"Did You Know?"

As consumers we demand the highest quality beef products, and the freshest, tastiest dairy products. But how do we get it? It's not something done at the supermarket; cattle must be born with these qualities.

ARS researchers in Maryland and Nebraska are trying to speed the process of identifying cattle with desired traits, and make it more efficient by using more precise techniques to look at a cattle's genetic makeup based on DNA markers.

Using technology originally used in the human genome project, the BeadChip (a glass slide containing thousands of DNA markers), ARS scientists worked with university professors and Illumina, Inc. (a San Diego firm that manufactures BeadChip) to design a chip for genomics-based studies on dairy cattle. The researchers developed a new genomic method—called genome-enhanced improvement—to identify bulls that produce offsring with optimum milk production and other traits.

The BeadChip can be used to specifically characterize single DNA markers in over 50,000 locations, distributed relatively evenly across the bovine genome. The researchers are using this tool to examine DNA from more than 50,000 cows and bulls representing several commercial dairy and beef breeds and ARS populations.

This technology has revolutionized dairy breeding efforts. The information is being used to correlate DNA data to traits of interest, such as milk, fat and protein production. Eventually, information derived from the markers will help beef producers streamline their identification and breeding efforts. Cutting test costs, while increasing the genetic improvement rate in dairy cattle, will help make the U.S. breeding industry more globally competitive.

ARS researchers worked with Illumina to commercialize this new hi-tech tool, the BovineSNP50. Since its inception in early 2008, sales of the BovineSNP50 total more than $50 million (more than 500,000 samples) for 23 scientific locations in 11 countries.

The research was so intriguing and valuable to scientists worldwide that the researchers formed the CGC—Cattle Genomics Consortium—to continue sharing and exploring genetic data generated using the BeadChip. This technology is also being used to identify genetically important traits in sheep and pigs.

Please submit story ideas and national award items to Tara T. Weaver-Missick, tara.weavermissick@ars.usda.gov or call 301-504-1663.