VETERINARY CALL

by Bob Larson, Kansas State University

Optimizing Technological Innovation

We are living in an increasingly technology-driven world, while at the same time, we are engaged in a business that relies on the unchanging relationship between sunshine, plants and animals.

Cattle producers have a long history of adopting new technologies to help them more efficiently shepherd the conversion of sunlight to high-quality protein, and today's producers have a new and growing selection of choices to consider.

Some of the established technologies that play an important role in beef production include breeding soundness examination of bulls; estrous synchronization for artificial insemination (AI); embryo transfer (ET); and use of animal health products such as vaccines, dewormers and antibiotics. These technologies help cattle producers to improve production efficiency, manage risk and protect the health and welfare of cattle.

Other technologies still considered cutting-edge but are developing a proven track record include sex-sorted semen, *in-vitro* embryo production, genomic-enhanced expected progeny differences (GE-EPDs), precision grazing and new diagnostic tests for important cattle diseases. Producers who have implemented these technologies are using the most modern tools available to address the age-old challenge to select the best replacement heifers and herd bulls, to improve sustainable grazing practices and to protect their cattle from common disease threats.

Looking ahead

On the horizon we are seeing investigation of drones and remote sensors for grazing management and animal health purposes, even greater utilization of genetic code information to enhance selection of bulls and heifers, and new-generation animal health products to optimize health and prevent disease. Researchers are currently working to identify how best to add these technologies to existing methods of cattle management.

Other technologies that may affect beef cattle production in the not-too-distant future include artificial intelligence and high-skilled robotics. Although there are substantial hurdles to overcome before these innovations gain practical usage, they are moving from the world of science fiction and into early stages of development.

Much of the recent advancement in technology used in agriculture has been made possible by rapidly increasing computing power, improved connectedness between electronic devices and a better understanding of what goes on inside of plant and animal cells. From universities to technology companies to farm fields and livestock pastures, we are seeing more interactions between the biologic sciences and the sciences of physics, chemistry and engineering. These interactions are taking place as we move beyond technology focused on farm equipment designed to augment physical labor to electronic devices designed to augment data management and decision-making.

In order for new technologies to have a lasting, positive impact on cattle ranching, they must work within the confines of animal husbandry systems that are based on the laws of biology. And, although there are reasons to be both excited by and concerned by the innovations that are changing the way beef cattle are raised and managed, regardless of your perspective, determining how to optimize innovations will have a long-term influence on your ranching operation. AJ

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