

End-products Endeavor

Like cattlemen in the U.S., Ireland's cattle producers are interested in efficiency of production.

by Troy Smith, field editor

Improving end-product quality through genetics

"They want a cow that will produce more from less," says Andrew Cromie of the Irish Cattle Breeding Federation (ICBF) during the 2018 Beef Improvement Federation Research Symposium and Convention. Cromie spoke during the End-product Improvement breakout session.

In Cromie's opinion, the Irish cattle industry focused too narrowly, for too long, on terminal traits. On most farms, genetic selection emphasized pounds of beef production and beef quality. Results proved positive for the traits prioritized, but were accompanied by negative trends for maternal traits. Cromie says an ICBF-led effort promoting more balanced selection began in 2014.

ICBF, explains Cromie, is a cooperative comprised of 30 local producer organizations. Ireland has approximately 100,000 cattle operations (dairy and beef), about half of which are beef farms with an average breeding herd size of 20 head.



Ireland's total beef production is greater than 500,000 metric tons annually, with more than 80% exported.

ICBF was established to help beef producers apply science and technology toward improved profitability, facilitating phenotypic data collection and incorporation of genomics in Ireland's national cattle evaluations, Cromie explains.

To date, about 1.2 million beef animals have been genotyped. As an

incentive for increased participation among producers, the European Union and Ireland's government have helped fund participation costs for producers meeting certain minimum requirements, including the genotyping of at least 12 animals per year.

Cromie says ICBF pushed for development of an economic or "profitability" selection index designed to afford balanced selection pressure for important terminal and maternal traits. However, the index is

weighted more heavily for traits contributing to cow efficiency. Applying the index, cattle are ranked according to a "star" system, with one star being the lowest and five stars being the highest ranking. The system is used for making comparisons within and across breeds.

"The goal is to get more four- and five-star cows," Cromie says. "These are the cows that are more profitable, more sustainable and more carbon efficient."



Andrew Cromie of the Irish Cattle Breeding Federation says the goal is to produce profitable and sustainable cows.

Investigating G x E

U.S. Meat Animal Research Center Meat Scientist Steve Shackelford asks the question: are dark-cutting beef influenced by more than just the environment?

by Troy Smith, field editor

Is there a genetic component to the incidence of dark-cutting beef carcasses? In a breakout session at the Beef Improvement Federation Research Symposium and

Convention focused on end-product improvement, U.S. Meat Animal Research Center Meat Scientist Steve Shackelford suggested that some cattle may be genetically more

susceptible to dark cutting.

To understand dark-cutting beef, it may be necessary to understand that the bright, cherry-red color associated with fresh beef results

when beef muscle containing the “normal” amount of lactic acid is exposed to oxygen.

Dark-cutting beef occurs among animals experiencing significant long-term stress, which depletes glycogen reserves in the animal’s body. It is glycogen that is converted to lactic acid postmortem. So, long-term stress depletes glycogen, which reduces post-harvest lactic acid in muscle, and the result is dark-colored meat.

There is nothing tainted about dark-cutting beef. It is safe and just as nutritious as bright-red beef product. However, it can exhibit a “sticky” texture and off flavor. These palatability problems tend to make consumers shy away.

“For years, we have been taught and we accepted that dark cutters are a result of

mismanagement and environmental circumstances,” Shackelford says, explaining how rough handling, long transportation hauls and pulling cattle off feed for excessive periods of time are contributors, along



Steve Shackelford of the U.S. Meat Animal Research Center says research is under way to explore how gene mutations may cause animals to respond to their environment in different ways.

with weather extremes and other challenging environmental factors.

However, Shackelford says there is evidence that certain bovine genes may affect relative susceptibility to the dark-cutting condition. He says research is under way to explore possible gene x environment (G x E) interactions and effects. In other words, researchers will be looking for gene mutations that may cause different individuals to respond to environmental variation in different ways.

“We will be able to access between 1,500 and 2,000 head of steers and heifers over the next four years,” Shackelford says, explaining how the cattle are also instrumental to another research project that required collection of genotypes for each animal. The research may provide insight to whether animal muscle glycogen storage and meat color can be influenced through genetic selection. [A](#)

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