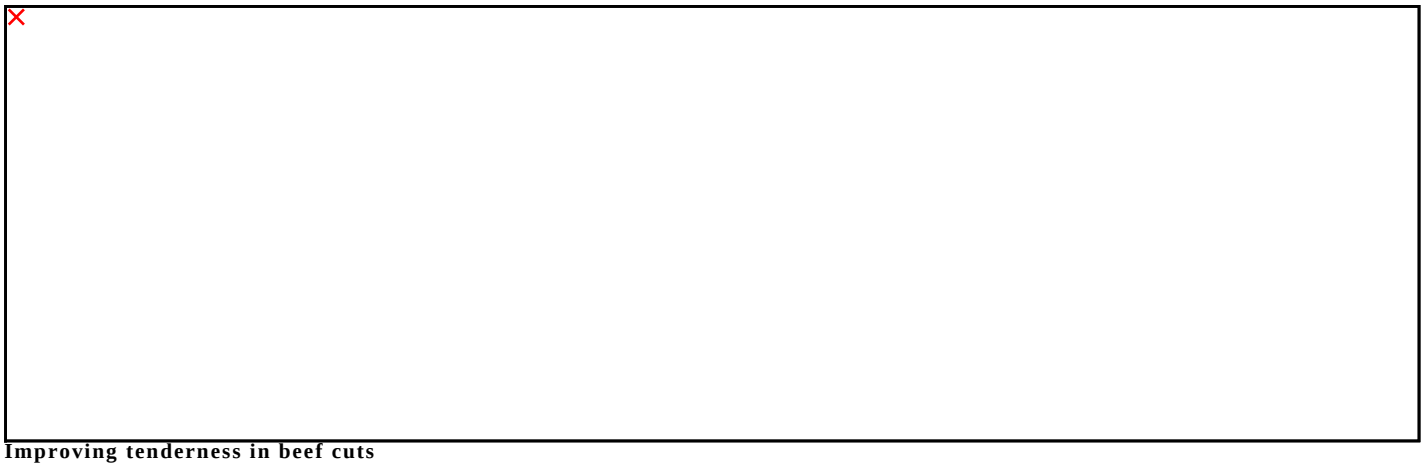

Improving tenderness in beef cuts

Project Code: BQU.06.13
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Project Title:

Genetics of eating quality of high connective tissue beef

Researchers:

Heather Bruce, Ph.D. hbruce@ualberta.ca

Heather Bruce, Ph.D., Graham Plastow, Leluo Guan, Paul Stothard and Zhiquan Wang (University of Alberta), Manuel Juarez and Changxi Li (Agriculture and Agri-Food Canada)

Background A number of commercially available DNA tests for beef tenderness effectively identify differences in ribeye tenderness that are related to post-mortem aging. Unfortunately, the beef cuts that need the most improvement are those that are tough due to connective tissue. Additionally, there are theoretical concerns that selecting for feed efficiency may reduce beef tenderness.

Objectives

1) determine how breed type, selection for feed efficiency, and carcass grade affect the meat quality and connective tissue characteristics of muscles from the strip loin, inside round, cross-rib and top sirloin

2) relate the meat quality and connective tissue properties of the major muscles of these cuts to each other and to the phenotype and genotype of the steers from which the muscles were harvested.

What they did Samples from major muscles of the strip loin, top sirloin, inside round and cross-rib were collected from steers from the Livestock Gentec breeding herds immediately after slaughter. Twenty-four steers from the Kinsella control (crossbred cattle not selected for efficiency using residual feed intake (RFI)), twenty-four steers from the Kinsella efficiency (crossbred cattle who have been selected for efficiency based on RFI), and forty-eight purebred Angus and purebred Charolais steers, half of each being low and high RFI, were slaughtered over two years at the Agriculture and Agri-Food Canada Lacombe abattoir. Full carcass information was collected from each carcass. The strip loin, top sirloin butt, inside round and cross-rib were removed from one or both sides depending upon muscle size. Tissue for DNA and functional genomics were collected from each muscle. Each muscle was assessed for intramuscular pH, fat, protein, moisture, colour, drip loss, cooking loss, Warner-Bratzler shear force, collagen content and collagen heat solubility, and consumer acceptability. DNA analyses searched for potential SNP markers that may explain differences in collagen characteristics and eating quality among muscles and populations, and the "control" and "efficiency" herds.

What they found

Breed had a bigger effect on carcass quality and consumer taste panel response that efficiency (high or low RFI) did. But there was still a lot of variation from animal to animal as well as variation within the different cuts of beef that were tested. For traits that were influenced by breed Angus and composite cattle tended to have better meat quality and were preferred by consumers in the taste test where as Charolais tended to have better quality yield. As expected, increasing the aging time was shown to increase tenderness. Generally, meat quality was not affected by RFI. Due to the small number of cattle used in this study, several SNPs were detected that may have an association with collagen content (and therefore toughness).

What it means

Selecting for more efficient cattle (low RFI) seems to have little effect on meat quality but these animals can eat less and grow just as well with less feed. This means that producers are able to select for more efficient cattle which should result in lower input costs and not affect meat quality.

This study provided a valuable first step in producing a DNA test for tenderness in meat. It showed that there may be DNA markers related to tenderness due to high connective tissue but further research is needed to validate those.

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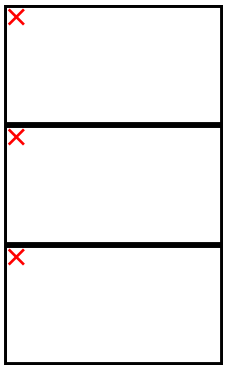

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For More Information Contact:
Beef Cattle Research Council
#180, 6815 - 8th St. NE
Calgary, AB T2E 7H7
Tel: (403) 275-8558 Fax: (403) 274-5686
info@beefresearch.ca

For More Information Visit:
www.beefresearch.ca