Chute-Side Application of Real-Time Ultrasound for Feedlot Cattle Marketing–A Pilot Project

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Summary

The collaborative efforts of Sioux Center Coop and Iowa State University will determine if real-time ultrasound measurements on feedlot cattle can be used to develop marketing models to assist Iowa producers in the decision-making process at marketing time and at a projected marketing time.

Introduction

Substantial structural changes have occurred and will continue to occur in the beef industry in the next ten years. Analysis of national beef production and marketing systems has indicated that to prevent further erosion of market basket share, the beef industry must make its priority the improvement of quality and consistency for consumers. Iowa has a future role to play in achieving this priority of quality and consistent beef for both domestic and foreign markets. Identification and utilization of superior genetics for end-products needs to be linked with Iowa-based production resources and branded beef marketing principles. By combining Iowa's resources, conscientious producers, feed, land, and cattle with the new available technologies, Iowa's beef industry could be propelled into the leadership position in the production of high-quality and value-added branded beef products.

Real-time ultrasound technology has been developed at Iowa State University, (ISU) to determine ribeye area, subcutaneous fat cover, and percent intramuscular fat (marbling) on live beef cattle. ISU animal science researchers have tested this technology primarily on breeding animals, yearling bulls, and replacement heifers. These measurements, collected by 50 Beef Industry Federation (BIF)- certified technicians across the U.S., will be used in the development of carcass EPD's. More recently, researchers have serially scanned feedlot cattle involved in research projects. Can this technology be transferred to the feedlot industry to help feedlot operators make marketing decisions? Two basic objectives must be evaluated to test the transfer of this technology:

1. To determine whether ultrasound images collected and processed 100 days prior to market time (at the time of re-implanting) to develop a marketing model can project specific cattle outcome groups and marketing dates.
2. To determine whether ultrasound measures can be collected and processed accurately and expediently enough chute-side on live cattle at market time to be implemented into a marketing model for decision making.

Materials and Methods

The Sioux Center Coop (SCC) Feed Yard has the capacity to feed 10,000 head of cattle, and they market cattle every week. Marketing foresight suggests that their feed yard should begin selling cattle on a formula pricing system and also feeding cattle for specific targeted branded products. Real-time ultrasound technology offers the opportunity to "characterize cattle" to make marketing decisions. Chute-side application of this technology must be tested.

Researchers at ISU have developed a chute-side feedlot ultrasound yield and quality grade predictor by utilzing an ultrasound scanner (Aloka500V® from Corometrics Medical Systems, Inc., Wallingford, CT, USA) with a 17-inch transducer, an external 9-inch video monitor, a powerful personal computer with Intel Pentium® 200 Mhz processor, and a 17-inch monitor. The system has the capacity to store more than 10,000 images.

The software for capturing and processing images is developed as an extension of ISU's USOFT® software (see 1997 A.S. Leaflet 1437). The USOFT Feedlot version has the following important features: 1) capturing longitudinal and cross-sectional images from *longissimus dorsi* of an animal, 2) processing a 100-by-100-pixel region of interest from the longitudinal image for predicting percentage intramuscular fat, 3) averaging results of percentage intramuscular fat prediction for up to five longitudinal images, 4) predicting marbling score, 5) tracing fat thickness from the cross-sectional image, and 6) predicting yield grade. The image and all relevant information are continuously updated on the screen. This minimizes the number of steps required to process an image and to evaluate an animal. If the results need to be saved, the user is required to enter an animal ID. The result file can be printed or used with other databases and performance evaluation software for further analysis and reporting.

This feedlot scanning system is on line at SCC. Two technicians have been trained by ISU to collect and process chute-side images. Currently, these technicians are scanning cattle each week on both market-ready and re-

implant cattle (100 days prior to market). Data resulting from images collected on market-ready cattle are being compared to corresponding carcass information collected on the cattle.

Ultrasound information from cattle scanned 100 days prior to slaughter is being combined with weight, hip height, days on feed, breed type, and energy level being fed, and incorporated into a data base. These data are being sent to ISU for analysis and incorporation into a growth model to predict body composition and quality of the cattle as they approach slaughter. This model will be used to help cattle feeders make management and marketing decisions during the last 100 days of the feeding period. For example, certain pens of cattle may be better suited for a specific branded beef program.

Results and Discussion

The components for feedlot chute-side scanning have been procured, assembled and tested at SCC. Software has been developed to drive the system. Data collection to build a data base has begun during the last 30 days.

Implications

Near-market-ready cattle would be scanned during the sorting for sale process. Yield grade and quality grade predictors would be combined with performance tracking into a marketing model to determine how and when cattle should be marketed (e.g., live vs. grade and yield on a particular grid, or now vs. 30 days from now). At marketing time, carcass data would be collected and the marketing model prediction would be compared to the bid received for the cattle. Cattle scanned 100 days prior to slaughter would be evaluated based on a model to project them into outcome groups. Management and marketing decisions could be made to better fit cattle into niche market specifications.

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