Beef Cattle Research Update

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USDA Testing a System That Could Replace Human Graders

According to a USDA official, a video instrument that grades beef carcasses by analyzing a digital video image taken of the ribeye could eventually become a widely used substitute for USDA graders. USDA is rolling out commercial tests of the video grading system in four major processing plants: National Beef Co. and Cargill Meat Solutions in Dodge City, Kan.; Nebraska Beef Co. in Omaha, Nebr.; and JBS Swift Group in Grand Island, Nebr.

The goal is for grading to be more uniform, precise, and accurate across the country than has proven possible with human graders performing subjective evaluations. Assuming the technology stands up under commercial testing, it could be used by any company that grades its beef according to USDA standards. Nationwide, about 160 USDA graders currently evaluate about 94% of the nation's steer and heifer slaughter.

The greater efficiencies made possible by the video imaging technology means that the agency could begin to cut back on the number of graders it employs within a year (SOURCE: Lisa M. Keefe for Meatingplace.com).

Predicting Beef Tenderness With a Hyperspectral Imaging System

In previous research, Univ. of Nebraska scientists constructed a "hyperspectral imaging apparatus" by integrating a digital video camera and a spectrograph for the purpose of predicting 14-day aged beef tenderness from 14-day scans. Compared to shear force evaluation of tenderness, the hyperspectral system was highly accurate (96.4%) in predicting 14-day tenderness. In the current study, the objective was to determine the accuracy of the system in predicting 14-day tenderness from scans done at 2 days postmortem. This would be important because beef typically reaches the consumer by 14 days postmortem.

A total of 314 USDA Choice and Select loin steaks were scanned at 2 days postmortem, aged to 14 days, and frozen. Steaks were then thawed, scanned, cooked in an oven, and slice shear force (SSF) values were obtained. The system predicted three tenderness categories (tender, intermediate, or tough) with 77.1% accuracy. Because SSF intermediate values are actually "acceptable" in tenderness to consumers, the tender and intermediate groups were merged into one group, resulting in two tenderness categories (acceptable and tough). When this was done, the system correctly classified steaks with an accuracy of 93.7%. The authors concluded that the hyperspectral imaging system was effective in predicting 14-day aged beef tenderness from 2-day scans and that implementation of such a system may result in "guaranteed tender" premium for beef

products that could benefit producers and the industry as a whole (Grimes et al. 2008. Nebraska Beef Cattle Report).

Effect of Prebreeding Body Weight on Beef Heifer Performance

For years, traditional recommendations have advocated substantial energy inputs for replacement heifer development because pregnancy rates in heifers depend on the number displaying estrus early in the breeding season. Consequently, it has been commonly recommended that heifers be developed between 60 and 65% of mature body weight (BW) before breeding. However, heifer development costs could be reduced if these standards were relaxed.

Univ. of Nebraska scientists randomly assigned a total of 261 heifers (505 lb) to be developed to 55% of mature BW (660 lb) before a 45-day, breeding season (intensive, INT) or 50% of mature BW (600 lb) before a 60-day breeding season (relaxed, RLX). Overall pregnancy rate did not differ, but RLX heifers had 7-day later calving dates and 11-lb lighter calf weaning weights than INT heifers. Calf birth weight, calving difficulty, second-calf conception rates, and 2-yr.-old retention rate did not differ between systems. Net cost per pregnant 2-year-old cow was less for RLX than for INT ($577 vs. $594).

Of the heifers that failed to become pregnant, a greater proportion of RLX than INT heifers were prepubertal when the breeding season began. Therefore, a second 2-year experiment evaluated melengestrol acetate (MGA, 0.5 mg/day) as a means of hastening puberty in RLX heifers. However, the proportion of heifers pubertal before breeding was not affected by MGA.

The authors concluded that developing heifers to 50 or 55% of mature BW resulted in similar overall pregnancy rates, and supplementing the diets of heifers developed to 50% of mature BW with MGA before breeding did not improve reproductive performance (Martin et al. 2008. J. Anim. Sci. 86:451).

Feedlot Profitability Was Improved by Ultrasound Sorting

The objective of this Kansas State Univ. experiment was to evaluate the potential for increasing profitability by sorting feedlot cattle at re-implant time using ultrasound technology. Steers were scanned and assigned to one of four system-assigned test groups plus a control group. Initial value was based on live weight at time of scanning. The four test groups were marketed based on days on feed projected by the sorting system. Profit was defined as carcass value minus initial steer value, feed, implant, and scanning costs.

Results showed that there was substantial monetary value from sorting. Average profit per head for sorted steers was $42.00 compared to $19.07 for control steers. The authors concluded that sorting feedlot cattle into uniform marketing groups at re-implant time using ultrasound technology is a cost-effective tool that can predict future carcass merit and improve profitability (Garmyn, A. 2007. Kansas State Univ. Beef Research Highlights).