
BEEF SPECIES: MAKING MORE BUT USING LESS: THE FUTURE OF THE U.S. BEEF INDUSTRY WITH A REDUCED COW HERD AND THE CHALLENGE TO FEED THE UNITED STATES AND WORLD. SESSION 1: THE U.S. STOCKER AND FEEDLOT INDUSTRIES

0117 Nutritional strategies to improve efficiency in the stocker and feedlot industries in a consumer-conscious market. M. S. Kerley*, W. J. Sexten, and A. M. Meyer, *University of Missouri, Columbia*.

Biological efficiency potential and nutrient supply synchrony are primary determinants of feed efficiency when converting feed to beef carcass yield. Feedlot diets have historically been formulated to have a minimum roughage inclusion to maintain rumen health and a minimum protein level (crude, metabolizable, or degradable protein) for targeted growth rates. While historically effective, we have asked if poorly digested and increasingly expensive roughage could be eliminated. We have also asked why diets are formulated for protein when calves have specific requirements for AA. When no-roughage diets were formulated to match absorbable AA supply to diet effective energy density (AAEE), net energy equations were found to overestimate energy required for gain and feed efficiency was improved in growing cattle. Recently developed, commercially available, in-pen weighing technology offers further opportunity to improve feed efficiency and reduce diet costs by formulating diets to supply absorbable AA equal to requirements, based on animal growth rate. Further improvement in efficiency has been demonstrated via selection for efficiency, based on residual feed intake (RFI). Our research to date has led us to conclude that nutrient requirement is influenced by RFI phenotype. More accurate estimates of biological energy requirement, real-time growth performance measurement capability, and increased biological efficiency selection can improve postweaning feed efficiency of cattle to a greater magnitude than generally thought possible, but full potential will not be realized if diet formulations do not support the potential for improvement.

Key Words: beef, efficiency, nutrition

0118 What is the future of genetic selection and cattle sorting technologies in the stocker and feedlot industries? R. L. Weaber*, *Kansas State University, Manhattan*.

The U.S. beef industry has experienced dramatic change over the past several years. The persistent drought throughout much of the United States has resulted in a reduction in cow inventory. The USDA reported that the 1 January 2014 all cattle

and calves inventory was down 2% from 2013, now totaling 87.7 million head, the lowest since 1951. In the same report, USDA inventory of cows and heifers that calved totaled 38.3 million, the smallest since 1941. Contraction of cow inventory and resulting calf crop have created challenges all along the beef value chain. Large vacant capacity exists in the U.S. feedlot and packing sectors. As a result of tight inventories, whole sale beef and fed and feeder cattle prices have reached record highs. High prices are shrinking per capita beef consumption to an expected 24 kg in 2014, decreasing 4.5 kg in the last decade. An estimated 60% of domestic beef consumption is ground product. Consumers continue to be value driven, choosing more ground beef in the marketplace for price and convenience. The U.S. all steak price to ground beef price ratio has trended downward over the last decade from 2.5 in early 2004 to < 1.7 in late 2013, indicating that all steak price hasn't kept pace with the price increase in ground beef. Some suggest whole muscle beef cuts are becoming luxury items. While consumers continue to seek lower cost protein sources and lower cost beef, the industry's production model remains unchanged. Most cattle are fed and marketed to maximize the value captured from middle meats, which comprise roughly 20% of the beef carcass, targeted to grade Choice average or better. This leads to substantial inefficiencies in the feeding and packing sector through overfeeding of cattle. In some cases, the additional fat decreases the red meat yield and value of end meats, which comprises the remaining 80% of the carcass. The beef industry's current issues in product demand, high retail prices, and lack of market-targeted products call for substantial changes in the beef value chain in terms of cattle sourcing, genetics, management, pricing, and marketing. Early targeting of cattle to an appropriate end use, based on genetic potential to efficiently meet a specified market target, could substantially change the way cattle are managed in terms of backgrounding and feedlot nutrition, growth-promoting technologies, and sorting for optimal marketing to maximize individual animal profitability.

Key Words: beef cattle, genetics, selection

0119 Beef quality vs. quantity in today's market.

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Exogenous growth-enhancing compounds, such as steroidal implants and β -adrenergic agonists (β AA), have been used to improve growth rate and efficiency in meat animals for more than a half century. In cattle, these compounds enhance efficiency of growth by preferentially stimulating skeletal muscle growth at the expense of adipose tissue accretion. These compounds have additive effects on carcass gain. Combined use of both these technologies have been shown to increase carcass gain > 35 kg during a typical feeding period. Consequently, these growth-enhancing compounds have been shown to reduce intramuscular fat (marbling) in beef cattle compared with non-treated cattle. This reduction in marbling score has been

associated with lower beef quality. These cellular events may in part be responsible for the negative effects observed with the use of these compounds in terms of marbling development in beef cattle. Markers of adipogenic differentiation were also affected by TBA/E₂. In adipose tissue, an enzyme important for energy balance, AMPK α , may also be affected by anabolic steroids and β AA. These data indicate that in adipose tissue compared with skeletal muscle, anabolic steroids and β AA may have opposite effects on cellular growth and differentiation. This inverse relationship may contribute to changes in beef quality. Balance is needed to maintain beef quality in light of demands to increase beef production, globally.

Key Words: adipose tissue, beef quality, skeletal muscle

0120 Economic considerations related to rebuilding the U.S. cow herd. G. T. Tonsor*¹ and L. L. Schulz²,
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The entire U.S. cattle industry is in the middle of several structural changes with pending (or perhaps ongoing) herd expansion at the heart of each current and possible industry adjustment. These changes coupled with issues more external to the industry are effectively increasing the overall uncertainty of profitability for not only cow-calf producers but stakeholders throughout the industry. This increased uncertainty will be

welcomed by some producers, who in turn may choose to expand their herds in coming years. Conversely, other producers uncomfortable with this uncertainty or facing favorable alternatives to cow-calf production will stabilize or further reduce their herds. The net impacts of these adjustments will dictate the collective make-up of the U.S. cattle industry for years to come. The ability of cattle producers to grasp the profitability and overall risk situation of their operations and broader industry trends is critical for long-term business success. Farmers and ranchers considering expansion need to make sound decisions to make sure their operations are economically sustainable and well positioned to succeed. In addition, opportunities exist for integration of young producers and future generations into cattle production, but these individuals need knowledge and tools to help them thrive in the industry. These expansion and entry into the industry decisions are best made when working with current and accurate understanding of broader economic trends. This presentation will discuss the broad economic situation motivating growing interest in herd expansion and subsequently outline key trends that are likely to influence realized national herd expansion. Throughout the presentation, a host of decision aides and related educational resources will be highlighted, enabling attendees to act on information they receive and apply it to their own operations and situations.

Key Words: beef cattle herd expansion, cow-calf production, economics, management