

Final Report Review

Project Title: Feeding High Quality Beef: Managing for Efficiency and Quality

Investigators: Erika Lundy Dr. Dan Loy

Primary Institution: Iowa State University

Award Amount: \$19,422

Reviewer: Dr. James Russell

Date: January 25, 2021

Project Objectives:

- Determine growth and carcass performance of steers with known genetic potential for high marbling when fed a perceived conservative vs aggressive nutritional program and implant strategy.
- Evaluate rate of internal fat deposition using carcass ultrasound based on implant and feeding strategies.
- Educate Iowa cattlemen on best management strategies to optimize cattle feed efficiency and carcass quality.

Project Results:

- Feeding Angus steers with a genetically high marbling potential a high energy (63 Mcal NE_g /lb.) diet for 144 days resulted in greater average daily gain (ADG), better feed conversion, heavier live and carcass weights, greater ribeye area (REA) and marbling scores than steers fed a lower energy (59 Mcal NE_g /lb.) diet with no effect on yield grades or 12th rib fat thickness.
- Implanting Angus steers with a genetically high marbling potential with 160 mg trenbolone acetate (TBA) and 32 mg estradiol in two doses (the RIS program) or 400 mg TBA and 40 mg estradiol in two doses (the R200 program) increased ADG, improved feed conversion, increased live and carcass weights and the ribeye area while not affecting yield grade, 12th rib fat thickness, or marbling score.
 - The effects of intensity of the implant strategies on the improvements in ADG, feed conversion, carcass weight, and REA were linear to the amounts of TBA and estradiol administered.

Final Report Summary

Nontechnical Summary:

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Lead Project Directors:

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Iowa is well known for producing high quality beef carcasses. Often, cattle are managed to optimize marbling development and carcass quality when marketing for carcass premiums, even if that means compensating feedlot performance and efficiency. A recent Iowa State University study was designed to evaluate practical ranges for conservative versus aggressive feeding strategies and implant strategies to determine the optimum level for managing efficiency and carcass quality on today's cattle. Fifty-four Angus steers ($n = 9/\text{treatment}$) from the ISU McNay Research Farm cow herd were fed for 144 days at the ISU Armstrong Research Farm in pens equipped with bunks capable of monitoring individual animal intake. Steers were allotted between two nutritional programs: 1) a lower energy finishing ration (59 NEg, 18% roughage level; LE) or 2) a higher energy finishing ration (63 NEg, 8% roughage; HE). Within each dietary treatment, one of three implant strategies was applied: 1) no implant (NIMP); 2) a conservative implant strategy (total of 160 mg trenbolone acetate (TBA) delivered throughout the study; Revalor-IS on d0 and d74; RIS); or 3) an aggressive implant strategy (total of 400 mg TBA delivered throughout the study; Revalor-200 on d0 and d74; R200). All steers were harvested on the same day at Iowa Premium. As expected, steers fed the LE diet had lower ADG and final weights compared to steers on the HE diet. Intake was not affected by diet, but the differences in growth resulted in poorer feed conversions when fed LE compared to HE. For implant strategies, ADG and final weights linearly increased as TBA dosage increased. While intake was consistent across treatments, feed conversion was positively impacted by implants and resulted in a 25% decrease in feed required to add an additional pound of gain between steers who received a R200 implant compared to steers receiving no implant. Overall, steers on this study graded 100% Choice and higher, 55% Prime, and 15% yield grades 4 and 5. Of most interest, implant strategy had no impact on marbling score. However, steers fed the LE diet tended to have lower marbling scores, which is likely attributed to lower growth performance and less finish on steers. In summary, the use of implants demonstrated no adverse side effects on marbling or carcass quality and improved growth performance and feed efficiency in steers with high marbling potential. When fed the same amount of days on feed, the use of a lower energy diet hurt performance and carcass quality. Results of this study show that when managed appropriately, the use of implants and nutrient-dense diets can effectively allow for optimizing efficiency without sacrificing quality.

Impacts:

- While producers often sacrifice technology and more aggressive nutrition programs to maximize carcass quality, based on this study, cattle can be fed efficiently using modern growth technologies and still produce premium quality carcasses.

Conclusions:

- Increasing the energy concentration of the diet by 7% and use of two doses of a 200 mg TBA and 20 mg estradiol implant in finishing steers reduces the amount of feed required per pound of additional gain by 9 and 25%, respectively.

- When steers are implanted more aggressively, additional energy is needed to support the additional growth response to maintain marbling deposition.
- Implanting has no negative effects on marbling deposition of cattle with known genetic potential to grade when combined with proper dietary management.

Technology transfer:

Graduate student theses or dissertations:

None

Refereed journal publications:

One manuscript planned for Journal of Applied Animal Science

Reviewed abstracts:

One abstract submitted to the 2021 meeting of the Midwest Section of the American Society of Animal Science

Extension/Outreach publications:

Erika Lundy and Dan Loy. October 2020. Research Update: Feeding High Quality Beef – Managing for Efficiency and Quality. Iowa Beef Center Growing Beef Newsletter. <https://mailchi.mp/4dee3b932662/growing-beef-newsletter-october-2020> * This article was also republished in Feedlot Magazine and Drover’s monthly newsletters and shared on social media platforms

One report to be submitted to the 2021 ISU Animal Industry Report

Scientific presentations:

Presentation at the 2021 meeting of the Midwest Section of the American Society of Animal Science

Extension/Outreach presentations:

Erika Lundy. Managing for Carcass Quality. Iowa Beef Center Feedlot Short Course. Ames, IA. August 12, 2020. (36 attendees)

Erika Lundy. Managing for Carcass Quality. Iowa State University Beef Nutrition Research Showcase. Ames, IA. December 5, 2019. (30 attendees)

Podcasts:

None

Other:

None

Personnel Support:

Faculty:

None

Extension specialists:

Erika Lundy, ISU Extension Beef Specialist, 5% of salary

Patrick Wall, ISU Extension Beef Specialist, 2% of salary

Associate scientist:

Garland Dahlke, Associate Scientist, 2% of salary

Post-doctoral associates:

None

Technicians:

None

Farm labor:

None

Graduate students:

None

Undergraduate students:

None

Other:

None

