BEEF CATTLE RESEARCH UPDATE

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Effects of Heifer Finishing Implants on Beef Carcass Traits and Meat Tenderness

Colorado State University researchers evaluated the effects of finishing implants on heifer carcass characteristics and longissimus muscle (LM) tenderness as measured by Warner-Bratzler shear force (WBSF) using 500 commercially fed Continental x British heifers.[1] The heifers were blocked by initial body weight (light group: ≤ 748 lb; heavy group: > 748 lb) and randomly assigned to 12 implant treatments that used 0, 1, or 2 finishing implants to deliver cumulative doses of trenbolone acetate (TBA) and estradiol (E_2), or both ranging from 0 to 400 mg of TBA and 0 to 40 mg of E_2 during the finishing period. The heavy and light heifers were slaughtered after 135 and 149 days on feed, respectively. Strip loins from each carcass were aged for 3, 7, 14, 21, or 28 days. The results of this study follow.

- Compared with non-implanted controls, implanting heifers once increased carcass weight by 17.4 lb without affecting marbling scores, quality grade, or LM WBSF values.
- Compared with the use of one implant, the use of two implants increased carcass weight by additional 13.2 lb, increased ribeye area by 0.74 in^2, reduced kidney, pelvic, and heart fat, and improved yield grade. However, reimplanted heifers produced a lower percentage of carcasses grading prime or choice (Figure 1) and greater WBSF values at all postmortem aging times (Figure 2).
- Among heifers receiving two implants, mean 14 day WBSF increased linearly as the cumulative combined dosage of E_2 plus TBA increased.
- Heifers implanted with a combination of E_2 plus TBA had larger ribeye areas, lower marbling scores and greater BWSF values after 3, 7, 14, and 21 days of postmortem aging than did heifers implanted only with TBA (Figure 3). However, WBSF values for the two groups did not differ when steaks were aged for 28 days.
- Single-ingredient implants containing 200 mg of TBA has no negative effects on carcass quality or meat tenderness, whereas the use of implants containing a combination of 20 mg of E_2 and 200 mg of TBA reduced marbling score and increased WBSF.
- Implant treatment effects on LM WBSF values gradually diminished as the length of the aging period increased (Figures 2 and 3).

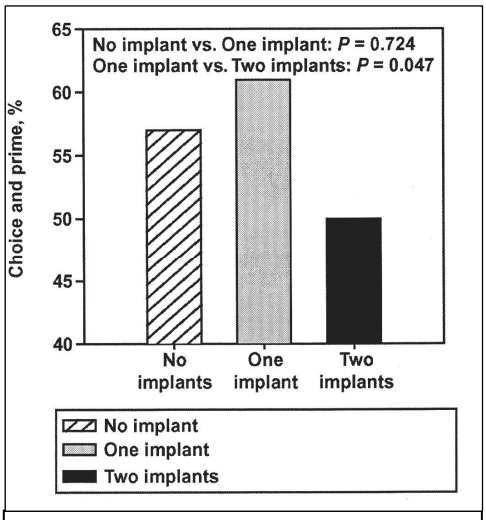

Figure 1. Percentage of carcasses grading Choice and Prime for heifers receiving no implant, one implant or two implants.

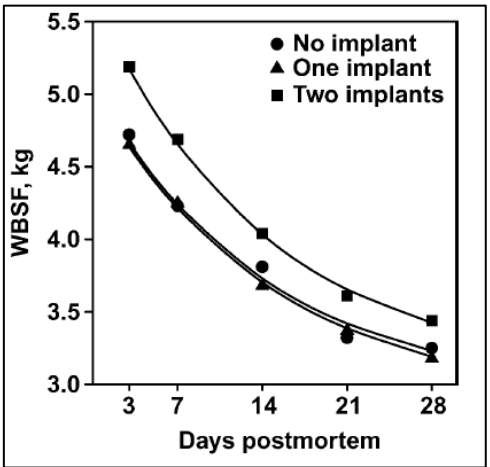

Figure 2. WBSF of strip loin steaks at various postmortem aging periods from heifers receiving no implant, one implant or two implants.

In summary, these researchers concluded that postmortem aging periods of 14 to 28 days were effective for mitigating the detrimental effects of mild or moderately aggressive heifer implant programs on the predicted consumer acceptability of strip loin steaks. Strip loins from non-implanted heifers, heifers implanted once, and heifers implanted twice with implants containing 200 mg of TBA required a minimum of 7 days of aging but were most likely to provide a satisfactory eating experience when aged 14 to 28 days. Heifers implanted twice with combination implants containing both E_2 and TBA produced strip loins that required at least 14 days of aging but were most likely to provide a satisfactory eating experience when aged 21 to 28 days. These results indicate that postmortem aging is important in assuring tenderness and consumer acceptability of strip loin steaks from both non-implanted and implanted heifers.

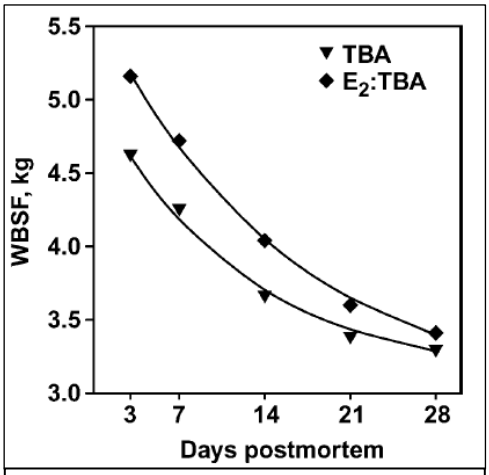

Figure 3. WBSF of strip loin steaks at various postmortem aging periods from heifers receiving implants containing TBA or TBA + E_2.

Bovine Respiratory Disease in Feedlot Cattle vs. Feedlot and Carcass Traits

Bovine respiratory disease (BRD) is the most common and costly beef cattle disease in the United States. Recent research showed that the economic loss associated with lower gains and treatment cost for BRD infection in a 1,000 head feedlot was $13.90 per animal, not including labor and associated handling costs.[2] Recently published research from the U.S. Meat Animal Research Center in Clay Center, NE evaluated whether selection for disease resistance is a viable means of preventing or reducing economic losses associated with BRD.[3] These researchers analyzed health records on 18,112 feedlot cattle over a 15-yr period and slaughter data on 1,627 steers over a 4-yr period to estimate the phenotypic and genetic correlations of BRD with growth, carcass, and meat palatability traits. The estimated heritability of BRD incidence was low at 0.08 suggesting that genetic selection for reduced BRD incidence would be slow at best. In contrast, heritability estimates for carcass traits were moderate to high, ranging from 0.26 to 0.68. Heritability estimates for palatability traits (WBSF, tenderness and juiciness scores) were moderate ranging from 0.23 to 0.31. Most genetic correlations of BRD with performance, carcass and palatability traits were low or negligible. These low correlations suggest that selection to reduce BRD in feedlot cattle would have negligible effects on growth, carcass, and palatability traits. Thus, selection to reduce BRD would have minor economic consequences on production traits or product quality.

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[1] Schneider, B. A., J. D. Tatum, T. E. Engle, and T. C. Bryant. 2007. Effects of heifer finishing implants on beef carcass traits and longissimus tenderness. J. Anim. Sci. 85:2019-2030.

[2] Snowder, G. D., L. D. Van Vleck, L. V. Cundiff, and G. L. Bennett. 2006. Bovine respiratory disease in feedlot cattle: Environmental, genetic, and economic factors. J. Anim. Sci. 84:1999-2008.

[3] Snowder, G. D., L. D. Van Vleck, L. V. Cundiff, G. L. Bennett, M. Koohmaraie, and M. E. Dikeman. 2007. Bovine respiratory disease in feedlot cattle: Phenotypic, environmental, and genetic correlations with growth, carcass, and longissimus muscle palatability traits. J. Anim. Sci. 85:1885-1892.

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