INFLUENCE OF BISON HARVEST SYSTEMS ON ANIMAL STRESS RESPONSE, CARCASS TRAITS, AND MEAT QUALITY CHARACTERISTICS

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I. OBJECTIVES

The objectives of this study were to evaluate the influence of harvest system (on-ranch or commercial harvest system) on (1) the stress response of bison heifers, (2) carcass characteristics and meat quality of bison heifers, and consumer preference for bison steaks.

II. MATERIALS AND METHODS

Grass-finished bison heifers were randomly assigned to harvest treatments: commercial ($n = 93$, transported ~720 km to a commercial harvest facility) or on-ranch ($n = 40$, harvested on-ranch using a sharpshooter and mobile slaughter unit). Blood samples were collected immediately following exsanguination and analyzed for serum cortisol and haptoglobin concentrations. Approximately 20 h postmortem, ribeye area, backfat thickness, marbling score, and instrumental color of the exposed ribeye and subcutaneous fat opposite the ribeye were recorded. A subsample ($n = 30$ carcasses closest to the average hot carcass weight for each treatment) was selected, and striploins were removed from one side of each carcass. Ultimate pH was recorded, and striploins were fabricated into 2.54-cm steaks. One steak was designated for crude fat determination. Two steaks were aged for 14 d and frozen for Warner-Bratzler shear force analysis, cook loss determination, and consumer sensory evaluation. Serum cortisol and haptoglobin concentrations, body weight, carcass characteristics, and meat quality data were analyzed using the MIXED procedure of SAS (SAS Institute Inc., Cary, NC) for the main effect of harvest treatment; slaughter date was included as a random effect, and peak temperature was included as covariate for Warner-Bratzler shear force and cook loss. Consumer preference data were analyzed using the MIXED procedures for the main effects of harvest treatment and serving order; serving time and panelist were included as random effects. Separation of least-squares means was performed using least significant difference with a Tukey adjustment, assuming $\alpha = 0.05$.

III. RESULTS

Commercially harvested bison heifers had elevated ($P < 0.01$) cortisol concentrations compared to heifers harvested on-ranch. Carcass weight, dressing percent, and ribeye area were greater ($P < 0.01$) for heifers harvested commercially. Instrumental color values (L^*, a^*, b^*) recorded at the ribeye area and L^* value of backfat opposite the ribeye were increased ($P < 0.05$) for heifers in the commercially harvested treatment. However, a^* and b^* values recorded for backfat opposite the ribeye were decreased ($P < 0.01$) in commercially harvested heifers. Heifers harvested on-ranch produced striploins with increased ($P < 0.01$) ultimate pH. Steaks from heifers harvested commercially had increased ($P < 0.01$) ether extractable fat percentage. Steaks from the on-ranch harvest system had less ($P < 0.01$) cook loss than steaks from the commercial system. Harvest treatment did not influence

($P > 0.05$) haptoglobin concentration, live body weight, backfat, marbling scores, tenderness, or sensory attributes.

IV. CONCLUSION

Collectively, these data indicate that harvest systems influence short-term stress response, and some carcass and meat quality characteristics of bison heifers. However, harvest systems had no impact on consumer preference for bison.

Keywords: bison, carcass characteristics, harvest systems, meat quality, stress