70 Grass and limited grain feeding production systems with post-harvest treatment to maximize carcass and tenderness characteristics of Bonsmara steers.

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Grass-based beef production systems have been increasing as a market alternative for beef. The combined effects of forage type, location, grain supplementation during forage feeding, limited grain feeding, and electrical stimulation (ES) on the subsequent carcass characteristics has not been full elucidated. Also, the aforementioned effects used in combination with blade tenderization (BLADE) and postmortem aging time on meat tenderness has not been fully examined. Bonsmara cattle were developed in South Africa for tropical adaptation, their ability to gain rapidly using short feeding times on high concentrate grain-based diets, and for tenderness. Our objectives were to identify the effects of location (LOC), forage type (cool vs warm season) (FT), supplementation (S), harvest of steers immediately off forage or after 90d on a high grain diet (DAYS), and ES on USDA Quality and Yield grade characteristics, fat and lean color, and pH in Bonsmara steers. Also, the aforementioned factors in combination with BLADE and postmortem aging time (AGE) on Warner-Bratzler shear force was determined. Steers (n=48) were randomly assigned to pasture at Overton or Uvalde, TX. Eight steers were randomly assigned to one of six treatments at each location: Cool-season forage (CSF) at Uvalde and harvested off grass; CSF at Uvalde and harvested after 90d on a feedlot ration (90D); CSF at Overton and harvested off grass; CSF at Overton and harvested off grass; CSF at Overton and harvested after 90D; warm-season forage (WSF) at Overton and harvested off grass, and WSF at Overton and harvested after 90D. Within the treatments, four steers were given S (corn at 0.8% BW/d) during forage feeding. At harvesting, one side of the carcasses was ES (300V for 30s, 350V for 30s, and 350V for 30s, with 10s rest) and chilled for 48h. USDA Quality and Yield grade factors, meat and fat color, and pH were determned. At 24 hours, strip loins were removed and segmented in half with each randomly assigned to no BLADE or BLADE. Within BLADE, three 2.54 cm steaks were cut, vacuum-packaged and randomly assigned to AGE (0, 14, 28 d) at 2°C. Steers harvested immediately off grass had younger bone maturity, higher lean maturity, less marbling, higher pH, darker colored lean and fat, and softer, coarser lean, with lighter hot carcass weights and lower yield grades than steers harvested after 90D regardless of location ($P<0.01$). Steers fed in Overton on CSF and harvested off grass were tougher than steers fed the other five treatments ($P=.0002$). ES did not improve tenderness and interactions of ES with LOC, FT, and S were not significant ($P>0.05$). Blade tenderization did not improve shear force values ($P>0.05$). The AGE and AGE by LOC by FT by DAYS interactions were significant ($P<0.0001$). When steers were harvested off grass, steers fed in Overton on CSF were tougher ($P<0.05$). For these steers fed 90D, tenderness was improved and aging did not improve shear force values. For steers fed CFS in Uvalde, steaks improved in tenderness with aging from 0 to 14 and 28 days; however, when steers were fed 90D, steaks had similar shear forces values across AGE as steers fed 0 d. Steers fed WSF at Overton and fed either 0 or 90D had similar shear force values after 0 d of aging. With aging, steaks from steers fed 90D improved in tenderness.