

## LONGISSIMUS PALATABILITY OF GRASSFED ZEBU TYPE CATTLE VS. WATER BUFFALOES SERIALLY SLAUGHTERED IN VENEZUELA

Huerta-Leidenz, N., Rodas-Gonzalez, A., Vidal, A., Colina, O.  
Facultad de Agronomía, Universidad del Zulia. Maracaibo, Venezuela

### Background

Meat from water buffalo (*Bubalus bubalis*) is usually produced by old animals slaughtered at the end of its productive life as work or dairy animal, many times weak or very thin. This fact has supported the generalized perception that buffalo meat is poor in quality (Moran, 1992; de Franciscis y Moran, 1992). To better position buffalo meat it is necessary to respond some questions concerning quality as compared to beef, its main alternative in the domestic and international markets. Most previous studies comparing water buffalo vs. cattle were conducted under intensive feeding regimes and/or using *Bos taurus* breed types as counterparts (Gigly et al., 1982; Valin et al., 1984). Such reports are not easily extrapolated to the vast majority of beef production systems in tropical America, based on grass fed, Zebu-influenced cattle.

### Objective

To examine differences for Warner Bratzler shear force and taste panel ratings in rib steaks between Zebu-influenced cattle and Water buffaloes raised on pasture and slaughtered at four comparative ages.

### Methods

Commercial Zebu cows were artificially inseminated with semen from five breeds (i.e., Brahman, Romo-sinuano, Red Angus, Black Anguas, and Charolaise) while buffalo sires were used for natural mating at the beginning of the same breeding season in a ranch located at Apure state, Venezuela. After parturition the cattle herd was put on improved (*B. humidicola*) pastures whereas the buffalo herd remained in lowlands to graze continuously native pasture up to the completion of the raising phase. On weaning time (231 d for buffaloes and 215 d for cattle) all animals (N= 132) were weighed off and the first group of bull calves (16 buffaloes and 17 cattle) were randomly selected to be slaughtered the following day. Half of the remaining bull calves were then castrated. The whole group of processed, weaned calves was then transported to "Charcote" ranch located at Cojedes state to complete the stocking and fattening phases. Bull and steer calves from both species were put on continuous grazing of a *Brachiaria spp* pasture without other supplementation than minerals. Randomly selected groups of 33 animals each (16 buffaloes and 17 cattle) were serially slaughtered at 17 mo (517 d for buffaloes and 500 d for cattle), 19 mo (602 d for buffaloes and 583 d for cattle), and 24 mo (736 d for buffaloes and 718 d for cattle), approximately. After 48-h chilling (0°C), carcasses were fabricated. Two rib steaks were chosen for sensorial analyses and another pair served for the Warner-Bratzler shear (WBS) test. Preparation and cooking of the samples for sensorial evaluation was carried out according to AMSA (1978). Five highly trained judges (Jerez et al., 1997) scored the samples using an 8-point structured rating scale (1 = extremely tough, dry, and excessive amount of connective tissue, bland and 8 = extremely tender, juicy, without connective tissue, intense). WBS values were recorded and averaged to obtain a single value for each animal. Analysis of variance was performed by the GLM procedure of SAS (1985) using specie, sex and the specie x sex interaction as sources of variation. Additionally, for each treatment, a frequency analysis determined the proportion of Tender (WBS = <3.88 kg), Intermediate (WBS = 3.88 to 4.98 kg) and tough (WBS = >4.98 kg) steaks, according to the tenderness thresholds described by Huerta-Leidenz and Rodas-Gonzalez (1998).

### Results and discussions

Juiciness ratings did not vary ( $P>0.05$ ) with the specie. Figure 1 indicates mean values for WBS, overall tenderness and flavor intensity ratings across slaughter ages. Longissimus steaks from buffaloes at weaning (7 mo approximately) exhibited lower shear values ( $P<0.01$ ) and were rated as more tender ( $P<0.05$ ) and more intense in flavor ( $P<0.01$ ) than those from cattle counterparts. Specie differences in the main palatability attributes (tenderness and flavor) at weaning, were not detected by panelists at more advanced slaughter ages. Mean WBS values at 19 mo and 24 mo of age indicate that cooked *longissimus* samples from cattle trended to require higher shear force than those from buffaloes, the difference becoming significant at 24 mo of age. Few studies had been conducted to compare buffalo meat with that of zebu-influenced cattle raised on pasture. Our results are somewhat opposite to those obtained by Australian workers (Robertson et al., 1986) which compared castrated males from both species grazing during six mo until 27 mo of age and found buffalo meat (*longissimus*) was inferior in tenderness. However, other reports present supporting evidence to our observation that buffaloes can produce meat of better quality or similar to that of cattle (Valin et al., 1984; Moran, 1992; De Franciscis y Moran, 1992; Merle et al., 1999).

Castration had no effect on palatability ratings at the slaughter ages studied herein. However at 17 mo of age, entire males from both species trended to produce meat with higher ( $P=0.07$ ) WBS than that of castrates. This trend was maintained at further killing ages, the difference versus castrates becoming significant at 19 mo of age (data not presented in tabular form). No Sex x Specie interaction was detected for any of the traits under study.

Figure 2 shows results of analyses of frequency for classifying beef and buffalo meat samples into tenderness levels across slaughter age groups. In general, it can be observed that with the only exception of the group slaughtered at 17 mo of age (meat from both species classifying similarly into tenderness levels) the highest proportion of tender steaks and the lowest proportion of tough steaks at any age derived from buffalo carcasses.

## Conclusions

Under extensive production systems young water buffaloes (*Bubalus bubalis fluvialis*) can produce meat as juicy or flavorful as that of young cattle. Buffalo meat could exhibit better quality than beef if buffaloes are slaughtered at weaning (7 mo of age). The inability of panalists to detect significant differences in meat tenderness between castrate and entire animals indicate the use of castration to ensure palatability is merely optional if animals are killed at the age range presented herein.

## Literature

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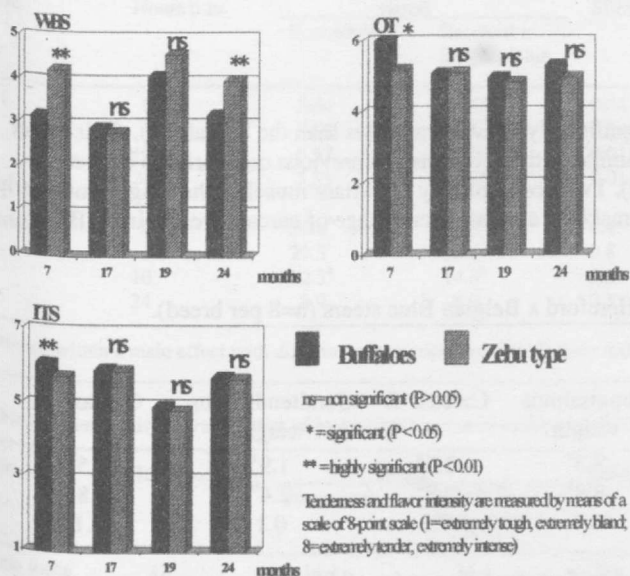


Figure 1. Comparison Zebu type cattle vs. Water buffaloes on Shear force values (WBS), Overall Tenderness (OI) and Flavor Intensity (IIS).

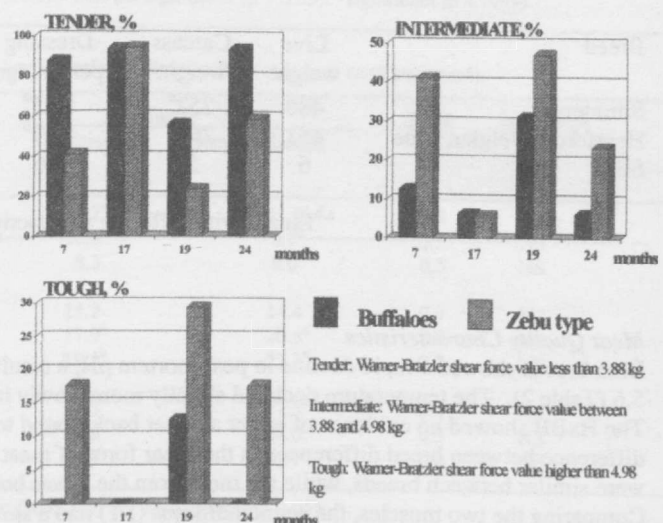


Figure 2. Percentage distribution of tenderness classes of rib steaks from grassfed Zebu type cattle and Water buffaloes serially slaughtered in Venezuela.