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Characteristics of Beef Carcasses Derived from Costa Rican Cattle as Affected by Gender and Dentition Age

J. Rodriguez¹, N. Huerta-Leidenz^{2*}, O. Murillo¹, M. O'Connor³, and A. R. Rodas-Gonzalez⁴

¹Tecnologico de Costa Rica, San Carlos, Costa Rica; ²Animal Science, Texas Tech University, Lubbock, TX, 79409, USA; ³O'Connor Consulting and Management, Inc, Washington, DC., 20817, USA; ⁴Animal Science, University of Manitoba, Winnipeg, Canada
*Corresponding author. Email: argenis.rodasgonzalez@umanitoba.ca (A. R. Rodas-Gonzalez)

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Objectives

To evaluate variation of carcass traits and cutability by gender and dentition age of cattle harvested in Costa Rica.

Materials and Methods

Cattle produced in Costa Rica were harvested in 1 of the 3 main federally-inspected plants of the country. The *Bos indicus*-influenced animals were selected randomly and sex class was recorded (CLASS; 193 intact males [bulls], 123 castrates [steers] and 61 cull females predominantly cows). Liveweight (LIVEW) was taken immediately before harvesting, and the hot carcass weight (HCW) was recorded after processing to calculate the dressing percentage (DRESS%). Dentition age (AGE) was estimated postmortem to segregate the animals in 12 mo (12MOA), 24 mo (24MOA), and 36 mo (36MOA). Scores for carcass finish (FINISH) and muscling (MUSCLING), and other carcass linear measurements (carcass length = CLENGTH; round circumference = ROUND; and Achilles tendon length = TENDONL) were taken before chilling. After 24 h post-mortem, chilled carcasses were evaluated for determining ribeye area (REA), backfat thickness (BACKFAT), and fat color (FATCOL) scores. Chilled carcasses were weighed and fabricated following precise instructions on style and maximum fat cover, removing subcutaneous fat in excess to 2 mm. The weight of boneless, closely trimmed, total saleable cuts (TSP), clean bone (BONE%) and trim fat (FAT%) from the whole carcass were computed as a percentage of the chilled carcass weight (CCW). Descriptive and variance analyses were

performed to determine the variation associated with gender, dentition age, and their interaction.

Results

The LIVEW, HCW, and CCW had a moderate variation (CV 15 to 18%) which corresponded well with the moderate variation observed in ROUND, REA, and BONE% (CV 13 to 15%). However, with this HCW range, FINISH and BACKFAT had a high variation (CV > 30%), as well as MUSCLING and FATC. In contrast, a low variation was detected (CV < 10%) for DRESS%, CLENGTH, TENDONL, and TSP%. As expected, mean values of traits related to carcass meat yields were in favor of the bull and steer carcasses, which dressed the heaviest carcasses, with the most convex profile (MUSCLING) and bulging leg muscle (ROUND), the longest carcasses, the largest ribeye area and higher yields of TSP as compared to female carcasses ($P < 0.05$). In contrast, carcasses from females exhibited more abundant/uniform distribution FINISH, thicker BACKFAT, yellowish FATC, and higher BONE% ($P < 0.05$) than those from steers or bulls. As AGE advanced, carcasses were heavier, had longer TENDONL and CLENGTH, exhibited more abundant fat cover, and yielded more BONE% and TSP%. Analysis of variance detected a significant effect of the CLASS × AGE interaction on LIVEW, HCW, CCW, ROUND, FINISH, BONE%, TSP ($P < 0.05$). Both bulls and steers at 36MOA showed a noticeable heavier body and carcasses with higher TSP yields with respect to the female carcasses; however, steer carcasses at 36MO presented most bulging round, more abundant/uniform FINISH and lower BONE% with respect to bull and female carcasses at the same AGE ($P < 0.05$).

Conclusion

These findings support the long-standing preference for raising and fattening bulls in Costa Rica. However,

the castration did not affect the carcass yield or cutability, and instead, the steers outperformed the bulls in carcass quality attributes such as FINISH and ROUND, which opens a marketing opportunity for castrates.