

COMPARISON OF WATER BUFFALOES VS. ZEBU-TYPE CATTLE ON CARCASS TRAITS AT CONTEMPORARY AGES

Comparación de búfalos vs. vacunos acebuados en características de la canal a edades contemporáneas

N. Huerta-Leidenz¹, A. Rodas-González², A. Vidal²,
O. Colina³ and R. Rodríguez⁴

¹Facultad de Agronomía.

²Facultad de Ciencias Veterinarias, Universidad del Zulia.

³Instituto Universitario Tecnológico de Maracaibo. Maracaibo, Edo. Zulia.

⁴Agropecuaria Flora C.A. Valencia, Edo. Carabobo, Venezuela.

Faxes (58)(61)536098-922482.

E-mails: rodas@telcel.net.ve y carnit@telcel.net.ve

Abstract

Four contemporary groups of buffaloes and zebu-type cattle (16 buffaloes and 17 cattle) raised under extensive conditions were serially slaughtered to compare carcass traits at corresponding ages (7 mo, 17 mo, 19 mo and 24 mo). Least squares means for carcass traits indicates that at every slaughter age, buffaloes produced carcasses with better ($P<0.05$) fat cover distribution and thicker back fat, and trended to exhibit better marbling scores than those produced by cattle. Although physiological maturity did not vary between species, at 24 mo of age buffaloes exhibited a slightly more advanced skeletal and muscular maturity than cattle counterparts. The adipose maturity showed that buffalo carcasses were younger (i.e., the fat cover maintained a creamy white color across all slaughter ages). Muscularity scores as judged by leg conformation and ribeye area showed advantages for buffalo's carcasses (differences becoming significant at 19 or 24 mo of age). However, when ribeye areas were adjusted by carcass weight, differences were in favor of cattle carcasses. According to Venezuelan grading standards, carcasses from both species were graded as "Ternera" (equivalent to baby beef) at the first slaughter point (7 mo of age). At further ages buffaloes

trended to grade better than cattle. In conclusion, young water buffaloes can produce carcasses with better attributes than cattle and are eligible for superior grades by Venezuelan standards if species are compared at similar ages.

Key words: Water buffaloes, zebu cattle, carcass, external fat cover, marbling.

Resumen

Cuatro grupos contemporáneos de búfalos y vacunos acebuados (16 búfalos y 17 vacunos) criados bajo condiciones extensivas fueron sacrificados para comparar sus características en canal a diferentes edades (7 m, 17 m, 19 m y 24 m). Las medias por mínimos cuadrados indicaron que en cada edad de matanza, los búfalos produjeron canales con mejor ($P<0,05$) acabado de grasa y mayor espesor de grasa, y tendieron a exhibir mejor marmoleo que los vacunos. Aunque la madurez fisiológica no varió entre especies, a los 24 m de edad los búfalos exhibieron una madurez ósea y muscular ligeramente más avanzada que sus contrapartes vacunos. La madurez adiposa mostró que canales de búfalo eran más jóvenes (i.e. la grasa de cobertura mantuvo un color blanco cremoso en todas las edades de sacrificio). La muscularidad evaluada por la conformación de la pierna y área del *longissimus* (AOC) mostró ventajas en las canales de búfalo (diferencias significativas a los 19 o 24 m de edad). Sin embargo, el AOC ajustada por el peso de la canal, favoreció a los vacunos. Según la categorización venezolana, las canales de ambas especies categorizaron como "Terñera" (equivalente a baby beef) a los 7 m de edad; mientras que para el resto de las edades, los búfalos tendieron a mejores categorías que los vacunos. En conclusión, los búfalos de agua pueden producir canales con mejores atributos que los vacunos y son elegibles para las categorías superiores de la categorización venezolana si se comparan las especies a edades similares.

Palabras claves: Búfalo de agua, ganado cebú, canales, marmoleo, grasa de cobertura.

INTRODUCTION

There is a growing interest in Venezuela and other South American countries to utilize water buffaloes (*Bubalus bubalis*) as an alternative to produce meat in tropical flooding savannas where harsh conditions are detrimental for productivity of most cattle breed types. However, adverse critiques are being raised by wholesalers against carcass quality (grading) of buffaloes. The Venezuelan grading system [1] was not designed to accommodate buffalo carcasses. However, market prejudices have re-

sulted in current price discounts (up to 20%) for buffalo carcasses. Comparative carcass studies for these species in the South American literature are scarce [3]. Previous comparisons of water buffalo vs. cattle are referred to intensive feeding regimes and/or using *Bos taurus* breed types as counterparts [2, 7]. Hence, there is the need to evaluate carcass performance of water buffaloes as compared to Zebu cattle counterparts produced under similar, extensive conditions, as it is occurring in the vast majority of beef production systems across tropical America. The objective of this research was to compare carcass performance between Zebu-influenced cattle and Water buffaloes raised on pasture and slaughtered at four comparative ages.

MATERIALS AND METHODS

Buffaloes were crossbred, with predominance of Murrah and Mediterranean breeds. Cattle were offspring of zebu dams sired by artificial insemination with bulls of different breeds (Brahman, Black Angus, Red Angus, Romosinuano and Charolaise). The cow-calf operation was located at a ranch located at Apure State. On weaning (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. Immediately after weaning (at 7 mo of age) half of the bull calves from each specie was castrated. The whole remaining 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 24-h chilling (0 °C) carcasses were evaluated according to Venezuelan standards [1]. Analysis of variance was performed by the GLM procedure of SAS [6] using species as the only source of variation.

RESULTS AND DISCUSSIONS

Least square means values for carcass traits are shown in Table 1. At every slaughter point, buffaloes produced carcasses with better ($P<0.05$)

TABLE 1
Comparison of grass-fed zebu-type cattle vs. Water buffaloes on carcass traits

Traits	7 mo			17 mo			19 mo			24 mo		
	Bu	Va	S	Bu	Va	S	Bu	Va	S	Bu	Va	S
External fat cover ^a	3.5	5.0	**	3.5	4.5	**	2.9	4.2	**	2.1	3.7	**
Back fat thickness, mm	6.1	1.5	**	5.6	1.1	**	5.1	1.0	**	11.0	3.0	**
Marbling score ^b	Pd ¹⁹	Pd ⁰⁵	*	Pd ²⁴	Pd ²²	ns	Tr ³⁵	Pd ⁸⁸	ns	L ³⁵	L ⁰⁸	ns
Bone Maturity ^c	A ³⁶	A ³⁶	ns	A ⁸³	A ⁷⁴	ns	A ⁸⁰	A ⁸⁰	ns	A ⁸⁶	A ⁷⁵	**
Lean Maturity ^c	A ³⁴	A ³⁴	ns	A ⁷⁴	A ⁷¹	ns	A ⁷⁸	A ⁷⁶	ns	A ⁷⁹	A ⁶⁴	**
Adipose Maturity ^d	1.0	1.0	ns	1.5	2.0	*	1.3	1.7	*	1.6	2.7	**
Final Maturity ^c	A ³⁵	A ³⁵	ns	A ⁸⁴	A ⁸³	ns	A ⁸²	A ⁸⁵	ns	A ⁸⁹	A ⁸⁹	ns
Muscular Profile ^e	3.4	3.2	ns	3.5	3.1	*	2.8	3.5	**	2.0	2.6	**
Ribeye area, cm ²	47.1	43.3	ns	46.1	42.9	ns	60.9	59.0	ns	63.9	60.0	*

TABLE 1
Comparison of grass-fed zebu-type cattle vs. Water buffaloes on carcass traits (Continuation)

Traits	7 mo			17 mo			19 mo			24 mo		
	Bu	Va	S	Bu	Va	S	Bu	Va	S	Bu	Va	S
Ribeye area adjusted by weight (cm ² /45.5 kg) ^f	15.8	18.8	**	12.4	14.0	**	13.0	15.4	**	11.7	13.0	**
Venezuelan grading system, % ^g	Veal 100	Veal 100		AA 31,25 A 37,50 B 31,25	B 70,58 C 17,64 D 11,76		A 69 B 31	B 100		AA 12.50 A 87.50	A 29.42 B 70.58	

Bu: Buffaloes.

Va: Zebu-type.

S: significant. Where ns= non significant (P>0.05) * = significant (P<0.05) ** = highly significant (P<0.01).

^a: where 1 = very abundant, 2= abundant, 3= media, 4=slight and 5= absent.

^b: where Pd = practically devoid; T= traces; L= slight.

^c: A: it corresponds to the first degree of maturity.

^d: where 1 = white ivory (A), 2= creamy white (B), 3=slight yellow (C), 4= intense yellow (D), 5= orange-yellow.

^e: where 1=superconvex, 2=convex, 3=right, 4=concave, 5=very concave.

^f: ribeye area adjusted for each 45.5 kg of weight of the carcass.

^g: Proportion of animals categorized according to Decree 181, carried out by the meat official grader of the slaughterhouse.

finish (in terms of fat cover distribution and back fat thickness) and trended to exhibit better marbling scores than those produced by cattle. Although no differences were expected in regard to physiological maturity, at 24 mo. of age buffaloes exhibited a slightly more advanced skeletal and muscular maturity than cattle counterparts. Fat cover in buffalo carcasses maintained a creamy white color across all slaughter ages which allowed for a better judgement of the adipose maturity. A report from Australia corroborates our observation in regard to the constant white fat colour of buffalo carcasses [5]. Muscularity scores as judged by leg conformation and ribeye area showed advantages for buffalo's carcasses (differences becoming significant at 19 or 24 mo of age). However, when ribeye areas were adjusted by carcass weight, differences were in favor of cattle. Several authors cited by Moran [4] have reported larger ribeye areas with thinner fat cover in Zebu type carcasses when compared to those of swamp or river buffaloes. According to Venezuelan grading standards, carcasses from both species were graded as Ternera (equivalent to veal or baby beef) at the first slaughter point (7 mo of age). At more advanced ages buffaloes trended to grade better than cattle.

CONCLUSIONS

Under extensive production systems like the described herein young water buffaloes (*Bubalus bubalis fluviatilis*) can produce carcasses with better attributes than those produced by young cattle if species are compared at similar ages. By the Venezuelan standards buffalo carcasses are eligible for superior grades if slaughtered at this maturity range and can grade better than grass fed beef carcasses.

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