

CARCASS QUALITY OF SAVANNAH-FED ZEBU TYPE CATTLE VS. WATER BUFFALOES SERIALLY SLAUGHTERED IN VENEZUELA

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Background

There is a growing interest in Venezuela and other South American countries to utilize the water buffalo (*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 critics are being raised by wholesalers against carcass quality (grading) of buffaloes. The Venezuelan grading system (Decreto presidencial 181, 1994) was designed to accommodate buffalo carcasses. However, market prejudices have resulted in current price discounts (up to 20%) for buffalo carcasses. Comparative carcass studies for these species in the South American literature are scarce (Merle et al. 1999). Previous comparisons of water buffalo vs. cattle are referred to intensive feeding regimes and/or using *Bos taurus* breed types as counterparts (Gigly et al., 1982; Valin et al., 1984). 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.

Objective

To compare carcass performance between Zebu-influenced cattle and Water buffaloes raised on pasture and slaughtered at four comparative ages.

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 (Decreto Presidencial 181, 1994). Analysis of variance was performed by the GLM procedure of SAS (1985) using specie as the only source of variation.

Results

Least squares mean values for carcass traits are presented in Table 1. At every slaughter point, buffaloes produced carcasses with better ($P > 0.05$) finish (in terms of fat cover distribution and back fat thickness) and tended 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 maturities than cattle counterparts. Fat cover in buffalo carcasses maintained a creamy white color across all slaughter ages which allows for a better judgment of the adipose maturity. A report from Australia corroborate our observation in regard to the constant white fat colour of buffalo carcasses (Robertson et al., 1986). Muscularity scores as judged by leg conformation and ribeye area showed advantages for buffaloes 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. Several authors cited by Moran (1992) 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 fluvialtilis*) can produce carcasses with better overall quality 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.

Pertinent Literature

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Tabla 1. Comparison of fed zebu type cattle vs. Water buffaloes on carcass traits

	9 mo				18 mo				21 mo				24 mo			
	Bu	Va	Dif.	S	Bu	Va	Dif	S	Bu	Va	Dif	S	Bu	Va	Dif.	S
Fat external cover ^a	3.50	5.00	-1.50	**	3.50	4.57	-1.07	**	2.93	4.26	-1.33	**	2.18	3.70	-1.52	**
Back fat thickness, cm	0.61	0.15	0.46	**	0.56	0.11	0.45	**	0.51	0.10	0.41	**	1.10	0.30	0.80	**
Marbling score ^b	Pd ¹⁹	Pd ⁰⁵	0.14	*	Pd ²⁴	Pd ²²	2.0	ns	T ³⁵	Pd ⁸⁸	2.0	ns	L ³⁵	L ⁰⁸	0.27	ns
Bone Maturity ^c	A ³⁶	A ³⁶	0.0	ns	A ⁸³	A ⁷⁴	9.0	ns	A ⁸⁰	A ⁸⁰	0.0	ns	A ⁸⁶	A ⁷⁵	0.07	**
Lean Maturity ^c	A ³⁴	A ³⁴	0.0	ns	A ⁷⁴	A ⁷¹	3.0	ns	A ⁷⁸	A ⁷⁶	2.0	ns	A ⁷⁹	A ⁶⁴	0.15	**
Adipose Maturity ^d	1.00	1.00	0.0	ns	1.50	1.99	-0.49	*	1.31	1.70	-0.39	*	1.62	2.77	-1.15	**
Final Maturity ^c	A ³⁵	A ³⁵	0.0	ns	A ⁸⁴	A ⁸³	1.0	ns	A ⁸²	A ⁸⁵	3.0	ns	A ⁸⁹	A ⁸⁹	0.0	ns
Muscular Profile ^e	3.43	3.17	0.26	ns	3.56	3.16	0.4	*	2.81	3.47	0.66	**	2.06	2.64	-0.58	**
Ribeye area, cm ²	47.09	43.33	3.76	ns	46.12	42.88	3.24	ns	60.88	58.99	1.89	ns	63.87	59.94	3.93	*
Ribeye area adjusted ^f	15.80	18.84	-3.04	**	12.38	13.95	-1.57	**	13.03	15.39	-2.36	**	11.64	12.94	-1.30	**
Venezuelan grading system ^g	T	T	-		AA	B	-		A	B	-		AA	A	-	-
	100%	100%			31,25%	70,58%			69%	100%			12,50	29,42		
					A	C			B				%	%		
					37,50%	17,64%			31%				A	B		
					B	D							87,50	70,58		
					31,25%	11,76%							%	%		

Bu: Buffaloes; Va: Zebu type; Dif: difference among means; S: significance; ns: non significant (P> .05); *: significant (P< .05); **:high significant (P< .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 classifier of the slaughterhouse.