CARCASS CHARACTERISTICS OF CROSSBREEDING BETWEEN *BOS TAURUS* AND *BOS INDICUS* BREEDS IN URUGUAY.

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Abstract. The objective of this research was the study the genetic type effect on carcass quality of 245 steers from Hereford (H) and F1 crosses, breeding sires of Angus (A), Salers (S) and Nellore (N) breed mated to Hereford dams. They were slaughtered at 730± 52 days at similar fat thickness. The highest weight of carcass was found in SH (250.5 kg) and NH (244.5 kg), while the lowest in AH (232,1 kg) crosses and H (222.8 kg) steers (p<0.01). Dressing percentage varied from 53.2 % (H) to 54.5% (NH). The highest meat yield (65.9 and 65.6%) were recorded in NH and SH respectively, with the lowest share of separable fat (6.4%) in SH, while the lowest amount of bone (21.5%) in NH crosses (p<0.01). No significative differences were evident for percentage of high commercial value cuts between crosses.

I. INTRODUCTION

No single cattle breed has all attributes that are needed to produce beef efficiently in all environments and to meet the requirements of all markets It is important to recognize that breed differences and rankings can vary due to such factors as sampling effects, environmental effects and production system (including end-point criteria). In many situations, the breed type of the cow herd must be matched to available resources and environmental constraints of the individual production unit. In either case, the genetic type best suited for cow herd production efficiency might not be optimal for postweaning production or meat traits (1). Substantial between -breed variation exists for many carcass composition and meat quality characteristics. Numerous reports are available on the effects of crossbreeding on carcass and beef quality attributes in *Bos taurus* breeds of cattle reared in temperate environments (2). Many of these reports also include tropically adapted breeds in their comparisons. However, there are relatively few reports of breed effects on carcass and beef quality attributes of cattle grazed at pasture. The object of this study was to examine the carcass quality from Hereford, Angus x Hereford, Nellore x Hereford and Salers x Hereford Fl steers fed pasture

II. MATERIALS AND METHODS

Carcass traits were evaluated from 245 steers from Hereford pure breed and F1 crosses, breeding sires of Angus, Hereford, Salers and Nelore breed mated to Hereford dams. Steers were slaughter in a commercial packing plant at the same fat thickness, with a slaughter age of 730 ± 52 days. At slaughter, the carcasses were identify, weighed and stored during 24 h in a chilling chamber at a temperature of 4ºC. After chilling, the right half of the carcass was used to determine carcass length, (from the anterior edge of symphysis pubis to the middle of the anterior edge of the visible part of the first rib). From these measurements a carcass blockiness index was calculated. This index expresses the relationship between hot carcass weight (kg) and carcass length (cm) as follows: Blockiness index = hot carcass weight *100 / carcass length. High values indicate high muscular development (3). Dressing percentage for an individual animal was defined as hot carcass weight divided by liveweight. Fat thickness was determined at P8 point (4). After a 48 h chill at 4 °C, the right side of each carcass was quartered between 10^{th} and 11^{th} rib into a 3-rib hind quarter and the remaining fore quarter. From the hindquarter the thin flank and the lateral ribs portion was removed generating the pistola cut. Left pistola of each carcass was fabricated into boneless retail product, lean tream, fat tream and bone. The pistola was dissected into 10 separate commercial joints: *tenderloin*; striploin; *Top Sirloin*, *tri-tip*; *rump cap*; outside; inside; *knuckle*; *Heel muscle*; and *shank* specified in INAC Hand-book (5). Striploin, tenderloin and Top sirloin were

taken as "valuable cuts". Saleable beef yield consisted of the 10 primal cuts and manufacturing meat with all bone removed. Data were analyzed by variance analysis of, GLM procedure of SAS.

III. RESULTS AND DISCUSION

Hereford (H) purebred reached the lowest slaughter weights, differing from Salers Hereford (SH) while Nellore - Hereford (NH) and Angus-Hereford (AH) crosses achieved intermediate weights (Table 1).

Table1. Slaughter weight, carcass weight and carcass dressing

	Slaughter weight (Kg.)	Carcass Weight (Kg.)	Carcass dressing (%)
p<f	p<0.01	p<0.01	p<0.01
H	418.6 ±5.6 a	222.8 ±3.3a	53.2 ± 0.3 a
AH	437.9 ±3.5 b	232.1 ±2.1a	53 ± 0.22ab
SH	464.6 ±3.5 c	250.5 ±2.1b	53.9 ±0.2bc
NH	448.4 ±4.6 b	244.5 ±2.7b	54.5 ± 0.3 c

Later maturing breeds have lower carcass fatness and higher proportions of muscle and bone, requiring higher slaughter weight, to achieve the same degree of fatness. NH crosses achieved the highest carcass dressing differing performance with H purebred and AH crosses while SH crosses, reached intermediate values being different from the pure breeds, but not of other crosses evaluated. This major dressing carcass achieve by NH crosses is mainly due to a lower proportion of gut contents and a lower weight of gut and intestines (6). HS crosses reached the lowest carcass fat thickness, the best hindquarter /forequarter ratio, and with NH crosses greater Blockiness index than H, and AH crosses. (Table 2).

Tabla 2. Carcass blockiness index, hindquarter /forequarter ratio and carcass fat levels.

	Blockiness index(Kg. /cm.)	Hindquarter/Forequarter ratio	Fat thicknes P8 (mm)
p<f	p<0.01	p<0.01	p<0.01
H	1.6 ± 0.01 b	1.04± 0.07 b	10.7 ± 0.33 a
AH	1.6 ± 0.06 b	1.01 ± 0.05 a	10.9 ± 0.20 a
SH	1.81 ± 0.06a	1.06 ± 0.04 c	9.8 ± 0.20 b
NH	1.80 ± 0.08a	1.04 ± 0.05 b	10.9 ± 0.30 a

Carcass conformation decreased when carcass length increased, decreasing the width of it, thus losing compactness (7).

NH and SH crosses achieved the highest percentage of salable meat differing from H pure breed and AH crosses (Table 3).

Table 3. Pistola meat yield and valuable cuts proportion.

	Saleable meat yield (%)	Valuable cuts (%)
p<f	p<0.01	ns
H	63.9 ± 0.4 a	21.3 ± 0.1
AH	64.6 ± 0.2 a	21.4 ± 0.1
SH	65.6 ± 0.2 b	21.6 ± 0.1
NH	65.9 ± 0.3 b	21.7 ± 0.1

This higher meat yield was explained in NH crosses by a lower bone percentage and in SH crosses by a lower percentage of fat trim (Table 4). Differences between breeds in meat yield are generally attributable to the levels of carcass fat. Despite this and in cases in which different breeds types are evaluated even at the same fat level, differences can be explained in terms of a greater muscle / bone ratio (8)

Table 4. Pistola percentage of Bone and fat trim.

	Bone (%)	Fat (%)
p<f	p<0.01	p<.0.01
H	21.9 ± 0.2 ab	7.2 ± 0.2a
AH	22.3 ± 0.1 a	7.1 ± 0.1a
SH	22.0 ± 0.1 ab	6.4 ± 0.1b
NH	21.5 ± 0.1 b	7.05 ± 0.2ab

Valuable cuts differed between breeds when evaluated at constant age and weight, while at the same slaughter end, the previously differences tended to disappear (6,9).

CONCLUSIONS

Carcasses of crossbreeding between 4 beef cattle reared in their typical production system have been characterized. In pastoral systems of Uruguay F1, crosses between *Bos Taurus* breeds such as Salers, and *Bos Indicus* breeds as Nellore with Hereford were superior in terms of carcass weight and carcass dressing than Hereford and Angus – Hereford steers. Salers and Nellore crosses provided an advantage of 1% and 1.7% over Hereford and Angus - Hereford crosses for pistol meat yield.

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