

CARCASS CHARACTERISTICS OF BRITISH AND CHAROLAIS STEERS RAISED ON GRASS

LAURO MÜLLER, JOSÉ J. LAUZER AND GISELDA P. ROBAINA

Universidade Federal de Santa Maria . Departamento de Zootecnia - Santa Maria, RS, BRASIL

INTRODUCTION

Crossbreeding is not normally used by the beef cattle ranchers in Brasil. The great majority of beef sold to the customers come from grading up breeds or "criollo" cattle. In the southern portion of Brasil (Rio Grande do Sul) where this work was conducted, the predominant breeds are: Hereford, A. Angus, Charolais and Devon. In the Central Depression Region where the University is located, Charolais is the main breed. The steers are normally slaughtered at 4,5 years of age and at an average live weight of 460 kg. Lately, through better feeding practices, a small percentage of steers have been killed at 2 years of age. Most of them however, are lighter in weight, about 400 kg.

The study was conducted to compare carcass and meat quality of Charolais and British steers that were slaughtered at 2 years of age.

EXPERIMENTAL

Forty-four steers (6 Angus, 8 Hereford, 6 Devon and 124 Charolais) originating from the University experimental herd were used in the experiment. They were weaned and castrated at about 7 months old and kept during summer time in native grasses. During winter, when there is a shortage of grass, they grazed a rye-grass pasture. They were slaughtered at 2 years of age in a nearby Packing-Plant. After 48 hs, chill, the carcasses were evaluated for conformation and a linear measurement of the thickness of the round was taken.

The right side of the carcasses were then ribbed between the 12 th and 13 th rib, the Longissimus muscle traced, fat thickness was measured and marbling, colour and texture of lean were subjectively evaluated. The left side was used to obtain the pistol cut (8 ribs) and posteriorly the 7 deboned cuts from pistol. A portion of the loin was taken to the University Meat Laboratory for tenderness and cooking loss determinations. The 2,5 cm thick steaks were roasted in an oven to an internal temperature of 70°C and tenderness was evaluated through the use of the Warner-Bratzler shear device.

RESULTS AND DISCUSSION

Since in preliminary analysis the three British breeds did not present any significant difference for all the traits studied, the data shown represent the average values for the three breeds. Table 1, presents average values for several carcass measurements.

TABLE 1. COMPARISON BETWEEN BRITISH AND CHAROLAIS STEERS WITH RESPECT TO SEVERAL CARCASS MEASUREMENTS

		British	Charolais
		n=20	n=24
Live weight	Kg	390	430 *
Hot carcass weight	Kg	210	230 *
Dressing percentage	%	54.0	53.5
Fat thickness	mm	3.0	1.0 *
Conformation ^a		10.0	11.0
Longissimus area	cm ²	53,2	60,5 *
Round thickness	cm	22.4	24.2

^a1-3 = Inferior, 10-12 = Good, 16-18 = Superior

Charolais steers presented heavier carcasses and a significant larger area on the Longissimus muscle, while the British breeds displayed a thicker layer of sub-cutaneous fat. These results agree with the data reported by Adams et al. (1973), Hedrick et al. (1975), Luckett et al. (1975) and Young et al. (1978). The live weight of 390 kg for the British breeds and Longissimus area of 53.2 cm², are inferior to the data found by Müller and Primo (1971) who reported a live weight of 430 kg and Longissimus area of 60 cm² for Hereford steers slaughtered at 2 years of age. Oliveira da Silva e Müller (1969) also reported heavier live weight (450 kg) for Charolais slaughtered at the same age and Longissimus area of 68 cm².

The proportion of the three major wholesale cuts in the carcass is presented in table 2.

TABLE 2. BREED COMPARISON ON THE YIELD OF SOME MAJOR WHOLESALE CUTS

		British n=20	Charolais n=24
Pistol cut (8 ribs) ^a	%	48.6	49.7
Forequarter (5 ribs)	%	37.2	36.6
Side	%	14.2	13.7
Edible portion of pistol in relation to carcass wt ^b %		34.6	35.7

^a Pistol cut = Round, rump and loin

^b Includes the heel of round

Although there were no significant differences for any of the cuts, Charolais steers presented 1% more on the most valuable portion of the carcass and a lower proportion on the forequarter and side. Edible portion in the pistol cut also favoured the French breed by about 1%. The results are in agreement with those reported by Lauzer, Müller and da Silva (1977) who found that Charolais steers presented a significant 2% more pistol cut than the British breeds.

The proportion of the "7 boneless cuts" from pistol in relation to carcass weight, is shown in table 3.

TABLE 3. BREED COMPARISON ON THE YIELD OF THE "7 BONELESS CUTS" FROM PISTOLA

		Britissh n=20	Charolais n=24
Top round	%	6.30	6.60
Bottom round	%	3.92	4.04
Eye of round	%	1.57	1.57
Rump	%	5.08	5.22
Sirloin tip	%	4.80	5.20 *
Tenderloin	%	1.70	1.80
Loin	%	7.55	7.23

^a Calculated in relation to carcass weight

All the proportions were in favour of Charolais but the loin, although the only significant difference was found in the sirloin tip. Lauzer, Müller and da Silva (1977) also reported slight advantage of Charolais in relation to British breeds in the proportion of these 7 cuts.

Table 4 presents the qualitative evaluation of steaks from the two breed groups.

TABLE 4. QUALITY CHARACTERISTICS OF LONGISSIMUS MUSCLE OF THE TWO BREED GROUPS

		British n=20	Charolais n=24
Marbling amount ^a		6.50	4.60 *
Colour of lean ^b		5.00	4.70
Texture of lean ^c		4.20	4.60
Warner-Bratzler shear	Kg	6.70	8.00 *
Cooking loss	%	20.50	20.70

^a 1-3 = Traces 4-6 = Slight 7-9 = Small

^b 1 = Dark 5 = Bright red

^c 1 = Ext. coarse 5 = Very fine

The British breeds showed a significant ($P < .05$) higher display of marbling and better tenderness as indicated by lower shear value. Young et al. (1978) also reported a higher deposition of marbling in Hereford and Angus steers in comparison with Charolais.

No difference in tenderness between Charolais and Hereford and Angus steers however, were reported by Hedrick et al. (1975) and Luckett et al. (1975).

The fact that Charolais steaks were tougher may find explanation in the "cold shortening" phenomenon. Since both groups of breeds presented quite light carcasses and the Charolais had less external fat (1.0 mm), the Longissimus may have cooled at a faster rate than the same muscle in the British carcasses (3.0 mm) and as demonstrated by Marsh and Leet (1966), muscles or portions of muscles that were cold shortened, present lower tenderness values.

Boths groups of animals presented acceptable colour and texture of lean. Cooking losses were also similar for both groups.

SUMMARY

Twenty British (Angus, Hereford and Devon) and 24 Charolais steers, were maintained during growing and finishing periods on grass and slaughtered at 2 years old. The Charolais showed heavier live and carcass weights, better muscular development and higher yield on the pistol cut (8 ribs). There were no differences on the proportion of the 7 deboned cuts from pistol. The British breeds presented a significant thicker deposition of external fat, better marbling and more tender steaks.

LITERATURE CITED

- Adams, N.J., W.N.Garret and J.T.Elings. 1973. Performance and carcass characteristics of crosses from imported breeds. J. Anim. Sci. 37:623.
- da Silva, B.O. and L. Müller, 1969. Características das carcaças de novilhos Charoleses abatidos aos 2 anos de idade. Relatório anual, Est. Exp. Tupanciretã, RS, Brasil. p. 12.
- Hedrick, H. B., G.F.Krause, J.F.Lasley, B.Sibbit, L. Langford and A.J. Dyer. 1975. Quantitative and qualitative carcass characteristics of straightbred and reciprocally crossed Angus, Charolais and Hereford steers. J. Anim. Sci. 41:1581
- Lauzer, J.J., L. Müller and S.F.da Silva. 1977. Influência da raça em alguns cortes da carcaça bovina. Rev. C. C. R. - UFSM, Brasil 7(8): 27 - 31.
- Luckett, R.L., T.B.Bidner, E.A.Icasa and J.W.Turner. 1975. Tenderness studies in straightbred and crosbred steers. J. Anim. Sci. 40:468.
- Marsh, B.B. and N.G.Leet. 1966. Meat tenderness. III. J. Food Sci., 31, 450.
- Müller, L. and A.T.Primo. 1971. Manejo na Desmama e Sobre-Ano com novilhos da raça Hereford. Relatório Anual, Est. Exp. S.Gabriel, RS, Brasil, p. 23.
- Young, L.D., L.V.Cundiff, J.D.Crouse, G.M.Smith and K.E.Gregory. 1978. Characteristics of biological types of cattle. VIII. Postweaning growth and carcass traits of three-way cross steers. J. Anim. Sci. 46:1178.