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INTRODUCTION

In order to improve the efficiency of beef production, crossbreeding exploiting complementarity and heterosis is a widely accepted means of incorporating desirable traits from various breeds (Lunstra and Cundiff, 2003).

Double muscling in cattle is recognized as an autosomal recessive trait (locus mh) widespread in the Belgian Blue Breed (BBB) (Charlier et al., 1995). Braford is a synthetic breed, approximately 3/8 Brahman and 5/8 Hereford, developed in Florida since 1947 and currently used in USA and South America. Nelore is a Brazilian cattle breed originated from the Ongole breed (India) first introduced in Salvador, Bahia, in 1868.

In Brazil, beef producers are more and more concerned with the fat content of the carcass and the tenderness of the meat, especially for export markets.

In this study, we compare the growth and the carcass performances of Belgian Blue x Nelore cattle and Braford cattle kept on the same pasture and fattening conditions in the Bahia state of Brazil.

MATERIAL AND METHODS

A total of 90 animals (36 BBB x Nelore and 54 Braford) of the Fazenda Lagoa do Morro, Agribahia, GES Group, were followed, from 2002 to 2005, by the CEPAB, a joint project of University of Liège, University of Gembloux and Seagri of Bahia State.

Nelore cows belonging to AgriBahia (GES) were inseminated with 2 Belgium Blue Bulls belonging to the Company “Belgium Blue Group”. Braford cattle was kept previously on the farm. The calvings were all normal and without assistance. A complementation based on rice by products (1% of live weight) was given to the animals during the test period.

Data were obtained from the farm, starting after the birth. The animals were all slaughtered the same day at 2 years in Tecnocarne in Salavador (Bahia). The 7^{th} rib of 10 BBB x Nelore and 10 Braford bulls were taken at the slaughterhouse 1 day after slaughter. Ribs were dissected in order to obtain the weight of fat, meat and bone and also the weight of specific muscles: Longissimus Dorsi (measure of the inside muscular development) and Trapezius and Latissimus Dorsi (measures of the external muscular development).

RESULTS AND DISCUSSION

The growth rate of both genetic groups was similar (Figure 1) with a global average daily gain from birth to slaughter of 740.9 g, a value to be considered in relation with a strong dry period in Bahia State starting when the animals were 300d old.

At slaughter, the average age of the 10 Braford bulls and the 10 Belgian Blue x Nelore bulls were 755.9 d and 750.4 d and the corresponding averages for weight at slaughter were 553.5 kg and 539.7 kg, respectively.
Braford had, on average, a higher value of live weight (+13.8 kg) but a lower carcass weight (-5.4 kg) than BBB x Nelore crosses.
The average killing out percentage of the BBB x Nelore (54.1%) was 2.32% higher than the Braford (51.78%). Similar improvements were found by Cundiff et al. (2000) in the MARC project. The dissection revealed that, in the 7th rib, BBB x Nelore males had : 2.54% less fat, 6.9% less bone and 9.44 % more meat, bigger Longissimus dorsi (eye muscle) and bigger peripheral muscles (Trapezius and Latissimus dorsi) (Table 1. and Figure 2).
The results show a redistribution of fat, bone and meat within the 7th rib (right half carcass) of BBB crosses which are characterized by more meat. The redistribution is well illustrated in Figure 2. Since the rib content is highly correlated with the rest of the carcass, one could consider that Belgian Blue crosses have a higher commercial value with the improvement of secondary cuts.

Table 1. Results of the dissection of the 7th rib of Braford and Belgian Blue x Nelore bulls

	Breeds			
Traits of the rib	**Braford**	**BBB x Nelore**	**Difference** BBB-Bradford	
Fat (g)	771.2	661.5	- 109.7 g	P<0.25
Bone (g)	1203.5	939.5	- 264.0 g	P<0.001
Muscle (g)	2015.5	2401.5	+ 386.0 g	P<0.01
Total Rib (g)	3990.2	4002.5		NS
Fat % in the rib	19.11	16.56	-2.54%	P<0.20
Bone % in the rib	30.40	23.50	-6.90%	P<0.001
Muscle % on the rib	50.50	59.94	+9.44%	P<0.001
Age at slaughter (d)	755.9	750.4	-5.5 d	NS

Table 2. Comparison of individual muscles of the 7th rib of Braford and Belgian Blue x Nelore bulls

	Breeds			
Traits of the rib	**Braford**	**BBB x Nelore**	**Difference** BBB-Bradford	
Longissimus dorsi (g)	216.5	264	+47.5 g	P<0.05
Longissimus dorsi (% of the rib)	5.49	6.62	+1.13%	P<0.10
Periph. Muscles (g)	413	528	+114.6 g	P<0.01
Periph. Muscles (%)	10.44	13.13	+2.68%	P<0.005

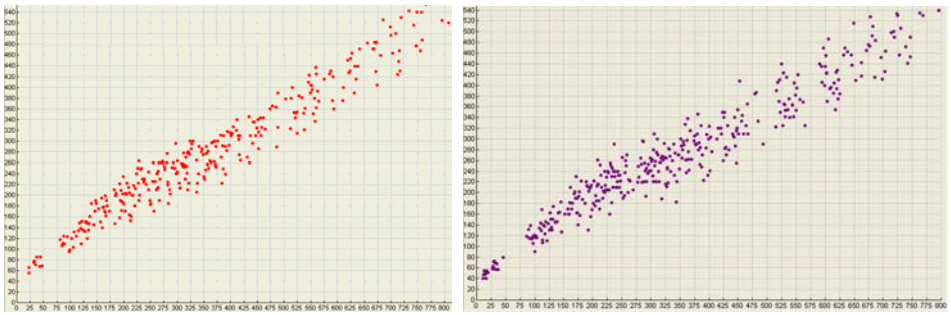

Figure 1. Growth from birth to slaughter of BBB x Nelore and Bradford cattle in AgriBahia, Bahia State, Brazil

CONCLUSION

The experiment organized in Bahia State illustrates the potential use of the Belgian Blue Breed on the Zebu type cattle, especially in tropical or subtropical regions.

Since Belgian Blue animals have a bigger muscular development, a fine skin and a smaller digestive system, the average carcass weight (and the killing out percentage) of the BBB x Zebu Nelore crosses shows the same trend as in pure Belgian Blue cattle but is less extreme.

With a redistribution of fat, meat and bone percentage within the rib and thus, by extrapolation, in the carcass, the crossbreeding of Belgian Blue with Zebu type cattle leading to more muscular cattle has a lot of potential.

According to the results of the dissection, it is clear that the meat industry should also pay more attention to the forequarter of the Belgian Blue x Nelore carcasses. In fact, the quantity of meat in the forequarter BBB x Zebu Nelore crosses is more important with a higher transformation potential. The forequarter should thus have another destination than the classical destination of the Nelore carcasses.

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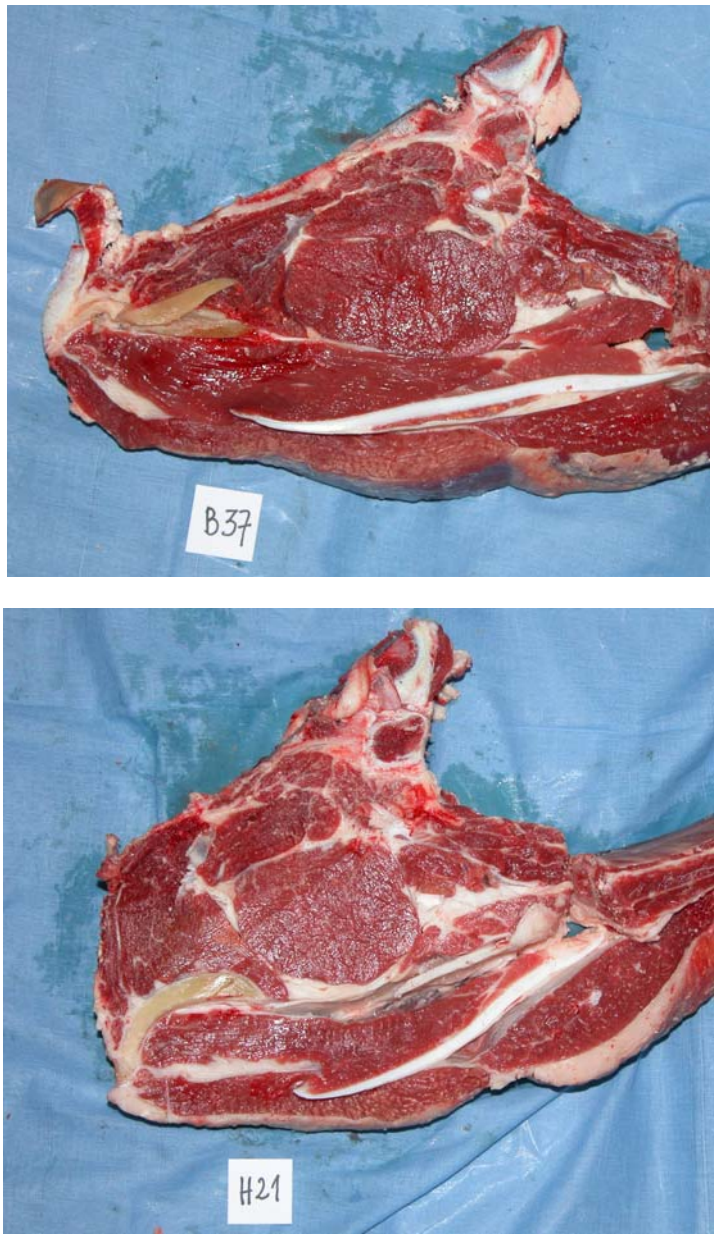

Figure 2. 7th Rib (right half carcass) of a BBB x Nelore (B37) bull and a Bradford (H21) bull slaughtered in Bahia State, Brazil (same scale see white square)