CARCASS AND MEAT PROPERTIES OF BROWN, HOLSTEIN, SIMMENTAL, AND BROWN X BELGIAN BLUE, HOLSTEIN X BELGIAN BLUE BULLS

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INTRODUCTION

Carcass traits of dairy, as well as dual purpose cattle breeds are getting worse with selection to high milk production. One way to improve these traits in their progeny is to apply industrial crossing, to use beef breed bulls with high genetic value for meat production traits. Breeds which exhibit double muscling are of special interest because of high dressing percentage, good conformation, high lean meat yield and high quality of meat (Arthur, 1995; Bailey et al., 1982; Boccard, 1982; Menessier, 1982). The aim of this experiment was to examine carcass and meat traits of purebred Brown (B) and Holstein (H) bulls and their crossbreeds with Belgian Blue (HXBB and BXBB) bulls and to compare them with Simmental (S) bulls.

MATERIAL AND METHODS

One hundred and twelve bulls (10 H, 53 B, 17 S, purebred bulls and 14 HXBB and 18 BXBB crossbred bulls) were fattened at the experimental farm. The animals were fed on grass and maize silage supplemented with concentrate in order to meet the nutritive requirements for 1.2 kg daily weight gain. Bulls were slaughtered at the same degree of fatness. 24h after slaughter pH and meat color were measured on the cross section of *musculus longissimus dorsi* (MLD) between ribs 7 and 8. Color was measured with Minolta chromameter CR300 and FOP. To define the tissue proportion,62 right halves (7 H; 8 HXBB; 24 B; 12 BXBB; and 11 S) were dissected into lean, fat, bone and tendons. Statistical analysis was performed by GLM procedure (SAS, 1989).

RESULTS AND DISSCUSION

Bulls were slaughtered at the same degree of fatness and different live weight. The average live weight at slaughter was 582 kg and differed significantly between breeds. H bulls had the lowest and S, BXBB and HXBB had the highest live weight. Subjective valuation of fatness revealed lower fat score for BXBB and HXBB. So the crossbred bulls reached the same degree of fatness at higher live weight than purebred bulls. Dressing percentage of HXBB was 3.9% higher compared to H bulls, and it was 4.3% higher in BXBB compared to B bulls. S bulls had higher dressing percentage than H and B bulls, but the differences were not statisticly significant ($p>0.05$). Keane (1990) and Michaux (1990) reported higher dressing percentage for Friesian X Belgian Blue than Friesian bulls. The evaluation of conformation was better in crossbreeds than in purebred bulls. The conformation score was almost two classes higher in HXBB compared to purebred H bulls, and in BXBB it was one class better compared to purebred B bulls. S bulls had better conformation score than H and B bulls but worse than crossbred bulls. Kenae (1994) and Purchas (1992) also reported better conformation in Friesian X Belgian Blue than Friesian bulls.

Table 1: LSQ-means and standard errors for carcass traits of Brown, Holstein, their crossbreeds with Belgian Blue and Simmental bulls.

	n	*Slaughter weight, kg*	*Carcass weight, kg*	*Dressing percentage, %*	*EUROP* conformation*	*EUROP* fatness*
Holstein	10	$531^{a}\pm13$	$281^{a}\pm8$	$54.5^{a}\pm0.5$	$2.2^{a}\pm0.2$	$2.9^{ab}\pm0.1$
Holstein X Belgian Blue	14	$610^{b}\pm10$	$356^{b}\pm7$	$58.4^{b}\pm0.4$	$4.0^{b}\pm0.1$	$2.8^{ab}\pm0.1$
Brown	53	$576^{c}\pm5$	$316^{c}\pm4$	$54.8^{a}\pm0.2$	$3.2^{c}\pm0.1$	$2.9^{a}\pm0.1$
Brown X Belgian Blue	18	$594^{bc}\pm9$	$348^{b}\pm6$	$59.1^{b}\pm0.4$	$4.2^{b}\pm0.1$	$2.6^{b}\pm0.1$
Simmental	17	$590^{bc}\pm9$	$325^{c}\pm6$	$55.1^{a}\pm0.4$	$3.4^{c}\pm0.1$	$2.9^{a}\pm0.1$

** E = 5; U = 4; R = 3; O = 2; P = 1.*

Values marked with different letters differ significantly ($p<0.05$)

H bulls had significantly smaller MLD cross-sectional area than the other four breeds. The HXBB bulls exhibited 40% higher MLD cross section area than purebred H bulls. Almost the same increase of MLD cross-sectional area was found by Gerhardy (1994). The differences between B, S, BXBB and HXBB bulls were not significant ($p>0.05$). Carcass composition, determined with dissection of right halves, showed that crossbred bulls had higher percentage of lean than purebred bulls and lower percentage of fat (BxBB 8.9%, HxBB 9.9%) than purebred bulls. All breeds had similar percentage of bone (16.3-16.8%) except H bulls, which had 19.5% bone. Higher meat yield in Friesian X Belgian Blue than Friesian bulls was reported also by Michaux (1990) and Purchas (1992) and lower kidney fat by Purchas (1992).

Table 2: LSQ-means and standard errors for lean, fat and bone percentage of Brown, Holstein, their crossbreeds with Belgian Blue and Simmental bulls.

	n	MLD area, cm^2	Lean, %	Fat, %	Bone, %
Holstein	7	47.2^{a} ±3.8	65.2^{a} ±0.9	13.4^{a} ±0.8	19.5^{a} ±0.4
Holstein X Belgian Blue	8	66.2^{b} ±3.6	72.1^{bc} ±0.8	9.8^{bc} ±0.8	16.7^{b} ±0.4
Brown	24	60.6^{b} ±2.0	69.6^{d} ±0.5	11.8^{a} ±0.4	16.8^{b} ±0.2
Brown X Belgian Blue	12	63.8^{b} ±2.9	73.1^{b} ±0.7	8.9^{b} ±0.6	16.3^{b} ±0.3
Simmental	11	64.3^{b} ±3.0	70.1^{dc} ±0.7	11.8^{ac} ±0.6	16.4^{b} ±0.4

Values marked with different letters differ significantly (p<0.05)

There were no significant differences between breeds in pH and in colour measured 24 h after slaughter with FOP and Minolta Chromameter on cross section of *m. longissimus dorsi* between ribs 7 and 8. No differences between mean ultimate pH and colour (L*, a* and b* values) for the longissimus muscle in Friesian and Friesian X Belgian Blue bulls were found by Purchas et al. (1992). But Gerhardy (1994) reported that meat of German Black Pied X Belgian Blue crossbreeds tended to be lighter in colour, compared to German Black Pied.

Table 3: LSQ-means and standard errors for pH meat colour of Brown, Holstein, their crossbreeds with Belgian Blue and Simmental bulls 24 hours after slaughter.

	n	pH 24	FOP	CIE L*	CIE a*	CIE b*
Holstein	10	5.60^{a} ±0.15	27^{a} ±2	36.4^{a} ±1.4	21.4^{a} ±1.4	10.5^{a} ±0.9
Holstein X Belgian Blue	14	5.54^{a} ±0.14	25^{a} ±2	34.2^{a} ±1.3	20.9^{a} ±1.3	10.2^{a} ±0.9
Brown	53	5.52^{a} ±0.08	26^{a} ±1	36.2^{a} ±0.8	20.6^{a} ±0.8	9.8^{a} ±0.5
Brown X Belgian Blue	18	5.61^{a} ±0.11	25^{a} ±2	35.6^{a} ±1.1	21.3^{a} ±1.1	10.6^{a} ±0.7
Simmental	17	5.42^{a} ±0.12	26^{a} ±2	36.0^{a} ±1.1	20.5^{a} ±1.2	10.0^{a} ±0.7

Values marked with different letters differ significantly (p<0.05)

CONCLUSIONS

Crossbreeds with Belgian Blue bulls were superior to purebred Holstein, Brown, Simmental bulls, they had higher dressing percentage, better carcass conformation, higher lean and lower fat percentage in carcass than purebred Holstein, Brown and Simmental bulls. There were no significant differences between genotypes in pH and in colour of *m. longissimus dorsi*.

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