GM 16. SIRE EFFECTS ON POSTWEANING GROWTH AND CARCASS CHARACTERISTICS IN PUBERED BRAHMAN CATTLE

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Resumen

Efecto de sementales sobre el crecimiento postdestete y características de la canal en bovinos brahman de raza pura

Una prueba de progenie para el crecimiento postdestete y las características de canal se llevaron a cabo en cinco sementales brahman. Esto fue el primer año de un estudio a largo plazo que evaluará 25 sementales. Se encontró diferencias significativas entre sementales en ganancia de peso diario ($P < .01$), peso vivo final ($P < .01$), peso de canal ($P < .001$), áreas del músculo del ojo del lomo ($P < .01$), rendimiento de canal ($P < .001$) y grado de calidad del departamento de agricultura de los Estados Unidos ($P < .001$). Los efectos potenciales sementales en suavidad de la carne fueron de interés particular, pero no se detectó diferencias entre sementales en suavidad basado en puntaje por un panel de gustación de carne o por medio de la fuerza de resistencia Warner-Bratzler. Se requiere mas datos de sementales adicionales para poder demostrar diferencias sementales en suavidad de la carne, si hay presentes.

Palabras claves: Bovinos, crecimiento, características de canal, suavidad de la carne de res, raza Brahman.
Key words: Cattle, growth, carcass characteristics, beef tenderness, Brahman breed.

Introduction

Brahman cattle and their crosses are used throughout the tropical and subtropical regions of the southern United States, Latin America, and the Caribbean because of their superior heat tolerance, disease resistance, and growth under harsh environmental conditions. However, in the United States, Brahman have a reputation for undesirable carcass characteristics, particularly with regard to tenderness (Crouse *et al*., 1989; Sherbeck *et al*., 1996). Recent advances in molecular biology have raised the prospect of developing genetic markers for tenderness in cattle that could be used to probe DNA from a blood sample and aid in marker assisted selection. To test potential genetic markers, tenderness data needs to be collected on animals from which genomic DNA has been isolated. Therefore, the objective of this study was to conduct a progeny test for tenderness on Brahman sires and to collect DNA from all sires, dams, and progeny for analysis with selected genetic probes. Data presented here are from the progeny of five sires that were tested the first year of a multiyear study that is planned to evaluate approximately 25 sires.

Materials and methods

A progeny test for growth and carcass characteristics was conducted on five purebred Brahman sires bred to Brahman cows at the Subtropical Agricultural Research Station, Brooksville, Florida (28 37' 00" N, elevation 84 m). Sires were registered Brahman bulls that were loaned by producers. Natural breeding with single-sire breeding herds was used, and cows assigned to breeding herds were stratified by frame size and lactational status. The breeding season began March 21, 1994 and lasted 105 days. Bull calves were castrated shortly after birth and all calves were weaned september 20, 1995. After two weeks on a preconditioning diet, calves were placed in eight feedlot pens blocked by sex and weight, implanted (Synovex H for heifers and Synovex S for steers), and fed a corn-based diet. Calves were slaughtered by pen when average backfat for the pen reached 10 mm determined by ultrasound. Carcasses were graded for USDA quality and yield factors after which a strip loin was removed, cut into 2.54 cm steaks, vacuum-packaged, aged for 7, 14, or 21 days, and then frozen until analyzed by Warner-Bratzler shear and sensory panel. Data were evaluated for effects of sire and sex by analysis of variance using the MIXED procedure of SAS (1996) with penblock considered random.

Results and discussion

Effects of sire on feedlot performance and carcass characteristics are given in table 1.

Table 1. Effects of sire on feedlot performance and carcass characteristics of purebred Brahman steers and heifers.

	Sire				
Item	1	2	3	4	5
n	14	16	14	19	15
Initial body wt., kg	216 ± 12.5	212 ± 12.4	220 ± 12.5	217 ± 12.4	216 ± 12.4
Final body wt.[**] kg	457 ± 14.9	443 ± 14.3	468 ± 14.7	488 ± 14.1	469 ± 14.5
Avg. daily gain[**], kg	1.18 ± 0.48	1.12 ± 0.045	1.20 ± 0.047	1.32 ± 0.043	1.22 ± 0.046
Hot carcass wt.[***], kg	292 ± 8.9	283 ± 8.5	293 ± 8.7	316 ± 8.2	297 ± 8.6
Dressing percentage[***]	67.2 ± 0.61	65.5 ± 0.57	65.0 ± 0.59	67.2 ± 0.54	65.7 ± 0.58
Fat over the ribeye[**], mm	15 ± 0.9	11 ± 0.8	11 ± 0.9	13 ± 0.8	12 ± 0.9
Ribeye area[**], cm^2	76 ± 1.6	69 ± 1.5	75 ± 1.7	78 ± 1.4	76 ± 1.6
USDA yield grade	3.2 ± 0.16	3.1± 0.15	2.8 ± 0.16	3.3 ± 0.14	3.1 ± 0.16
USDA quality grade[a***]	551 ± 9.7	496 ± 9.0	501 ± 9.6	517 ± 8.4	520 ± 9.2
Percent choice[b]	21.4	0	7.1	0	6.7
Terderness score[c]	4.1 ± 0.21	4.2 ± 0.19	4.6 ± 0.21	4.3 ± 0.18	4.4 ± 0.20
Warner-Bratzler shear, kg					
day 7	8.6 ± 0.43	7.5 ± 0.39	7.1 ± 0.42	7.7 ± 0.37	7.7 ± 0.41
day 14	7.7 ± 0.56	7.1 ± 0.52	6.5 ± 0.54	7.0 ± 0.51	6.9 ± 0.53
day 21	6.7 ± 0.37	6.4 ± 0.34	6.4 ± 0.36	6.6 ± 0.32	6.4 ± 0.35

**P < .01. ***P < .001. [a]Standard = 400 to 499; select = 500 to 599; choice = 600 to 699. [b]Means, not analyzed statistically. [c]Day 14, scored on an 8-point scale (4 = slightly tough, 5 = slightly tender).

A total of 41 steers and 37 heifers were finished in the feedlot with days on feed ranging from 175 to 238. Feed :gain ratios were 6.9 for steers and 7.4 for heifers. Slaughter endpoint of 10 mm fat over the ribeye was slightly exceeded due to constraints on slaughter scheduling, and fat over the ribeye differed among sires (P < .01). There was no effect of sire on initial body weight, but sire effects on average daily gain and final body weight were significant (P < .01). Hot carcass weight (P < .001) and ribeye area (P < .01) ranked highest for Sire 4 and lowest for Sire 2, reflecting differences in final body weight. Sire affected dressing percentage (P < .001), but there was no effect of sire on USDA yield grade. USDA quality grade (P < .001) was highest for Sire 1 (middle select) with 21% of carcasses grading choice. There were no differences among sires in tenderness scored by sensory panel on steaks aged for 14 days or measured by Warner-Bratzler shear on steaks aged for 7, 14 or 21 days. Consistent with previous reports (Shackelford *et al*., 1991; Sherbeck *et al*., 1995), increased aging time was associated with increased tenderness. Although there was no effect of sire on tenderness, shear force at 7 days of aging ranged from 4.6 to 11.3 kg for individual progeny and at 21 days of aging ranged from 3.7 to 10.4 kg. This suggests that there was substantial maternal influences on tenderness that may be revealed as progeny from the same dams are evaluated in subsequent years. Furthermore, as data from additional sires are generated, we expect to find significant sire differences in tenderness. In 1997, carcass data on progeny from a second set of sires will be obtained, progeny from a third set of sires will be weaned, and a fourth set of sires will be used in the spring breeding season.

Conclusions

This progeny test of five Brahman sires revealed genetic differences in postweaning rate of gain and carcass quality grade. Data from additional sires will be required to demonstrate genetic differences in tenderness.

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