

Influence of sexual condition of feedlot crossbred angus x nelore cattle on carcass traits (#558)

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Introduction

Brazil is the second largest producer and one of the largest beef exporters in the world and the majority of the Brazilian herd is composed mainly of pure bred or crossbred *Bos indicus* cattle. However, this fact would be altered by using strategies such as the use of taurine crossbred cattle exploring the heterosis and complementarities of those genotypes.

Besides the breed, the sexual condition of cattle has a strong influence on beef quality, as it affects the deposition of muscle and carcass fatness (ZHANG et al., 2010). The effect of sexual condition has been shown to be greatly determinant in differences in growth and deposition rates of body tissues on carcass (BERG; BUTTERFIELD, 1976; OWENS et al., 1995), resulting in a direct effect on performance (BERG; BUTTERFIELD, 1976) and beef quality (GAGAOUA et al., 2015).

Bulls had the best performance traits, regarding efficient feed conversion, faster growth and greater carcass dressing-out, producing more muscle tissue than fat (SEIDEMAN et al., 1982; FRITSCHKE; STEINHART, 1998). According to Lee et al. (1990), the superior performance represented by the greater live weight, carcass weight, ribeye area and carcass dressing percentage presented by bulls is due to the presence of testosterone.

Regarding the disadvantages presented by bulls and the attempt to obtain an improvement in meat quality, beef production implies castration of bulls for slaughter, thus reducing aggressiveness and facilitating their handling. In this sense, it is necessary to study the use of young females for beef production attempting to produce better carcass quality and to attend the demands of the consumer market.

The influence of sexual condition (bull, steer, and heifer) of feedlot crossbred Angus x Nelore cattle on carcass traits was studied, using the example of hot carcass weight, dressing, pH 24 h, ribeye area, and backfat thickness.

Methods

One hundred and fifty Angus x Nelore cattle (50 bulls, 50 steers, and 50 heifers) were used, presenting an initial mean weight of 239.6 ± 14.7 kg, 226.3 ± 12.0 kg and 230.0 ± 8.7 kg, respectively, and 11 months of age. The animals were confined, kept under the same management conditions and diet for 150 days and harvested. The final mean weight was 488.9 ± 30.7 kg, 452.5

± 24.9 kg, and 431.3 ± 26.3 kg for bulls, steers, and heifers. Hot carcass and dressing percentage were measured. After carcasses were chilled for 24 h at 0-2 °C, pH 24 h using a digital pH meter (Hanna Instruments Inc®, Model HI 99163, Woonsocket, RI, USA), ribeye area using a 1 cm² rib eye grid, and backfat thickness with a 6" digital caliper (Amatools, Model ZAAS Precision, Piracicaba, SP, Brazil) were analyzed in *Longissimus* muscle, between the 12th and 13th ribs.

The experimental design was a completely randomized, with 50 replicates per treatment, considering each animal as an experimental unit. The data were analyzed by the proc MIXED SAS® (version 9.4), and submitted to ANOVA. Significance was declared when P < 0.05, and means were compared by the Tukey test (5% of significance).

Results

Bulls presented higher hot carcass weight, dressing percentage, pH value, and ribeye area when compared to the other sexual conditions (P < 0.0001). However, heifers had greater backfat thickness compared to the other categories (P < 0.0001). Steers and heifers had no difference as regards of dressing percentage and ribeye area (P < 0.0001) (table 1).

Possibly, the results observed in this study for carcass and beef traits of bulls are associated with hormonal profile. Testosterone stimulates the increase of amino acid incorporation into the protein, thus increasing muscle mass without a concomitant increase in adipose tissue (DAYTON; WHITE, 2008). In addition, besides the anabolic effect, testosterone has a secondary effect on the temperament of the animals, causing a greater susceptibility to pre-slaughter stress on bulls, which produces beef with high pH value, dark color, and tough beef (LEE et al., 1990).

The greatest backfat thickness and the lower weight of heifer's carcasses is due to earlier fat deposition, thus reducing the rate of growth (BERG; BUTTERFIELD, 1976).

Similarly to Seideman et al. (1982), in these study, steers and heifers showed lower performance and higher fat deposition when compared to bulls.

Conclusion

As shown, the sexual condition influences carcass traits and the best sexual condition to be used by producers depends on the purpose of their produc

tion. If the goal is to produce beef in quantity, the best sexual condition to be produced is bull. But, if attempting to produce better carcass quality and to attend the demands of the consumer market, heifers and steers are the best sexual conditions to be produced.

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Table 1. Carcass traits of Angus x Nelore cattle of different sexual conditions

Variable	Steers	Heifers	Bulls	SEM	P value
Hot Carcass Weight (kg)	246.1 ^b	235.4 ^c	275.8 ^a	2.332	0.0001
Dressing (%)	54.4 ^b	54.56 ^b	56.51 ^a	0.179	0.0001
pH 24 h	5.55 ^c	5.67 ^b	5.78 ^a	0.011	0.0001
Ribeye Area (cm ²)	66.26 ^b	66.38 ^b	74.34 ^a	1.086	0.0001
Backfat Thickness (mm)	7.3 ^b	8.64 ^a	5.08 ^c	0.353	0.0001

Distinguished lower case letters differ by Tukey test with P < 0.05.

SEM: Standard Error of the Mean.

Table 1. Carcass traits of Angus x Nelore cattle of different sexual conditions

Table 1

Notes