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Evaluation of Nelore, Canchim, Santa Gertrudis, Holstein, Brown Swiss and Caracu as Sire Breeds in Matings with Nelore Cows. Effects on Progeny Growth, Carcass Traits and Crossbred Productivity

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EVALUATION OF NELORE, CANCHIM, SANTA GERTRUDIS, HOLSTEIN, BROWN SWISS AND CARACU AS SIRE BREEDS IN MATINGS WITH NELORE COWS. EFFECTS ON PROGENY GROWTH, CARCASS TRAITS AND CROSSBRED PRODUCTIVITY

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SUMMARY

Over three calf crops, 1096 exposures of 380 Nelore (a Zebu breed) cows to 6 sire breeds Nelore (N), Canchim (C), Santa Gertrudis (G), Holstein (H), Brown Swiss (S) and Caracu (K), resulted in 644 calves weaned for a 63% calving rate. Sire breed effect was significant for birth weight, weaning weight, 13 mo weight and 18 mo weight. HN and SN calves were the heaviest at all weighing periods while CN, GN and KN calves were the intermediates. Average daily gain from 18 mo to slaughter age was measured in 125 males finished in feed lot and 116 on pasture. A significant breed of sire x finishing system interaction was observed. Under feed lot, HN and SN had higher daily gain and dry matter intake per kg of metabolic weight than the other ones. HN calves showed the worst feed conversion. The average slaughter age was 788 d for feed lot and 989 d for pasture finished steers. Carcass traits were evaluated in 241 slaughtered animals. CN calves had the highest dressing % and edible portion % under both finishing conditions. Crossbred group productivity (calculated as 18 mo weight times the weaning rate %) was greater for locally adapted breeds of sire.

INTRODUCTION

Crossing European breeds with Zebu cattle is considered the best way to increase the genetic potential for beef production under Brazilian conditions. A work conducted by TROVO et al. (1983) showed a great superiority of F_1 cows from Brown Swiss x Guzera cross as compared to pure Guzera cows, when they were mated with Nelore or Guzera bulls under pasture conditions. Although crossbreeding has been recomended by several researchers, many questions still remain to be answered.

The project reported herein was undertaken by the Instituto de Zootecnia (a state research institute) at the Experimental Station of Andradina, State of São Paulo, to evaluate the effects of six sire breeds in matings under natural service with commercial Nelore (a Zebu breed) cows on reproduction, mortality, progeny growth (on pasture and feed lot conditions) and carcass traits. The following paternal breeds were chosen: Holstein (H), Brown Swiss (S), Santa Gertrudis (G), Canchim (C), Caracu (K) and Nelore (N). Canchim is a synthetic beef breed developed from a 5/8 Charolais:3/8 Zebu foundation, while Caracu, a native breed, which is presently part of a preservation program.

MATERIAL AND METHODS

General Description of the Location

This research was conducted at the Experimental Station of Andradina, State of São Paulo, which is located in a typical beef cattle region. The climate is hot and humid, with a dry season from July to September. The pastures are mainly constituted of tropical grasses (Panicum maximum and Brachiaria decumbens).

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Plan

In October 1979, 380 Nelore heifers were alloted at random within weight o form 12 breeding groups. Each sire breed, Nelore (N), Canchim (C), ertrudis (G), Holstein (H), Brown Swiss (S) and Caracu (K) was represented lls per year, on average. One bull per breeding group was used in a single e in each year. Artificial insemination was used for H and S bulls in the year (1979). The number of cows exposed to dairy bulls was greater in the reeding season (1981). Cows were realloted at random to the breeding in the 2nd and 3rd year.

ement

Duration of breeding season was 90 days, beginning November, 1st. After ing, cows were kept as one herd. Calves, born from August of October, were d two times per year, in April and May, with an average age of 210 days. weaning, females were kept on pastures until breeding age. Males were d on pastures until 18 monts old when they were alloted, within breed of according to weight to two finishing systems: pasture and feed lot. Every a sample of 7 head per sire breed was assigned to each system. Animals gned to feed lot were not castrated. They were kept in individual pens (5 x partially covered and concreted floor. The concentrate was a mixture of and cotton seed meal and corn or sorghum silage as the roughage. The entrate: roughage ratio in the diets was around 60:40. The amount of entrate fed to all animals was adjusted every week, based on the roughage ke.

ghtering Procedure

A group of 6 animals was slaughtered weekly, one per breed of sire, after to 222 d in the feed lot and average age of 788 d. The animals finished on tures were subjected to the same slaughter procedure with average age of 989 d.

Data

Data collected included natality %, mortality %, birth weight (BW), ning weight (WW), 13 mo weight (W13), 18 mo weight (W18), and average daily n during the finishing period (ADG1). For the feed lot animals, dry matter ke and daily gain after adaptation (ADG2) were measured. From these values, matter per kg of metabolic weight and feed conversion (FC) were calculated. cass traits were: hot carcass weight; hot dressing %; special hindquarter %; ble portion % on half carcass; fat thickness; trimming % and loin eye area.

tistical Analysis

Growth and carcass data were analysed according to a model which included effects of birth year and month, age of calf , sex, breed of sire and breed sire x birth year interaction. Carcass data were analysed within finishing tem. A model including breed of sire, birth year and month, finishing system breed of sire x finishing system interaction were used for ADG1 and dressing Data on mortality, natality and crossbred group productivity were not jected to statistical analysis.

RESULTS AND DISCUSSION

Year of birth, sex and breed of sire had highly significant effects on , WW, W13 and W18. Month of birth affected only the BW. Age of calf at ning influenced WW, W13 and W18. Least squares means for these weights are

considered. Dairy bulls-sired calves were the heaviest. Calves from CN, GN and KN groups were intermediate in those weights. The breed of sire x birth year interaction was significant for W13, a weight recorded at the end of dry season. Ranking of sire breeds for W13 changed over the years without any consistent pattern.

The sire breed x finishing system was significant for ADG1. The magnitude of sire breed differences in ADG1 was greater under feed lot than on pasture conditions; however, in both systems crossbred calves had better growth ability.

Least squares means for feed lot performance are presented in table 2. HN and SN calves had higher average daily gain and dry matter intake per metabolic weight. In addition, HN calves showed the worst FC.

Breed of sire had a significant effect on all carcass traits in both finishing systems. Least squares means for carcass data recorded on 241 slaughtered animals are presented in table 2. Nelore calves were slaughtered with greater finishing degree (higher fat thickness) but smaller slaughter weight than the crossbred calves in both finishing systems. CN calves showed greater dressing % and loin eye area. Average slaughter age was 788 d for feed lot and 989 d for pasture finished steers. Dressing % for feed lot calves was on average 4% greater than on pasture.

Regarding the reproductive data (table 1) the H, S and G breeds of sire had very poor performance, due to the tropical conditions where this work was carried out. A gross evaluation of crossbred group productivity (W18 x weaning rate %) indicated higher values for local adapted sire breeds (Canchim, Caracu and Nelore).

Overall, these results indicate that Canchim and Caracu when used as paternal breeds in crossings with Zebu cows could be an alternative for a more efficient beef production in the tropical conditions of Central Brazil.

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TABLE 1. Fertility, mortality and progeny growth performance by breed of sire.

Trait	Crossbred groups[1]					
	NN	CN	GN	HN	SN	KN
AI exposures	177	171	168	206	204	170
AI born	141	142	82	97	107	125
Natality (%)	79.7	83.0	48.8	47.1	51.4	73.5
Mortality (%)	7.80	4.93	13.41	5.15	11.20	6.40
BW (kg)[2]	27.7 a	29.0 b	28.3 ab	29.8 ab	30.6 cd	26.0 e
WW (kg)[2]	168.9 a	188.9 bd	187.5 bde	195.2 c	189.2 cde	182.9 e
W13 (kg)[2]	164.2 a	183.9 b	185.0 b	202.9 c	191.3 d	183.1 b
W18 (kg)[2]	242.9 a	275.7 be	271.3 b	303.7 c	288.3 d	280.4 e
Crossbred group Productivity[3]	174.9	220.6	116.7	136.7	135.5	196.3
ADG, Feed Lot (g)[4]	815	907	941	988	995	865
ADG, Pasture (g)[4]	405	442	449	471	446	444

[1] NN = Nelore; CN = Canchim; GN = Santa Gertrudis; HN = Holstein; SN = Brown Swiss and KN = Caracu
[2] BW = birth weight; WW = weaning weight; W13 = 13 mo weight; W18 = 18 mo weight.
[3] Crossbred group productivity = W18 x weaning rate %.
[4] ADG = average daily gain from 18 mo to slaughter age.

TABLE 2. Feed lot performance and carcass traits from slaughtered animals finished under pasture and confinement.

Trait	Crossbred group[3]					
	NN	CN	GN	HN	SN	
			Feed Lot			
Number	21	21	19	23	20	
ADG (g)	904b	1004ab	1039ab	1060a	1070a	
DM intake (kg/d)	7.7d	8.3cd	8.4bc	9.7a	8.9b	
DM/Kg metabolic weight	96.2b	94.5b	95.9b	104.2a	102.2a	
FC (DM/gain)	8.6b	8.2b	8.1b	9.2a	8.4ab	
Slaughter age, d	791	796	798	789	766	
Slaughter wt (kg)	425a	475bc	477cd	517d	483c	
Hot carcass wt (kg)	249a	283c	277c	301d	279c	
Dressing %	58.6ab	59.5b	58.1a	58.1a	57.8a	
Special Hind Quarter (%)	44.9cd	45.3d	44.3bc	43.8ab	44.1ab	
Edible Portion (%)	72.4a	74.8b	73.8ab	74.3b	74.5b	
Fat Thickness (mm)	4.7b	3.1a	3.4a	3.3a	2.8a	
Trimming (%)	11.6b	9.3a	9,8a	8.8a	9.5a	
Loin eye area (cm^2)	71.0a	87.1c	86.0c	86.0c	83.2bc	
			Pasture			
Number	21	21	18	20	15	
Slaughter age, d	993	994	988	989	983	
Slaughter wt (kg)	421	468	461	502	472	
Hot Carcass wt (kg)	239c	262ab	254b	276a	253bc	
Dressing[2] %	55.1	56.2	54.5	54.2	52.7	
Special Hind Quarter (%)	47.4	47.8a	46.8bc	46.3cd	47.2ab	
Edible Portion[1.2] (%)	71.7a	71.4a	69.4b	71.2ab	72.9a	
Fat Thickness[2] (mm)	4.2	3.1	3.6	3.0	2.9	
Trimming[2] (%)	10.0a	9.8a	12.3b	9.9a	9.2a	
Loin eye area (cm^2)	71.0c	79.2a	73.6bc	74.9abc	80.7a	

1
2 % calculated for half carcass
3 traits are from two years only
NN = Nelore; CN = Canchim; GN = Santa Gertrudis; HN = Holstein; SN = Brown Swiss and KN = Caracu.