Bulletin of Animal Science, Special Edition, 1995 *ISSN 01260 - 4400*

Pre and Post-Weaning Performance Characteristics of Brahman, Boran and Tuli Crosses in Beef Cattle Evaluation Programs

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ABSTRACT: Preliminary results are presented for birth weights , weaning weights , calf survival to weaning and post weaning gain both off pasture and under feedlot conditions in the Germ Plasm Evaluation Program at the University of Queensland, Gatton College. Progeny of Brahman sires were heavier at birth and at weaning than those of Boran, Tuli and Hereford sires ($P<0.01$). The greater birth weights resulted in a higher incidence of dystocia in cows giving birth to Brahman sired calves. Total calf losses to weaning for Boran sired calves of 3.7% were significantly less than in calves sired by Brahman, Tuli and Hereford sires ($P<0.05$). Castrate male progeny of Brahman , Boran and Tuli sires were grown on a high energy feedlot diet from 10 months of age for 83 days. Brahman sired calves showed significantly higher growth rates ($P<0.05$) than other animals, while the carcases of Boran sired steers had significantly greater fat depth at the 12th rib and P8 sites ($P<0.01$). Female progeny of Brahman, Boran and Tuli sires when grown on poor quality native tropical pastures resulted in greater weight gains for Brahman progeny than for Tuli progeny which was higher than for progeny of Boran sires ($P<0.05$).

Key words: Beef Cattle, Brahman, Tuli, Boran, Feedlot

Introduction

Beef production in tropical Australia has changed from *Bos taurus* (British) breeds to one in which *Bos indicus* (Brahman) and derived genotypes predominate. While such animals are environmentally adapted, they are deficient in areas of reproductive efficiency and meat quality (Cundiff, et al., 1986; Crouse, et al., 1989; Rowan and Taylor 1994). Beef producers are under increasing pressure to improve reproductive efficiency in tropically adapted beef herds and at the same time improve other production parameters including growth rate and product acceptability.

Breed differences are an important genetic resource for improving traits of economic importance. Breeds of diverse genetic composition are necessary to exploit heterosis and complementarity through crossbreeding in the production of genotypes environmentally adapted and capable of meeting market specifications for their products. *Bos taurus africanus* (Tuli) and *Bos indicus* of African origin (Boran) have recently become available to Australian beef producers.

This report presents preliminary results to characterise Brahman, Boran and Tuli when crossed with multiparous Hereford dams for calf survival, post weaning growth and subcutaneous fat thickness.

Materials and Methods

A Germ plasm Evaluation Program was initiated at the University of Queensland, Gatton College in 1978. With the availability of semen from recently imported Boran and Tuli cattle from Africa, genotype evaluation was undertaken using crossbred progeny from mature Hereford cows sired by American Grey Brahmans, Boran and Tuli.

Brahman : Two Brahman sires were used to produce F1 cross progeny.

Boran : Boran are pure *Bos indicus* that evolved in Southern Ethiopia and are considered to be genetically dissimilar to zebu cattle of Indian origin. They are early maturing and evolved under a stressful dry tropical environment. Frozen embryos were imported into Australia from Zambia by scientists at the CSIRO Tropical Cattle Research Centre, Rockhampton, Queensland and a consortium

of beef cattle breeders in Australia. Semen from 7 Boran bulls which were derived from the imported embryos was used.

Tuli : Tuli are *Bos taurus africanus* Sanga type cattle developed in the 1940's from indigenous Tswana stock in Zimbabwe. They are of high reproductive capacity and capable of withstanding high levels of environmental stress. Frozen embryos were also imported into Australia with the Boran embryo shipment. Semen of 7 Tuli bulls was used in this program.

Hereford : Two Hereford bulls were mated to Hereford cows to produce purebred progeny for evaluation.

Calves born in July and August were weighed at birth and again at weaning. Two hundred day adjusted weights were calculated by correcting for sex of calf and age of dam. Details of ease of calving and causes of calf mortalities from birth to weaning were determined by frequent observations of the cow herd and by subjecting all dead calves to a detailed post mortem examination.

F1 crossbred castrate male weaners sired by Brahman, Boran and Tuli sires were lotfed from 10 months of age for 83 days using a diet of 85% concentrate and 15% roughage. Body weights were taken on a fortnightly basis and subcutaneous fat thicknesses were determined at the 12th rib and P8 sites using ultrasound scanning. The corresponding female weaners were grown on poor quality tropical pastures and their post weaning gain over 90 days was measured.

Data were analysed using analysis of variance and least squares, fixed model procedures (SAS, 1988).

Results

Breed of sire effect over Hereford dams for birth weight, weaning weight, calf mortality to weaning, post weaning gain and subcutaneous fat thickness is shown in Tables 1 and 2.

There was a significant breed effect for all traits studied. Progeny of Brahman sires were significantly ($P<0.01$) heavier at birth than those of Boran, Tuli and Hereford sires. This resulted in a higher incidence of dystocia in cows giving birth to Brahman sired calves which was a major cause of

Table 1. Birth weights, weaning weights and calf mortality of sire groups mated to mature Hereford dams

Breed group	n	Birth weight kg	Adj 200 day weight kg	Dystocia %	Calf mortality %
Hereford X Hereford	51	31.9^{cd}	189.0^{c}	0.0	7.8^{b}
Brahman X Hereford	38	42.5^{a}	243.2^{a}	5.3	7.9^{b}
Boran X Hereford	27	35.7^{b}	216.5^{b}	0.0	3.7^{a}
Tuli X Hereford	35	34.1^{bd}	222.3^{b}	0.0	8.6^{b}

Means with different superscripts within columns are significantly different ($P<0.05$).

Table 2 Weight gains and fat thicknesses of steers under feedlot conditions and weight gains of heifers at pasture

Breed group	Steers n	Feedlot gain kg/day	Fat thickness 12th rib mm	Fat thickness P8 mm	Heifers n	Pasture gain kg/day
Brahman X Hereford	7	1.83^{a}	9.00^{b}	12.85^{b}	20	0.36^{a}
Boran X Hereford	6	1.58^{b}	12.00^{a}	16.60^{a}	16	0.25^{c}
Tuli X Hereford	7	1.57^{b}	8.28^{b}	11.85^{b}	12	0.31^{b}

Means with different superscripts within columns are significantly different ($P<0.05$).

calf mortality in this group. Calf mortality from the commencement of parturition to weaning of 3.7% in Boran sired calves was approximately one half the loss experienced in other groups. Mortalities in Tuli sired calves were due principally to anatomical abnormalities, while incidental causes such as dam mortality and infectious and non infectious diseases accounted for calf mortalities in Hereford sired calves.

Adjusted 200 day weights were significantly heavier ($P<0.01$) for calves by Brahman sires (Table 1) and this effect was carried through into the post weaning period where the progeny of Brahman sires grew significantly faster ($P<0.05$) in the feedlot and at pasture than the progeny of Boran and Tuli sires (Table 2). Fat deposition in steers under feedlot conditions was significantly greater in Boran sired animals than those sired by Brahman and Tuli ($P<0.01$).

Discussion

These results indicate that the progeny of Boran and Tuli sires when mated to multiparous Hereford cows produced relatively small calves when compared to the progeny of Brahman sires. They were however heavier than purebred Hereford calves and this effect would be due principally to heterosis. Boran and Tuli sired calves were extremely active soon after birth and suckled readily. The only anatomical defects were in Tuli sired calves which increased neonatal mortality in that genotype. Total calf mortality from the commencement of parturition to weaning was low when compared to losses reported by Holroyd (1987) and Rowan (1992). Lighter birth weights of calves sired by Boran and Tuli compared with Brahmans could result in such breeds being used for matings to heifers where dystocia is a significant cause of calf mortality.

The superior post weaning gain displayed on a high (feedlot) and low (poor quality pasture) nutritional plane by progeny of Brahman sires clearly indicates that the growth potential of recently imported cattle from Africa is inferior to *Bos indicus* cattle presently used in Australia. The subcutaneous fat thickness over the 12th rib and rump (P8 site) for the steers at the conclusion of the feedlot fattening period showed a greater thickness for Boran sired steers than that of the other two breed types. This tends to illustrate the earlier maturing characteristic of the Boran breed.

Research is continuing into the reproductive and maternal characteristics of F1 females sired by Boran and Tuli, as well as carcass and meat quality of the castrate male progeny.

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