

LIVE WEIGHT GAINS OF BRAHMAN BEEF ENTIRE MALES COMPARED WITH STEERS IMPLANTED WITH COMPUDOSE^Â.

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ABSTRACT

Liveweight gains (LWG) of 58 Brahman steers and 66 entire males raised under similar conditions in the Markham Valley, a hot dry area of Papua New Guinea were compared. The steers were implanted with Compudose 400[®] containing synthetic oestradiol 17 α and the measurement period was 120d starting from 112d after weaning. LWG of steers was found to be slightly lower than for entire males but the difference was not significant. This result, together with the costs and risks of castration necessitates careful consideration of the practice of raising steers rather than entire males under certain conditions in Papua New Guinea.

Keywords: Growth, growth promotant, tropics, Brahman, beef cattle, Papua New Guinea.

INTRODUCTION

In Papua New Guinea (PNG) about 80% of beef cattle are kept on large-holder ranches (Vincent and Low 2000) and are sold on mature liveweight basis. One important management practice on these ranches is castration of young beef males which are then implanted with synthetic growth promoters in the hope of improving their growth rates and feed efficiency. This practice is almost absent on small holder ranches probably due to high initial costs and lack of equipment, trained manpower and understanding.

Castration, among other uses, is believed to reduce wildness in cattle on ranches where human contact is minimal and also prevent undesirable pregnancies in mixed herds. However, castration deprives the animals of their natural sex hormones produced in the testes, which stimulate growth and affect other important production characters. Synthetic growth promotants such as Compudose 400[®] are therefore usually administered to the steers either as implants or injections to improve their performance. A number of studies have reported desirable effects of these synthetic hormones such as increased growth rate, feed efficiency and decreased fat deposition in steers (Minish and Fox 1982; Mathison and Stobbs 1983; Stobbs *et al.* 1987). According to its manufacturers, each Compudose 400[®] silicone rubber implant contains the same oestradiol 17 α found in mammals including cattle and this compound is released in a controlled manner over a period of 400 days. Oestradiol 17 α stimulates the pituitary gland resulting in the release of the animal's own natural growth hormone. The growth response of steers to growth promotants has however, been reported in the literature

to depend on genotype of the animal and other environmental factors such as age and the plane of nutrition of the animal (Song and Choi 2001). Generally growth performance of steers on synthetic growth promotants are enhanced in more intensive systems such as feedlots where the plane of nutrition is often higher and other environmental challenges are minimal.

In PNG, however, most beef cattle are kept under range conditions where the availability of grazed pastures and their nutritional status depend on the season. In the rainy season pasture conditions and nutrient supply from pastures are usually better than in the dry season. Supplementary feeds such as molasses and copra meal are also used but the supply of these also varies in composition and availability. Furthermore there are inherent costs and risks of castration and use of synthetic growth promotants. Under these conditions a further re-examination of performance of beef steers under ranching conditions in PNG is necessary.

The objective of this study was to compare live weight gains (LWG) of Brahman entire beef males with those of steers implanted with Compudose 400[®], in the Markham Valley, a hot dry tropical area of Papua New Guinea (PNG).

MATERIALS AND METHODS

The cattle used in this study were kept at the Sulikon cattle ranch of Trukai Farms, at Erap located 7°S, 147°E and 90m above sea level. Mean annual rainfall on the ranch is 1260mm with most of it falling between November and March while May is usually the driest

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month. Temperatures range from 20°C to 30°C. Cattle on the ranch were of the Brahman breed with a small amount of Javanese zebu inheritance introduced to improve reproductive performance. The breeding herd is usually mated to calve during a single calving period each year, from December to April, which corresponded to the wet season.

Calves used in this study were weaned in February 2001 and consisted of 142 beef males. The animals were randomly assigned to two treatment groups of equal size: entire males and steers. Steers were castrated, dewormed and implanted in June with Compudose 400^a, under the skin of the earflap, about 112d after weaning. Liveweight of the cattle were measured on the day of implantation and, 120d later, at the end of the testing period.

All experimental animals received similar management practices usually employed on the ranch. Weaned cattle were rotationally grazed in paddocks containing both improved and native pasture species such as *Dichanthium* sp., *Bothriochloa* sp., *Imperata cylindrica*, *Brachiaria* sp., *Urochloa* sp., *Macroptilium atropurpureum* and *Stylosanthes* sp. at about 1.5 beasts/ha. Cattle were given supplements of copra meal and molasses and had access to drinking water and mineral and salt licks freely on the ranch.

The data analysed was on 124 cattle weaned between three and six months of age. Age at weaning, was

included as a covariate in the fitted linear model, which, in statistical notation was:

$$Y = \mu + T + \beta X + \varepsilon$$

Where: Y is a liveweight gain (LWT) observation on a calf calculated as the difference between liveweight just before implantation of compudose and at the end of the test period; μ is a general mean; T is the treatment group of calf (entire males or steers); X is the age of the calf at weaning and used as a covariate; β is a regression coefficient and ε is a random residual term. The computations were run in the analysis of variance (unbalanced treatment structures) procedures of GENSTAT (2003).

RESULTS AND DISCUSSION

Table 1 shows the results of the analysis of variance of LWG of calves from time of implantation of Compudose 400^a to the end of the test period. The treatment effect did not contribute significantly to variation in LWG among calves ($P < 0.05$) indicating that both steers and entire males would perform similarly with respect to LWG and any differences among them could arise simply by chance. The mean LWG for entire males and steers were estimated to be 91.8kg and 86.1kg respectively (Table 2). Thus

Table 1. Analysis of variance of liveweight gain of beef calves

Source of variation	Degrees of freedom.	Sum of squares	F value
Age at weaning	1	4507.9	0.016*
Treatment group	1	986.8	0.254 ns
Residual	121	90748.1	
Total	123	96242.7	

* Significant
ns Not significant

Table 2. Estimates of mean liveweight gain of beef calves.

Factor	Subclass	Number of observations	Estimated mean LWG \pm s.e. (kg)
Treatment	Entire males	58	91.8 \pm 3.60
	Steers	66	86.1 \pm 3.37

steers grew slightly less than entire males but the difference was not important. It is known that males generally grow faster than steers not implanted with synthetic growth promotants however only few reports have compared entire males with steers implanted with compudose.

LWG is known to have high positive phenotypic correlations with mature market weights (Koots *et al.* 1994), the trait by which cattle are sold in PNG. Thus this result suggests that steers may not produce extra profits from sold cattle as compared with entire males on the basis of mature market weights under the conditions of this study. This is more so because the domestic market for high quality meat associated with beef from steers (e.g. better texture, flavour, juiciness and tenderness) is limited. Other disadvantages associated with raising steers are the cost of castration and synthetic growth promoters and the risks of calf mortality from infections. On the other hand meat from bulls are known to be leaner, a quality which is now becoming an important public health consideration. Moreover beef males on the ranch are usually sold at relatively young ages where carcass quality would not be affected by the development of secondary sexual characters in the entire males. This result therefore suggests that beef cattle enterprises need to re-evaluate the practice of raising steers rather than entire males for the domestic market in PNG under the conditions mentioned in this study.

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