THE EFFECT OF TRENBOLONE ACETATE ON THE RATES OF LIVESTOCK LOSS AND SUBSEQUENT GAIN BY STEERS GRAZING NATIVE PASTURE IN NORTHERN AUSTRALIA

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SUMMARY

Twenty-five Droughtmaster steers were implanted with 300 mg trenbolone acetate and 25 control non-implanted steers grazed the same unimproved native pasture for a dry and a wet season prior to being dispatched to the abattoir. The treated steers lost significantly \( (P < 0.05) \) less liveweight during the dry season and gained significantly \( (P < 0.001) \) more liveweight in the following wet season than the controls. At slaughter of the steers at the end of the wet season, 9 months after treatment, the mean carcass weight of the treated steers was 8 kg heavier than that of the controls, the difference just failing to reach statistical significance \( (P = 0.08) \).

Keywords: trenbolone acetate, liveweight change, steers.

INTRODUCTION

Annual liveweight gain in northern Australian cattle is relatively small because the quite reasonable growth rates achieved in the hot, wet summer are replaced by zero gains, or even liveweight loss, during the dry winter and spring. Liveweight gain has been improved during the wet season by the use of growth promotants (Hodge et al. 1986; Mason et al. 1986) but such implants do not usually reduce liveweight loss during the dry season (Hunter and Vercoe 1988; Hunter 1989). In contrast the anabolic agent trenbolone acetate reduces energy expenditure with reduced rate of liveweight loss in cattle fed poor-quality roughage (Hunter and Vercoe 1987; Hunter and Magner 1990).

There have been no reports evaluating trenbolone acetate in situations of liveweight loss in cattle grazing under conditions similar to that in the commercial industry. The purpose of the present study was to determine the commercial impact of trenbolone acetate administered to steers in the dry season preceding their normal slaughter date. Of particular interest was liveweight gain in the following wet season in case any dry season advantage was eroded by compensatory gain of untreated animals. The extensive nature of the beef industry in northern Australia demands that inputs are inexpensive on a per head basis. If treatment with trenbolone acetate proved to be cost effective, it is likely to have a reasonably high adoption rate as the technology is simple and fits in well with current management practices.

MATERIALS AND METHODS

Fifty Droughtmaster steers 3 or 4 years old with a mean \( \pm \text{s.e.m.} \) initial weight of 501 ± 9.6 kg grazed together in a 140 ha paddock at Lansdown Research Station, (19°40'S, 146°51'E, 60 m altitude). The mean annual rainfall is 860 mm of which 75% falls between December and March. The native pasture was predominantly bluegrass (Bothriochloa bladhii) and spear grass (Heteropogon contortus).

The steers were divided into 2 groups balanced for age and liveweight. The steers in the treated group \((n = 25)\) were implanted subcutaneously on the upper surface of the ear with 300 mg trenbolone acetate mixed with cholesterol (Roussel UCLAF, Paris) at the beginning of the experiment in September. At this time no green leaf was available in the pasture. The implant has a suggested functional life of about 150 days and the dose rate was based on efficacy studies of R.A. Hunter (unpublished data) in steers losing weight on poor-quality roughage. Steers in the control group \((n = 25)\) were not implanted. The steers were weighed at monthly intervals except from December to March when frequent heavy rain and waterlogged conditions made cattle movement impractical. Samples of blood were collected at 2 monthly intervals. Plasma was obtained by centrifugation and stored at \(-15^\circ\text{C}\). It was intended to use plasma urea concentration as a crude index of rumen ammonia concentration so that decisions could be made about when urea supplementation would be of benefit. Urea-N concentration in plasma was determined using an Auto Analyzer technique [Technicon Instruments Corp. modified by Marsh et al. (1965)].
At the end of the experiment in May the steers were weighed. Nine days later they were transported to an accredited export abattoir and slaughtered the following day. Hot carcass weight and fat depth at the P8 rump site were recorded and carcass value assessed from the current market price.

The significance of difference between treatment groups was determined by analysis of variance. All liveweight changes were adjusted by covariance for liveweight at the beginning of the period under study. Final liveweight was similarly adjusted for initial liveweight.

RESULTS

The seasonal conditions were such that green pasture was available until late winter delaying the start of the experiment until September. Rain fell in October which meant there was only a very short period of liveweight loss. Dry standing feed was available at all times until the rains started. Although there was no rain in November, the pasture contained sufficient new growth to ensure that the steers did not lose any further liveweight. The summer rainfall was in excess of that normally experienced for the wet season.

The steers lost liveweight for approximately 1 month (September-October) then gained liveweight thereafter until the following May when they were slaughtered. During the first period, the steers treated with trenbolone acetate lost significantly ($P < 0.05$) less liveweight than the non-implanted controls (Table 1). During the subsequent months of liveweight gain, the implanted steers gained on average 26 kg/head ($P < 0.001$) more than the controls, giving treated steers a total liveweight advantage of 33 kg/head. The mean carcass weight of the treated steers was 9 kg/head heavier than the controls, the difference just failing to reach statistical significance ($P = 0.08$). There was no significant difference in fat thickness or commercial value of the carcasses in price per kg. Treated carcasses returned an additional $A17 gross. Thirteen carcasses in each treatment group were down graded, 10 in each group for poor butt profile and 3 for uneven fat distribution.

DISCUSSION

The results of this study showed that treatment of steers with trenbolone acetate at the commencement of the normal northern dry season resulted in individual liveweights being approximately 30 kg heavier at slaughter 9 months later. As there was no effect of treatment on carcass grade, measured by price per kg, the gross financial return from implanted steers was higher ($17). The additional liveweight of the treated steers was made up of a reduced weight loss during the brief period of undernourishment and accelerated gain when pasture quality improved after rain.

Table 1. Effects of trenbolone acetate in steers grazing tropical native pastures on mean liveweight change and carcass parameters

Weight changes were adjusted for liveweight at the beginning of the period under study. Final liveweights were adjusted for liveweight at the beginning of the experiment.

<table>
<thead>
<tr>
<th></th>
<th>Control (n = 25)</th>
<th>Trenbolone (n = 25)</th>
<th>s.e.m.</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial liveweight (kg)</td>
<td>497</td>
<td>506</td>
<td>13.6</td>
<td>n.s.</td>
</tr>
<tr>
<td>Weight change Sept.–Oct. (kg)</td>
<td>-33</td>
<td>-26</td>
<td>2.3</td>
<td>$P &lt; 0.05$</td>
</tr>
<tr>
<td>Weight change Oct.–May (kg)</td>
<td>104</td>
<td>130</td>
<td>4.6</td>
<td>$P &lt; 0.001$</td>
</tr>
<tr>
<td>Weight change Oct.–May (kg/day)</td>
<td>0.53</td>
<td>0.66</td>
<td>0.023</td>
<td>$P &lt; 0.001$</td>
</tr>
<tr>
<td>Total weight change Sept.–May (kg)</td>
<td>71</td>
<td>104</td>
<td>4.8</td>
<td>$P &lt; 0.001$</td>
</tr>
<tr>
<td>Final liveweight (kg)</td>
<td>572</td>
<td>603</td>
<td>4.7</td>
<td>$P &lt; 0.001$</td>
</tr>
<tr>
<td>Hot carcass weight (kg)</td>
<td>302</td>
<td>310</td>
<td>2.8</td>
<td>n.s.</td>
</tr>
<tr>
<td>Fat thickness (mm)</td>
<td>13</td>
<td>12</td>
<td>1.0</td>
<td>n.s.</td>
</tr>
<tr>
<td>Carcass value ($/kg)</td>
<td>2.06</td>
<td>2.06</td>
<td>0.009</td>
<td>n.s.</td>
</tr>
<tr>
<td>Total carcass value ($)</td>
<td>622</td>
<td>639</td>
<td>16.5</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

At the commencement of the experiment mean (t.s.e.m.) plasma urea-N concentration was 68 ± 16.9 mg/L. At all other sampling times green feed was available and the concentrations were > 90 mg/L.

The reduction in liveweight loss associated with trenbolone treatment is consistent with the results of pen studies in which treated steers fed low-quality roughage diets lost less weight than controls (Hunter and Magner 1990). The brief period of liveweight loss prevented any real evaluation of the benefits or
otherwise of trenbolone acetate treatment during undernutrition in the paddock. However treatment was associated with increased slaughter weight, carcass weight and gross financial return, most of this advantage accruing during the period of liveweight gain. No explanation can be suggested for the contrast between the highly significant difference in final liveweight and the lack of a statistical difference in hot carcass weight. It may be that dressing percentages of the 2 groups were different. However because the animals were slaughtered 10 days after the final weight was determined calculation of dressing percentage was not possible.

This study does verify that an implant of 300 g trenbolone acetate reduced the rate liveweight loss in steers under practical grazing conditions. In this case the magnitude of the reduced loss was small. Whether this was due to the very brief period of weight loss or some other factor should be determined in future studies.

ACKNOWLEDGMENTS
We thank the staff of Lansdown Research Station and T. Whyte for technical assistance. The project was partly financed by the MRC and Roussel UCLAF.

REFERENCES