ZERANOL AND OESTRADIOL \textsuperscript{17B} FOR SUCKLING STEERS AND HEIFERS

D.C. Nicol*, W.J. Taylor** and A.W.R. Draper***

SUMMARY

Suckling steers and heifers between one week and three months of age, grazing fertilised subtropical grass-legume pastures in the coastal lowlands of south-east Queensland were treated with two different anabolic agents. In one experiment, implants of 36 \textsuperscript{mg} zeranol improved average liveweight gains by 14 kg (P<0.05) in 178 days to weaning. There was no significant effect from a second implant of 36 \textsuperscript{mg} zeranol given to steers after 91 days.

In a second experiment with suckling steer and heifer calves, the liveweight gains at 194 days from two sequential implants of 36 \textsuperscript{mg} zeranol (the second after 92 days) were not significantly different from one 24 \textsuperscript{mg} implant of oestradiol \textsuperscript{17B}. Calves implanted with zeranol and oestradiol gained 20 kg more by weaning (P<0.05) than the controls, with heifers gaining 2.6 kg v. 14 kg for steers (P<0.05).

INTRODUCTION

Sammons (1980), Geldard and Wellington (1981) and Sully (1982) showed that the anabolic compound zeranol increased the growth rates of suckling steer calves in temperate southern Australia. We tested zeranol and another anabolic agent, oestradiol \textsuperscript{17B} (Chudleigh et al. 1982) in the subtropics. There are few data available on liveweight responses by young cattle to oestradiol \textsuperscript{17B} which was released commercially in Australia in 1983.

The manufacturers recommend that implants of 36 \textsuperscript{mg} zeranol\textsuperscript{a} and 24 \textsuperscript{mg} oestradiol \textsuperscript{17B} will last for 90-100 days and 200 days respectively.

We first tested the effect of a zeranol implant on the liveweight gains of suckling steer and heifer calves, with a second implant after 91 days on half the treated steers. The second experiment compared the effect of implanting two sequential doses of zeranol with a single dose of oestradiol \textsuperscript{17B}.

MATERIALS AND METHODS

Experiment 1

The experiment was conducted in two herds grazing pastures of fertilised Lotononis bainesii cv. Miles, Paspalum plicatum cv. Rodd's Bay and Chloris gayana cv. Callide, near Childers. The environment has been described by Adams and Hawley (1975). The calves were from mature high-grade zebu cows mated to Braford or Charolais-Hereford bulls.

One hundred and fifty-two mixed sex calves between one week and two months of age, with a mean live weight of 86±22 kg (s.d.) were randomly assigned to treatment groups after routine vaccination in November-December 1981. Steer calves received the following treatments:- Control; 36 \textsuperscript{mg} zeranol; 36 \textsuperscript{mg} zeranol with another 36 \textsuperscript{mg} zeranol after 91 days; heifer calves received the first two treatments. After treatment calves and their dams grazed together for 178 days until weaning in May 1982.

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Experiment 2

This experiment was conducted in three herds on 'Brookside' and the neighbouring property 'Carramar' in the following year, with calves of similar breeding and from high-grade zebu cows mated with Simmental bulls and low-grade zebu cows mated with high-grade zebu bulls. For the first 150 days of the experiment both properties were drought affected, necessitating the provision of a mixture of fortified molasses (Nicol et al. 1984) incorporating 3% urea (w/w), 5% cottonseed and 5% meat and bone meal. Cows and calves were fed 42 kg/week/breeding unit on 'Brookside' for 150 days and for 120 days on 'Carramar', in addition to the available pasture.

Two hundred and thirty-nine mixed sex calves, between one week and three months old with a mean liveweight of 97 ± 25 kg (s.d.) were randomly assigned, within herds, to the following treatments in November 1982:- Control; 36 mg zeranol with a further 36 mg zeranol after 92 days; 24 mg oestradiol 17β. The calves and their dams grazed together throughout the 194 days trial period, which terminated at weaning in June 1983.

Implants were placed subcutaneously on the back side of the ear according to the manufacturers' recommendations in both experiments.

Liveweight data were pooled across herds, within years, and analysed by the least squares method (Harvey 1960), with the initial weight fitted as a covariate.

RESULTS

Experiment 1

The liveweight gains of treated and control calves are shown in table 1.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of Animals</th>
<th>Day 91</th>
<th>Day 178</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>66</td>
<td>87 a+</td>
<td>157 a</td>
</tr>
<tr>
<td>Zeranol</td>
<td>62</td>
<td>95 b</td>
<td>171 b</td>
</tr>
</tbody>
</table>

+ Means in the same column followed by different letters differ significantly (P<0.05).

An implant of 36 mg zeranol increased liveweight gains of steer and heifer calves by 8 kg after 91 days and by 14 kg after 178 days (weaning).

Table 2 compares the liveweight gains of steers given one or two sequential doses of 36 mg zeranol with untreated steers.
TABLE 2 Effect of two zeranol treatments on the liveweight gains of suckling steers

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of Animals</th>
<th>Liveweight gain (kg)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Day 91</td>
<td>Day 178</td>
</tr>
<tr>
<td>Control</td>
<td>27</td>
<td>89 a</td>
<td>164 a+</td>
</tr>
<tr>
<td>1 x Zeranol</td>
<td>25</td>
<td>95 a</td>
<td>178 b</td>
</tr>
<tr>
<td>2 x Zeranol</td>
<td>24</td>
<td>95 a</td>
<td>183 b</td>
</tr>
</tbody>
</table>

+ Means in the same column followed by different letters differ significantly (P<0.05).

Steers given one dose of zeranol gained 8 kg more (P<0.05) than controls in the period from day 91 to day 178. The second implant of 36 mg zeranol administered after 91 days gave no further advantage during the second period.

Experiment 2

One heifer lost its oestradiol implant in the first 91 days. Zeranol implants could not be checked visually. The liveweight gains are summarised in Table 3.

TABLE 3 The liveweight gains of heifer and steer calves treated with zeranol and oestradiol 17β

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of Animals</th>
<th>Liveweight gains (kg)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Day 92</td>
<td>Day 194</td>
</tr>
<tr>
<td>Control</td>
<td>78</td>
<td>83 b+</td>
<td>151 b</td>
</tr>
<tr>
<td>Zeranol</td>
<td>81</td>
<td>90 a</td>
<td>170 a</td>
</tr>
<tr>
<td>Oestradiol 17β</td>
<td>80</td>
<td>91 a</td>
<td>171 a</td>
</tr>
</tbody>
</table>

+ Means in the same column followed by different letters differ significantly (P<0.05).

Zeranol and oestradiol gave an 8 kg advantage (P<0.05) over controls after 92 days and 20 kg after 194 days (weaning). Heifers showed a greater response (P<0.05) to zeranol and oestradiol implants than steers (9 kg v. 6 kg at 92 d and 26 kg v. 14 kg at 194 d).

The calves in one herd showed a greater response (P<0.05) to zeranol and oestradiol implants. After 194 days, the responses to implants in herd one on 'Brookside' (30 kg) were greater than in the other two herds (13.5 kg and 15 kg).

DISCUSSION

These results show a 9 to 21% increase in liveweight gains of suckling steers and heifers grazing pastures in the subtropics from the use of zeranol and oestradiol implants. The responses recorded compare favourably with those of

The lack of response to the second zeranol implant agrees with the findings from a similar 205 day trial with suckling steers (Nichols and Lesperance 1973). The response to the initial 36 mg zeranol lasted beyond the 90–100 days recommended by the manufacturers, and this may account for the lack of advantage from the second implant.

The liveweight response to an oestradiol implant or two zeranol implants was similar, indicating scope for comparing one implant of 36 mg zeranol with one implant of 24 mg oestradiol 17β.

The variability of the responses to these anabolic agents may be related to the level of nutrition of the lactating cows and calves. Although all herds were fed similar supplements during the drought, the greater quantity of pasture available to herd one probably accounted for the greater response.

The greater response by heifer calves in one experiment is difficult to explain and may warrant further research.

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REFERENCES


