

UREA SUPPLEMENTS FOR GRAZING BEEF WEANERS

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Summary

In a cattle grazing experiment where (a) urea-molasses, (b) molasses and (c) no supplement were compared, the latter two groups maintained weight during the 16 1 day feeding period whereas the urea-molasses group gained over 0.18 kg/day. Growth post-feeding was assessed at two and four months thereafter and, while significantly greater gains were recorded by the control and molasses groups, cattle in the urea-molasses group were still a mean of 23 and 22 kg respectively heavier at the final weighing than the control and molasses groups respectively.

Measurements of pasture availability and faecal output indicated that the urea-molasses group consumed more dry matter than the other groups.

Regular anthelmintic treatment showed no effect on bodyweight where a slight parasite burden only proved to be present.

I. INTRODUCTION

The marked seasonality of pasture growth under tropical conditions has its effect on animal bodyweights with severe weight losses coinciding with decline in quality of the pasture (Alexander and Chester 1956). There have been a large number of pen studies examining the addition of urea and molasses and similar supplements to low quality roughages (Morris 1958; Beames 1959; Barrie and Clark 1959; Coombe 1959). However there have been relatively few studies on the use of such supplements by animals grazing these low quality pastures.

In the supplementary feeding experiment described in this paper molasses and urea and molasses alone were offered as supplements to grazing to weaner beef cattle during the drier months of the year when pasture quality was low.

II. EXPERIMENTAL PASTURES AND ANIMALS

The experiment was carried out at the "Swan's Lagoon" Cattle Research Station, Millaroo, near Townsville, where the mean annual rainfall is 79 cm of a markedly summer incidence (Prescott 1949). The pastures were mainly giant spear grass (*Heteropogon triticus*), black spear grass (*Heteropogon contortus*) and kangaroo grass (*Themeda australis*) on coarse grey sands overlying solonised clays.

Prior to the commencement of the experiment the six paddocks were stocked heavily during the bulk of the pasture growing season and then spelled to allow a

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build-up of young pasture for the experiment which was conducted over the dry season of the year. Pasture available to the animals was measured by quadrats on August 14 and January 7 near the commencement (August 6, 1968) and end of the experiment (January 14, 1969) during which period the animals grazed at the rate of one animal to 2 ha.

A group of 90 Brahman-Shorthorn calves aged six months were weaned in the middle of July 1968 and fed lucerne hay in yards for a week during which they were offered a molasses-water mixture in a roller-lick feeder (Mutch 1966) similar to those used to supply the supplement in the experiment. After this period, they were allowed to graze on pasture similar to the experimental pasture for three weeks until the experiment was commenced.

III. EXPERIMENTAL PROCEDURE

The animals were randomised within sex to six groups. The treatments were no supplement, molasses supplement (0.23 kg/head/day), and molasses (0.23 kg/head/day) plus urea (57 g/head/day) supplement using roller-lick feeders and were allocated to the groups on a randomised block basis, blocking on sex. It was endeavoured to maintain these levels of intake by weekly adjustment of the amount of water added to the mixture. A further treatment comprising an anthelmintic injection (Injectable "Nilverm" 4 ml/45 kg) every six weeks was imposed on half the animals selected initially at random over each of the six paddocks.

Regular three weekly weighings were made using a standardised procedure throughout the experimental period and the post-feeding period until May 1, 1969. Initial and final weights for the feeding period were the mean of weighings on three consecutive days. All animals were condition scored at each weighing (Winks and Lamberth 1968).

Faecal worm egg counts were determined on a six weekly basis from the male cattle and faecal nitrogen and phosphorus levels were determined on a three weekly basis on bulked faecal samples from the control group (Roberts *et al.* 1951; Moir 1960).

On three occasions during the later stages of the study, the mean faecal output of each of the male replicates in a 24 hour period was determined on the treatments. Each treatment group was enclosed for 24 hours in a covered concrete yard with water provided but no feed. After a further 24 hours to allow partial drying of the faeces, the faeces for each group was collected, oven dried and weighed to obtain the mean faecal output.

The method of analysis of data used was a covariance analysis of a balanced factorial design.

IV. RESULTS

The pasture D.M. content determined on samples taken on August 14 was comparable for all groups being 1801 kg/ha D.M. for the control, 1731 kg/ha for the molasses and 1800 kg/ha for the urea-molasses groups. However the final sampling on January 7 showed a slight difference between the first two groups at 1524 kg/ha and 1400 kg/ha respectively but a marked reduction in available fodder for the urea-molasses group at 1106 kg/ha suggesting a greater consumption of pasture by this group.

The desired level of consumption of the supplements was nearly achieved

being 1232 kg for the molasses groups (0.26 kg/head/day) and 1198 kg molasses (0.25 kg/head/day) and 238 kg urea (49 g/head/day) for the urea-molasses groups. The protein and phosphorus levels in the dry matter faeces of the control group varied between 6.1 and 5.6 per cent protein and 0.28 and 0.18 per cent phosphorus with the highest levels of both being at the end of the experiment and lowest over the September-November period.

During the experimental . period, there was no significant difference in the gains of the control and molasses fed groups resulting in a final weight of 158 kg for the control and 162 kg for the molasses groups (Table 1). The urea-molasses group gained significantly more weight than the other two groups resulting in a final weight of 192 kg. The overall condition scores of the urea-molasses group were also significantly higher than those of the other two groups ($P < 0.01$). The condition score of the urea-molasses group did not vary significantly throughout the feeding period whereas those of the two groups declined at a similar rate being both significantly lower than those of the urea-molasses group at the end of feeding ($P < 0.01$).

Post-feeding performance was assessed two and four months post-feeding and, in each case the gain of the urea-molasses group was less than that of the other two groups ($P < 0.01$). However four months after the feeding had ceased, the mean weight of the urea-molasses group was 263 kg while the molasses group was 241 kg and the control 240 kg, both being significantly lighter ($P < 0.01$). All groups had significantly higher condition scores at two months with the scores at four months post-feeding being significantly higher than those at two ($P < 0.01$). At two months post-feeding the urea-molasses group had significantly higher condition scores than the other two groups ($P < 0.01$). At four months, it still had significantly

TABLE 1
Weight Changes and Condition Scores of Cattle During the Feeding and Post-Feeding Periods

Treatments	Mean Weight Changes* (kg/day)			Mean Condition Scores		
	Feeding Period 161 days	Post- Feeding Period		During Feeding Period 161 days	During Post- Feeding Period	
		2 mo.	4 mo.		2 mo.	4 mo.
STEERS						
Pasture	—0.03	0.68	0.76	4.27	4.24	4.64
Pasture + Molasses	0.02	0.64	0.73	4.27	4.36	4.87
Pasture + Molasses + Urea	0.19	0.57	0.62	4.99	5.11	5.37
HEIFERS						
Pasture	0.02	0.65	0.72	4.42	4.47	4.93
Pasture + Molasses	0.00	0.68	0.78	4.33	4.33	4.87
Pasture + Molasses + Urea	0.18	0.56	0.67	5.00	5.16	5.43
STANDARD ERROR OF THE MEAN	0.01	0.03	0.02	0.10	0.10	0.09

*Weight changes are all corrected for initial weight, in the case of the feeding period for initial weight, at 6.8.69 and in the case of the post-feeding period for the weight at the commencement of that period at 15.1.69.

higher scores than the control group but there was no significant difference between the condition scores of the molasses and urea-molasses groups. There was no effect on sex on bodyweight gain.

The mean faecal worm egg counts of the untreated animals varied from 120-250 e.p.g. over the period whereas the treated animals never exceeded 40 e.p.g. The predominant species infesting the stock were *Cooperia*, *Haemonchus*, *Oesophagostomum* and *Ostertagia* spp. There was not any effect of anthelmintic treatment on bodyweight gain.

The three measurements of mean daily faecal output for the three feeding treatments in November, December and January were 2344 g, 2230 g and 1847 g D.M. for the urea-molasses group, 1853 g, 1946 g and 1654 g D.M. for the control and 1727 g, 1999 g and 1810 g D.M. for the molasses group.

V. DISCUSSION AND CONCLUSIONS

The performance of the control animals was superior to that normally recorded on the Station (Winks, unpublished) which may have been a result of the management to which the pasture was subjected before the experiment commenced. Faecal protein levels indicated that the animals were able to select a ration which approached maintenance levels for the major part of the period (Moir 1960).

The absence of a response to molasses supplementation is in agreement with the results of experiments using energy supplements with low quality roughages in pens (Beames 1959; Coombe 1959; Coombe and Tribe 1962) indicating that an energy supplement alone was insufficient to overcome the failure of cattle to gain weight. A slight depression in growth of molasses supplemented animals was reported by von La Chevallerie (1965).

The liveweight response to urea and molasses is similar to that reported in pen studies (Morris 1958; Beames 1959; Coombe 1959). In experiments with grazing animals, it has been possible to reduce or prevent weight loss by the use of a urea-molasses supplement (von La Chevallerie 1965; Alexander, Daly and Burns 1970) but the use of such supplements where control animals made virtually no growth had failed to produce any benefit (Skinner 1964). McDonald (1968) has concluded that if the pasture enables the cattle to maintain approximately their bodyweights, urea is not likely to be nutritionally useful, but when considerable bodyweight loss is associated with inadequate nitrogen in plentiful supply of dry forage, urea supplementation is likely to reduce bodyweight loss. The results of the present experiment are at variance with this concept and could indicate that pastures may vary in their capacity to combine with urea-molasses to provide a productive ration.

The increased faecal output of the group fed urea-molasses would suggest an increase in their intake of roughage, which agrees with the results of pen studies (Clark and Quin 1951; Morris 1958; Beames 1959; Coombe 1959). The low value of the last determination of faecal output as well as the estimate of pasture availability in this experiment would indicate that the availability of roughage was becoming limiting for the urea-molasses group.

Compensatory growth which can nullify the benefits of supplementary feeding either completely or in part is known to be affected by the nature, duration and

severity of the undernutrition as well as the stage of development of the animal (Wilson and Osbourn 1960; Alexander, Daly and Burns 1970). In the present study, the degree and duration of undernutrition were such that substantial compensatory gains would have been expected, yet four months after feeding ceased over 80 per cent of the weight advantage of the urea-molasses group remained.

The absence of a response in bodyweight gain to anthelmintic treatment is understandable in view of the low parasite burden found in the faecal samples. Conditions during the study were dry and not conducive to a major increase in parasite numbers. Also the previous spelling of the trial area may have helped maintain a low level of pasture contamination.

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