

EVALUATION OF A COMMERCIAL SUPPLEMENT FOR BREEDING COWS ON UNIMPROVED COASTAL PASTURES OF NORTHERN NEW SOUTH WALES

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SUMMARY

A commercial mineral and non-protein nitrogen supplement (NPN) was fed for three years to a herd of breeding cows grazing unimproved grass pastures at Grafton. A second herd received no supplement. Supplemented cows were significantly heavier at weaning in year three and had stronger rib bones with higher phosphorus and calcium levels. There was no significant difference in calving per cent between the two herds. The calves from the supplemented herd were significantly heavier at weaning and were more valuable. However, the supplement cost far exceeded the increased value of the calf. Results suggest that feeding a supplement containing minerals and non-protein nitrogen under these conditions is not warranted,

INTRODUCTION

There are many soils of low fertility on the north coast of New South Wales which support carpet grass (*Axonopus affinis*), native grasses and Eucalypt forest. Cattle grazing pastures on these soils have a diet low in phosphorus, nitrogen and digestible energy (Cohen 1972). In trying to overcome this problem, 75% of beef producers in the Copmanhurst shire near Grafton have used prepared mineral licks and supplements or bone meal (Mitchell 1976).

However, Cohen (1976) at Grafton failed to show significant responses in cow live weight, calf birth weight, weaning weight or fertility when a phosphorus or a phosphorus, urea and molasses supplement was used. Cohen obtained a non-significant increase from 64.7 to 67.7% in calving from a phosphorus supplement and suggested that further work should be done with larger numbers of cows because a small increase in fertility might improve economic benefits to the producer. This experiment was carried out to assess the biological and economic effects of feeding a commercial mineral and non-protein nitrogen supplement to breeding cows on carpet grass pasture.

MATERIALS AND METHODS

Ninety three-year-old Hereford heifers which had been raised on unfertilized pasture in the upper reaches of the Clarence river, were purchased for the experiment in July 1975. All were empty when tested for pregnancy. The heifers were randomised into two herds of 45 on the basis of weight and body condition. They grazed an unfertilized 200 ha area of carpet and blady grass (*Imperata cylindrica*) subdivided into two paddocks. The two herds grazed separately and were alternated between paddocks every two weeks to minimise paddock effects.

From August 1975 one herd received a popular mineral and non-protein nitrogen supplement ("Special Fermafos": Rumevite Pty Ltd, Brisbane). The manufacturer's analysis was: 28% minimum crude protein (2% crude protein from natural sources and 26% crude protein from urea and biuret); 10% salt; 9% phosphorus; 16% calcium; .003% cobalt; 0.03% copper and 0.003% iodine. The supplement contained an unspecified quantity of "molasses distillers solubles".

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This gave it a distinct molasses smell and a sticky consistency when wet. The second herd received no supplement.

The supplement was fed in three half 200 litre drums, each placed at a different point of the paddock to avoid competition. Initially the supplement was fed *ad libitum* as suggested by the manufacturer. However, after seven months intake was still three times the recommended rate. Accordingly, from April 1976, intake was restricted to 100 g/head/day (9 g phosphorus) and, after calving, to 120 g/head/day (10.8 g phosphorus). After the period of *ad libitum* feeding, the supplement was replenished once a week throughout the year and was consumed over most of the week. Later more rock salt (1/3 by proportion) was added to spread intake. To estimate the number of cattle eating the supplement, a tasteless, red food dye was incorporated on four occasions during the experiment. The stained muzzles of the "eaters" could be identified from horseback up to 24 hours after access.

Heifers were joined for three months from September 1975. Cows in both groups were in poor condition after calving in spring 1976, and few had cycled by early January 1977. Consequently, calves were weaned in mid-January at approximately six months of age and joining extended from October 1977 to February 1978. The calves born in 1977 were weaned in April 1978 and the trial terminated.

Cows were weighed and their condition score estimated five times per year after a 17-hour fast. Height, length and girth of cows were measured with a tape at the start and at calf weaning during the experiment. Calves were weighed and their height, length and girth measured at birth and at weaning. Calf value was assessed by two livestock agents.

At the conclusion of the experiment, cows were slaughtered, checked for pregnancy and the 12th and 13th rib removed to estimate calcium and phosphorus in fat-free bone (Cohen 1973). Elasticity (mm of curvature) and strength (kg) were measured when a load was applied to the central point of rib. Five heifers with oesophageal fistulae were used to collect samples of pasture on offer at monthly intervals during 1976-77. Digestibility of organic matter was determined by the *in vitro* method.

RESULTS

The supplemented pregnant cows were significantly heavier than the unsupplemented pregnant cows after two years. However there were no differences in body size between the two groups and no significant differences in weaning per cent (Table 1).

The number of cows detected as eating the supplement during dye marker observations increased from 69 to 78%. The same cows (11%) were not seen to be stained on any occasion.

The 12th rib bones of the supplemented cows were stronger, less elastic and had higher phosphorus and calcium levels than those of the unsupplemented cows (Table 2).

The organic matter digestibility of pastures selected by the fistulated animals was low, ranging from 53% in summer to 44% in winter.

Calves from the supplemented group were significantly heavier than calves from the unsupplemented group at weaning in both years. The supplemented group of calves had a significantly larger body size in both years (Table 1).

areas of coastal northern New South Wales. Our aim was to test the supplement under conditions that stressed breeding cows and allowed the opportunity to illustrate the advantages traditionally attributed to the supplement. The grass pastures in our experiment, and in the Clarence Valley, have low phosphorus, protein and energy levels (Garden *et al.* 1978) and they provide a sub-maintenance diet for breeding cows in late winter and 'early spring.

The supplement did increase weights of pregnant cows and weaning weights but the increases were not large. The weaning weight response may have been due to stimulation of milk production from the nitrogen and the limited crude protein in the supplement, rather than from phosphorus and calcium. Experiments in Queensland and South Africa using similar supplements (Cohen 1975) have reported increases in fertility and growth rate. On the unimproved pasture of our experiment energy and nitrogen levels offered were too low to allow the mineral and largely NPN supplement to affect fertility of breeding cows or produce an economic response in calf growth. Over the three years of supplementation, bone strength and reserves of phosphorus and calcium were built up and may have indirectly aided walking and grazing under free range (Cohen 1975). Despite this benefit we conclude from this experiment that the practice of feeding non-protein nitrogen and mineral supplements to cattle grazing north coast naturalised grass pastures is not warranted unless:

- (i) a marked improvement in protein and energy levels of the pasture is achieved; or
- (ii) a larger amount of true protein is included in the supplement.

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