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CONCENTRATE FEEDING OF DAIRY CATTLE *

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IDENTICAL TWINS WERE EMPLOYED to determine the effect of supplementing cows subjected to a severely restricted pasture diet for a period of eight weeks after calving with a liberal ration of concentrates.

The feeding programme prior to calving was arranged so that half of the twin sets calved down in good condition and the remaining sets in poor condition. For the first eight weeks after calving the pasture intake of all animals was deliberately restricted and during this period one member of each twin set was fed six pounds of concentrates per day. After the end of the eighth week, concentrate feeding was discontinued and the members of twin pairs were brought together and fed ample pasture for the remainder of lactation so that carry-over effects could be studied. The quantities of concentrates consumed by the cows were measured directly and their pasture intakes by the indirect chromium marker—faecal nitrogen method. The cattle were weighed regularly and accurate records kept of the amounts of milk and butterfat produced.

Intake measurements during the eight weeks differential feeding period showed that the supplemented animals derived approximately 25 per cent. of their total D.O.M. intake from the concentrates and that they ate no less pasture than the unsupplemented co-twins. Both groups of unsupplemented cows were definitely underfed as their intakes increased markedly when transferred to *ad lib.* grazing at the end of the eighth week of lactation.

The twins fed concentrates did not lose as much weight after calving as their supplemented mates and the length of the period over which weight was lost was, on average, shorter.

The feeding of concentrates markedly affected the average lactational length, the unsupplemented cows tending to dry off at an earlier stage.

During the eight week period over which the concentrates were fed the supplemented animals produced substantially more milk and butterfat than their control mates. The average difference was 35 gal. of milk for the twin sets that calved in

*This paper was read and the questions answered by Dr. C. P. McMeekan, Superintendent, Ruakura Animal Research Station.

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good condition and 45 gal. for those that calved in poor condition. There were marked carry-over effects after transfer to an ample pasture diet at the end of the eighth week of lactation. By the end of lactation the average differences amounted to 116 and 187 gal. respectively.

The value of the additional milk and fat produced over the first eight weeks was quite insufficient to cover the cost of the concentrates fed. Nevertheless, because of the marked carry-over effects concentrate feeding paid handsomely on a total lactation basis.

The level of nutrition of the supplemented animals was extremely low during the period over which the concentrates were fed and it was emphasized that completely different results might have been obtained had adequate pasture been available to both the supplemented and control cattle during the post-calving period.

DISCUSSION

Q: *This experiment seems to indicate that if I were a dairyman I would run more cows, keep them on a low plane and give them some meal. Surely this is not right?*

A: It is certainly not right. This experiment provides no evidence as to what cows in either group would have produced if they had been well fed on grass after calving. From many previous studies, it is a reasonable certainty that production, both with and without meal, suffered on the restricted grass intake operating for the first eight weeks. The intake data indicate that all cows were under-fed during this time.

Q: *But the low plane on meal produced more than the high plane either with or without meal.*

A: I stressed that no valid comparisons could be made between the low and high plane groups but rather that the data should be considered as from two separate experiments with the cows of the low plane group being of higher dairy merit than those of the high plane. To sort out the true effect of the differences in plane prior to calving, co-variants will have to be used on the raw data presented in this paper.

Q: *Under New Zealand conditions with seasons varying from year to year, this technique could be used by farmers with a very high stocking rate who had run into trouble in the spring after calving. However, supplies of concentrates might be difficult to come by because of their widespread demand in such a difficult year.*

A: From long experience with New Zealand dairying, I have never known all dairying districts to suffer from a severe grass shortage after calving. Rather the pattern has been for this to occur in the one district only. In consequence, the technique could be used.

Q: *Were the concentrates restricted or was the feeding ad lib.?*

A: It was a ration on a daily basis irrespective of level of production at a flat rate of 6 lb. per day.

Q: *Was there a large variation in the lactation length within the twin pairs?*

A: No, as I remember the data there was only one aberrant pair. There was, of course, a big difference between pairs.

Q: : *Was any attempt made to gauge the benefit of the manurial residue from the meal?*

A: : No.

Q: : *What was the nutritive ratio of the meal ration fed? What made you decide on the 6 lb. level? What were the absolute yields of butterfat? I recollect seeing the milk yields but not the butterfat.*

A: : I have not worked out the nutritive ratio. The average content worked out was 16 per cent. protein. A flat rate was employed because it is our view at Ruakura that such a system is of much more practical use under our conditions than any attempt to vary concentrates according to level of production. In addition, the aim was to increase the intake through the addition of concentrates by approximately 20 to 25 per cent. Yields of butterfat were not shown since they are directly related to the F.C.M. figures shown. Multiply these by 4 per cent. for fat yield.

Q: : *Surely the difference in production owing to meal feeding would have been accentuated if the cows had been fed this meal according to their level of production?*

A: : The figures merely indicate that the cows responded differently to feed intake. No details of individual ratios of grass to meal or of total intake of individual cows were provided so that no knowledge exists as to whether the variable grain ration might have given a different response. It probably would have done, but I would stress that it is more practical to feed on a flat rate basis since individual milk yields under New Zealand conditions are not known.

Q: : *I am rather interested in the milking time. Could you indicate whether offering cattle 6 lb. of meal could significantly extend milking time? If that were the case, it could account for some of the improvement in milk yield after discontinuation of meal feeding.*

A: : I have no information on the milking time.