

EFFECTS OF LEVELS OF CONCENTRATE SUPPLEMENTATION ON MILK PRODUCTION AND BODY WEIGHTS OF LACTATING DAIRY COWS.

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ABSTRACT

Nineteen dairy cows were used over a 7-month period to evaluate the effect of allocating different levels of concentrate during early lactation. The animals were fed on grass hay basal diet and supplemented with either 2 Kg (LLC), 4 Kg (MLC) or 8 Kg (HLC) per day. Milk yields were measured daily, body weight and body condition scores were monitored weekly. Milk yields during the first 12 weeks of lactation were 11.6, 12.6 and 16.9 Kg/day for LLC, MLC and HLC respectively. The HLC had significantly higher ($P < 0.001$) milk yield than both MLC and LLC. The body weights and condition scores of animals in different treatment groups remained relatively constant during the study period. The HLC were significantly heavier than the other two groups.

INTRODUCTION

About 77% of the total dairy cattle population are kept by small scale farmers and about 80% of the milk produced in Kenya come from smallholder dairy farmers (Mbogoh, 1984) most of whom are found in the highlands. In these highlands, feeding of dairy cattle is often based on crop residues and low quality hay and pasture. Since these are often low both in protein and energy there is a need for supplementary feeding to meet nutrient requirements. As supplies of commercial concentrate are limited and consequently expensive, economical allocation has to be found so as to increase milk production.

The feeding practice of smallholder dairy farmers in Kenya highlands is to give their dairy cows a constant amount of dairy concentrate of 2 Kg throughout lactation (Omore, 1996). However cows do not achieve potential peak milk yield and therefore do not attain maximum milk returns from their inputs. Because of low peak milk yield, total lactation yields are lower by significant amounts. This is thought to be affected by feeding level in early lactation (Broster and Strickland, 1977)

It was the objective of this study to investigate the effects of reallocation of dairy concentrate to the early part of lactation on milk yield cow body weight and condition.

MATERIALS AND METHOD

Nineteen (19) dairy cows (Friesian/Ayrshire/Jersey) were grouped into parity/breed classes (2,4,5, and 6) and cows within a group were randomly assigned to three levels of concentrate supplementation just after calving. Cows were allowed free access to Rhodes grass hay but fed on dairy concentrate in the milking parlour individually according to the treatment. Cows in group one received 2 kg of concentrate (LLC), those in group two 4 kg (MLC) and group three 8 kg (HLC).

In this experiment feeding allowances towards early lactation at the cost of later lactation, was necessitated by the plan to equate total dairy concentrate allocated to dairy cows by farmers (610 kg) This amount was reallocated to the first half of lactation (22 weeks, 4 kg/day (MLC)) and first quarter of lactation (11 weeks; 8 kg/day (HLC))

Milk yields were recorded twice daily in Kg. The live weights were estimated using heart girth measurements once a week and body condition scores were estimated using method developed by Edmondson *et al* (1989) of 6 point scale (0 to 5).

Statistical analyses were performed using the Statistical Analysis System SAS. General linear model procedure was used with milk yield as a dependent variable and breed, parity treatment and body weight as independent variables and initial milk yield as a covariate.

RESULTS

Live weight and condition score

The live body weight and condition score patterns are illustrated in figures 1 and 2 respectively. The weights for animals in group HLC increased from the day of calving whereas those in MLC and LLC lost weight to the 6th week after which they gained weight and there were no

Figure 1. Mean body weights during the experimental period

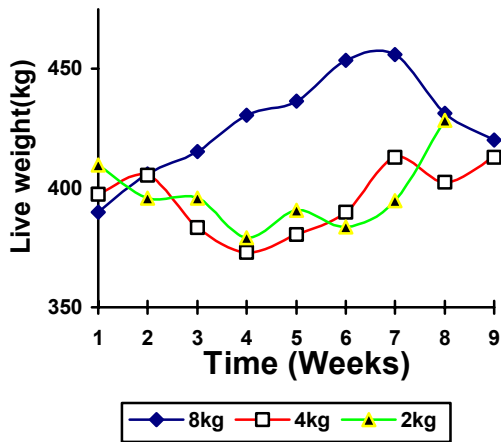
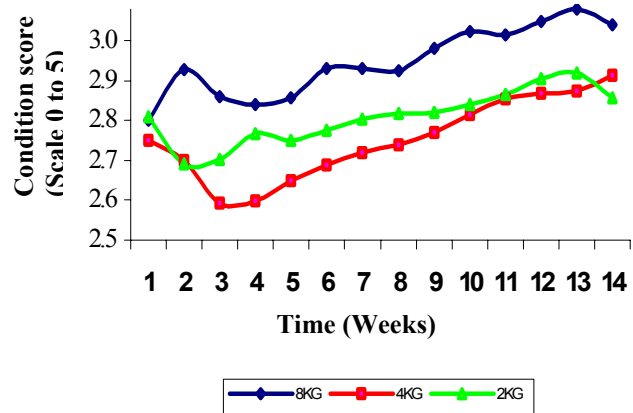


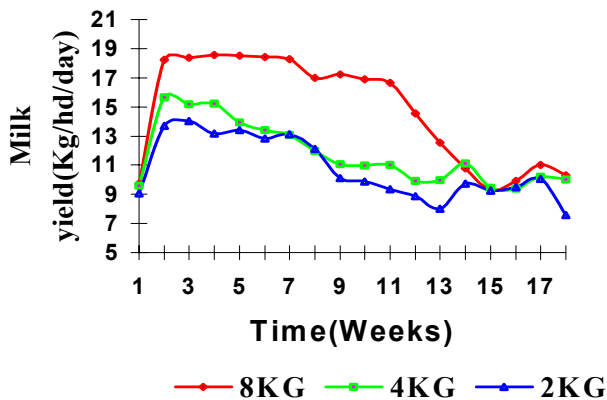
Figure 2. Mean condition scores during the experimental period



significant differences between treatment groups. There was tendency for cows in LLC and MLC to be lighter than those in the HLC class. Condition scores were also significantly affected by the treatments ($P < 0.05$)

Milk yield

Fig3. Lactation curves



The HLC realised higher yields than MLC and LLC. From the second phase of lactation (>15), when the HLC group received no concentrate, there was no significant differences in yields among all the treatment groups. Total lactation yields for the 18 weeks for a cow were 1816 Kg, 1489Kg and 1349Kg for treatment groups HLC, MLC and LLC respectively. There was no significant effect of parity and breed on milk production ($P > 0.05$)

The yields of LLC group began to decline 2 weeks after calving and MLC group 3 weeks after. HLC showed a constant yield to the 11th week. No group had a defined peak.

DISCUSSION

The objective of the experiment was to study effects of levels of concentrate supplementation on milk production and body weights of lactating dairy cows. Flat rate feeding of concentrate was used.

The data presented in this study shows that cows respond to changes in energy input in terms of milk output and live weight change. The amount of concentrate given at the three flat rates had effect on live weight change. Cows LLC and MLC were lighter than those in HLC. Increasing live weight gain in milking cows with higher concentrate input was also observed by Atson *et al* (1995). Body condition scores show that cows in HLC were in better condition than those in groups HLC and LLC. The cows, however, appear to have been under conditioned (highest calving at 2.8) while the expected should be above 3.5 (Mulvany, 1977). Body condition is an important factor in achieving potential milk yield at low than high concentrate intakes. Previous study shows that body condition score use is confounded with milk yield potential i.e. cows of higher score at calving may be those of lower genetic merit (Moisey and Leaver, 1985).

Although the experiment was designed with anticipation that HLC would reach peak milk yield i.e. 21 Kg, this was not observed but a rather flatter curve was obtained. Previous experiment showed similar lactation curve Johnson (1977). However, after the concentrate feeding was stopped at 75 days there was a sharp drop in milk yield (17-11 kg in 4 weeks). This was due to a decline in total daily energy intake. HLC yield was higher probably because of efficiency in energy conversion to milk.

When the total amount of annual concentrate allocation was used, but reallocated to early lactation more yields was realised in the period under review. These results indicate that it is beneficial to reallocate concentrate to the first phase of lactation.

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