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EFFECTS OF AN AUTOMATIC FEEDER ON INTAKE AND MILK YIELD

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The Alfa Laval feeder is designed to control the daily intake of concentrate by individual dairy cows. The method of operation has been described by Collis *et al.* (1978). Signals from a collar around each cow's neck activate a dispenser to supply concentrate for a maximum time per day which can be adjusted to each cow's milk yield. The purpose of this study was to determine whether the use of the feeder affected the cows' intake of concentrates and forage, and in turn their milk production.

Material and Methods

73 British Friesian or British Friesian x Ayrshire cows at different stages of lactation were used. Initially 52 of them were divided into two groups of similar average age and stage of lactation: 32 to use the feeders and 20 control cows. Subsequently cows were introduced into the two groups alternately as they calved, replacing the cows that had been milking longest, and maintaining a constant number in each group. Before the experiment both groups were fed a complete diet to appetite in the manger (table 1). When the experiment began the treatment group was offered the concentrate portion of the diet, in cubed form, from two adjacent feeders, in addition to the complete

mix in the mangers. After three days the feeders became this group's sole source of concentrates (except for 1 kg fed twice daily to both groups in the parlour) and the complete feed, less the concentrates, was fed as before. Up to 10 weeks post calving each cow in the treatment group was allowed 12.5 kg of concentrate/day from the feeders, then, as their yield declined, the collar was adjusted at fortnightly intervals to allow 2 kg of concentrate for every 5 kg of milk produced.

Each month the cows' behaviour was observed continuously for one period of 72 or 48 hours and records were kept of the time for which each dispenser delivered concentrate to each cow. Individual milk yields were recorded weekly.

Results

The cows adapted readily to using the feeders, but there were slight modifications in their behaviour as the experiment progressed (Collis *et al.*, 1978).

On average there was a good correlation ($r = 0.96$) between the desired and actual concentrate intakes of the cows, although the older cows tended to eat less concentrate than the setting on their collars allowed (table 2).

After the introduction of the feeders, the

experimental group of cows increased its intake of concentrates and decreased its intake of roughage. After 6 weeks the mean dry matter (DM) and mean metabolisable energy (ME) intakes had decreased from 21 kg and 235 MJ/day to 17.8 kg and 205 MJ/day respectively. After 14 weeks, as lactation progressed and the collar settings were reduced, the intake of concentrate decreased and the mean DM and mean ME intakes increased again to 19.8 kg and 214 MJ/day respectively. The mean DM and ME intakes of the control cows remained constant throughout the experiment (table 3).

There was no significant change in the mean milk yields of both groups, but the peak milk yield of the treatment group (37.3 kg/day) was significantly higher ($P < 0.001$) than that of the control group (33.7 kg/day).

The mean stage of lactation of the two groups remained very similar throughout the experiment.

Conclusions

The feeders provided a simple and efficient method of feeding dairy cows individually. They permitted cows to receive several concentrate feeds each day, and pre-

Table 1.— Approximate daily allocation of the complete diet per cow

	kg dry matter (DM)
Maize silage	2.0
Lucerne silage	2.8
Dried lucerne	4.6
Concentrates (soya meal, wheat, barley)	8.0
Chopped hay	0.9
Chopped straw	0.9

vented excessive consumption. The cows quickly adapted to using them regularly and the changes in behaviour did not affect their intake of concentrate. The older cows consistently ate less than their full allocation but their intake was more than sufficient for their yield, particularly in the first 10 weeks of lactation when the collar setting was high in order to encourage maximum milk production. This high collar setting was probably the main cause of the decrease in the mean ME and mean DM intakes of the cows using the feeders, but in spite of this there was an increase in the peak milk yields of these cows. This increase may have been due to the high digestibility of the concentrate, in comparison with that of the remainder of the complete diet.

References

- COLLIS K.A., QUICK A.J., NEWMAN G., 1978. The behavioural adaptation of dairy cows to automatic feeders (Alfa Laval). *Proceedings, 1st World Congress on Ethology Applied to Zootechnics*. 2, 37.

Table 2.— The relationship between age of cow and mean percentage of concentrate allocation eaten

Year of birth	Mean age (weeks)	N ^o of cows	% allocation eaten in 24 hours
1975	142	4	98.6
1974	173	8	97.4
1973	234	8	94.9
1972	273	4	90.7
1971 and older	401	3	79.7

Table 3.— The mean daily dry matter (DM) and metabolisable energy (ME) intakes of a group of cows using an automatic feeder, and of a control group of cows

	Pre	+ 6 weeks	+ 14 weeks
<i>Feeder group</i>			
DM	21	17.8	19.8
ME	235	205	214
<i>Control group</i>			
DM	21	20.7	21.7
ME	235	230	232