

EFFECT OF TIME OF YEAR AND PRIOR FEEDING EXPERIENCE ON
FEEDING BEHAVIOUR OF SHEEP AS IF FOR LIVE EXPORT

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SUMMARY

Failure to eat pelleted feed during assembly before live export can increase the risk of sheep dying aboard ship. Factors effecting feeding behaviour were investigated in a series of three experiments. Experiment 1 showed that Merino wethers with previous experience of supplements of pellets, oats or an oat/pellet mix, given either when they were lambs or when they were 18 months old, resulted in animals eating 35% more pellets, over five days of lot-feeding, than those which had never been fed supplements (1.37 versus 1.02 kg/wether.day, $P < 0.001$). Experiment 2, tested the correlation (repeatability) of the feeding performance of batches of Merino wethers taken at intervals of three weeks and six months from 11 properties. The percentages of sheep from the various farms which did not eat at time zero versus three weeks had a correlation coefficient of $R = 0.77$ while between zero and six months $R = 0.44$. Experiment 3 confirmed a low repeatability ($R = 0.23$) of feeding performance using batches of Merino wethers taken from another set of ten properties at an interval of six months. The experiment also confirmed the advantage of previous experience of pellets. Previously supplemented versus never supplemented groups had 5.4 compared to 9.7% sheep which did not eat on three or more out of five days ($P < 0.05$).

Keywords: live sheep exports, feeding behaviour.

INTRODUCTION

Groups of sheep from different farms vary widely in the proportion of animals which fail to eat pellets during assembly before export and this failure can increase the risk of death aboard ship (McDonald *et al.* 1987). The explanation for this variation may lie in permanent factors such as genotypic differences or differences in permanent learning (imprinting). Early exposure of lambs to different feeds, particularly in the presence of their mothers, has been shown to improve the **later acceptance** of those feeds (Green *et al.* 1984) and it is possible that this imprinting could be of value for the preparation of sheep for live export. It is also possible that factors such as differences in grazing conditions, experiences during handling, trucking or social disruptions may also affect feeding behaviour.

This paper describes three experiments designed to investigate: (i) the importance of early exposure of sheep to grain-based diets; (ii) the variation in feeding performance of sheep from different properties and the repeatability of this performance; and (iii) the value of on-farm feeding of pellets to sheep from various farms as a means of preliminary conditioning for export.

MATERIALS AND METHODS

Merino **wethers** suitable for live export in terms of live weight (group averages of 45 kg or more) and condition (score 3 or 4) were used in each experiment. **Feedlot** testing consisted of measuring feeding behaviour of individual animals using paint-soaked sponges attached to troughs to mark sheep as they reached in to eat (McDonald 1986). Individual animals were identified and paint marks recorded at a daily muster.

Pellets **were fed** in troughs in all experiments: ad libitum in experiment 1, and at 1 **kg/wether, offered once daily, in** experiments 2 and 3. In experiment 1, the pellet composition was (kg/tonne): barley grain 410, oat grain 50, wheat bran 100, lupin seed 100, oat hulls 150, hay 150 and mineral and vitamin mix 40. In experiments 2 and 3 the composition was: hay 550, barley grain 100, lupin seed 250, bran 50 and mineral and vitamin mix 50. The yards **were** bare of vegetation and the sheep were stocked at 20, 6 and 8 **m²/sheep** for experiments 1, 2 and 3 respectively. Observations during lot feeding ran for 12 days in experiment 1, four days in experiment 2 and five days in experiment 3. Specific details are given below.

Experiment 1 The experience of **wethers** with three diets was controlled from birth to 19 months of age when they were tested for feeding behaviour in a **feedlot**. The three treatments were supplements of oats, pellets or an 80:20 oat/pellet mix given either while suckling as lambs or when 18 months old, just before testing in the **feedlot**. A control group was unsupplemented. There were 90 animals (three replicates of 30) in each of the seven treatments, making 630 animals in all. The animals were prepared in the following way. A flock of 2100 mixed age ewes was divided into seven groups of 300, one month before lambing in winter 1984. Four groups were run on pasture as one mob, and each of the remaining three groups **was** fed one of the three supplements in long troughs twice weekly at a rate equivalent to 0.2 **kg/ewe.day**. Feeding continued until the lambs were four to eight weeks old. All sheep were fed oats/hay to control weight loss in autumn. When the animals were 18 months old, four groups of 90 were formed from the **wether hoggets** which had never received supplements and three groups were fed the supplements for three weeks at 1 **kg/wether.day** in troughs on dry pasture, while the fourth (control) received no supplement. All groups were tested for feeding behaviour in separate **feedlot** yards during November 1985.

Experiment 2 The feeding behaviour of **wethers** from 11 different properties was monitored in a **feedlot** during October 1985, April 1986 and May 1986. *Different sheep from each property were used at each time. (50 per group x 11 properties x 3 times, total = 1,650). In October, 50 sheep from each property were trucked to the **feedlot**, mixed and tested for feeding behaviour. Six months later, in April, a further 100 **wethers** were purchased from the same farmers. Fifty **wethers** were immediately removed and tested in the **feedlot** (April) with the remaining 50 being held on each farm for an additional three weeks before testing (May). Although the sheep used in April and May were from the same farms as those used in October, **many of** them were born a year earlier. The various farm groups **used in** October were born from 1980 to 1984 while those used in April and May were born from 1981 to 1984..

Experiment 3 One hundred sheep were obtained from each of 10 farms. These were divided into two groups of 25 and one group of 50. **The two** groups of 25 were grazed separately for one week during which one group from each farm was **supplemented with** pellets while the other group **was** unsupplemented. The supplement was given daily in troughs at 0.2 kg/wether. These groups of 25 were then mixed **and tested in** the **feedlot** (December 1986). The remaining

groups of 50 from each farm were agisted in 10 separate groups at a research station for six months to provide a common environment prior to testing. Then, as in December, they were divided into groups of 25 and given one week's grazing either with or without supplementation with pellets before testing in a feedlot.

RESULTS

Experiment 1 There was no significant effect of previous exposure on the percentage of sheep marked during the feedlot period. Apart from day 1 in the feedlot, when some pens had low percentages marked, high percentages of sheep were marked each day (87-100%).

Feed intakes over the first five days of feeding were 35% higher in sheep with previous experience of supplements compared with controls (1.37 versus 1.02 kg/wether.day, $P < 0.01$, treatments pooled). The effect of type of supplement was non significant (1.32, 1.43 and 1.36 kg/wether.day for oats, pellets and oat/pellet mix respectively) as was the effect of the age when supplements were first given (1.29 versus 1.44 kg/wether.day for supplementation as lambs versus hoggets). After day five, treatment differences in intakes were not significant.

Experiment 2 The relationships between the percentages of sheep which were marked on at least one of the four days in the feedlot are shown in Figure 1 for the May 1986 versus April 1986 (three week interval) and May 1986 versus October 1986 (six month interval) comparisons respectively. There was a high correlation for the three week comparison ($R = 0.77$, $p < 0.01$, Fig. 1a) and a low correlation ($R = 0.44$, N.S., Fig. 1b) for the six month comparison. The comparison over the 5 month interval of April versus October also had a poor correlation ($R = 0.45$, N.S.).

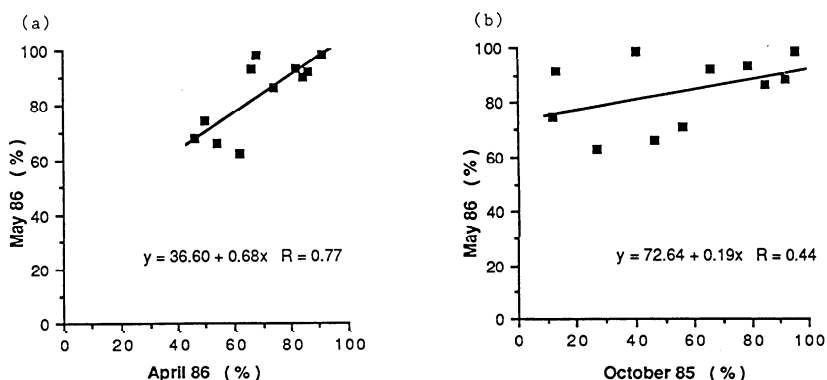


Fig. 1 Repeatability (correlation) of the per cent sheep marked at feed troughs on at least one of the four days spent in a feedlot using successive groups of wethers from 11 properties tested before and after (a) a three week interval (April and May 1986) and (b) a six month interval (October 1985 and May 1986).

Experiment 3 All pellets were eaten each day in both the December and July tests. The means (and ranges) for the percentages of sheep from the different farms which failed to be marked on three or more of the five days of lot feeding were 8.8 (0 - 24) and 5.2 (0 - 12) for the unsupplemented versus supplemented groups in December 1986, and 10.6 (0 - 20) versus 5.6 (0 - 16) for

the respective groups in July 1987. The performance of the lines of sheep in July versus December was poorly correlated ($R = 0.25$ for the unsupplemented groups and $R = 0.22$ for the supplemented groups).

When the results for the December and July tests were pooled, the supplemented versus unsupplemented groups had means of 5.4% and 9.7% sheep not marked on three or more days ($p < 0.05$).

DISCUSSION

The fact that sheep in experiment 1 with previous experience of supplements ate 35% more than unsupplemented groups over the first five days supports the findings of Green *et al.* (1985). However, the intake data showed no advantage of exposing the sheep to the supplements as unweaned lambs versus at 18 months of age. In fact, the groups exposed as unweaned lambs tended to have fewer sheep marked on the first day. This suggests that on-farm exposure to such feeds may be more effective when given immediately before export rather than earlier in life. However, as lambs are normally more sensitive to learning than adults, it is possible that they could be trained with use of less feed and hence at lower cost.

The benefit of previous experience of feeds was again confirmed using the 20 groups of sheep in experiment 3 where, overall, those groups previously supplemented had 44% fewer sheep not marked on three or more days in the **feedlot** compared with unsupplemented groups. More work is required to test whether on-farm feeding improves feeding performance to the extent that deaths and liveweight loss during export are reduced.

In experiment 2, the low repeatability of the feeding performance of the various lines of sheep for the six month comparison versus with the three week comparison suggests either that repeatability decreases with time or that sheep from different **groups** on the same farms differ in feeding behaviour. However, experiment 3 used batches of sheep from the same original flocks and confirmed a low repeatability of feeding performance over a six month comparison. This indicates that the influences of genotype and previous management conditions of the sheep in experiment 3 were not consistent after six months **agistment** on a common property.

It is concluded that, although the feeding behaviour of sheep from **different** properties is variable and not repeatable when tested in feedlots, improvements can be made by prior exposure of sheep to pellets, a pellet/oat mix, or oats.

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