

LAMB PERFORMANCE IN FEEDLOTS

G.J. TOMES* and J.E. DYMOND*

Summary

In two trials in the West Australian wheatbelt, crossbred lambs, confined in open air feedlots, were fed diets with varying sources and levels of nitrogen and energy. Lupin and Starea supplementation produced better growth rates than unsupplemented and urea-supplemented diets. No appreciable differences in carcass quality were obtained with any treatment.

I. INTRODUCTION

The intensive feeding of lambs is accepted overseas but is usually not economic under Australian conditions (Pearce, 1972). Daily live-weight gains exceeding 500g and feed conversion ratios (dry matter intake:liveweight gain) in the region of 1 - 1.4 : 1 were recorded with crossbred lambs in trials using high energy and protein liquid diets (Walker, Cook & Jagusch 1967; Hodge, 1971). When solid diets based on cereal grain and protein supplements were used in experiments, daily gains rarely reached 400g and feed conversion ratios were around 2.3 - 2.8 : 1 during the fattening period from 15-40kg (Ørskov et al. 1971; Fraser & Ørskov, 1974). This very satisfactory performance is usually halved in commercial feedlots. (MLC 1971).

In one survey carried out in the Northam-Meckering area (1973), we found that several farmers used grain as a supplementary or even total diet when finishing or holding lambs in anticipation of better prices. On the basis of limited information recorded in our survey, we estimated that daily gains of approximately 100g/day and feed conversion ratios between 10:1 and 12:1 are usual in these operations. Survey data also revealed a very low usage of various nitrogen supplements and diets usually had lower protein levels than those considered for growing lambs. (NRC 1964, ARC 1965, Ørskov 1973).

While cereal grain based diets containing 1.5 - 1.8%N can in some cases, be sufficient for mature sheep, they cannot satisfy the protein requirements of fast growing lambs. The suitability of various protein supplements for intensive lamb production has been investigated mainly in the U.K. where white fish meal and soybean meal supplements are preferred. As the use of these supplements is not economically feasible under local conditions, we investigated the performance of lambs on diets supplemented with three available N supplements (lupins, urea, Starea) in two trials during October - December periods in 1973 and 1974.

* Muresk Agricultural College, Northam, W.A.

+ STAREA is a proprietary product produced by mixing finely ground grains with a non-protein nitrogen source such as urea. This material is processed by passing it through a cooker-extractor under moisture, temperature and pressure conditions that cause the starch to gelatinize.

II. MATERIALS AND METHODS

Experiment 1

One hundred and sixty crossbred lambs (Border Leicester X Merino) of similar age and bodyweight ($24.4 \pm .31\text{kg}$) were fed on a diet of oats straw with increasing proportions of barley. After 14 days of conditioning, when levels of ground barley reached 80%, 105 animals were allocated to seven treatments (3 replicates of 5 lambs were used per treatment) and fed the rations shown in Table I. These diets were fed for 29 days ad lib and amounts of feed consumed by each group were recorded daily. All animals were weighed on four occasions (prior to conditioning, prior to experiment, after 15 days on tested rations, and on completion of trial) after being starved of food and water for 24 hours.

TABLE I

Composition of diets used in Experiment 1

Diet No.	N%	Component %			
1. (Control)	1.46	Basic Mix*	88	2	MVS**
2. (Lupins)	2.08	B.M.	75	23	Lupins 2 MVS
3. (Lupins)	2.56	B.M.	56	42	Lupins 2 MVS
4. (Urea)	2.08	B.M.	96.5	1.5	Urea 2 MVS
5. (Urea)	2.56	B.M.	95.5	2.5	Urea 2 MVS
6. (Starea)	2.08	B.M.	92	7	Starea 2 MVS
7. (Starea)	2.56	B.M.	86	12	Starea 2 MVS

* Basic Mix: Barley 80%, Straw 20%.

** Mineral-vitamin supplement included in all diets.

NaCl	35.0%	S	1.0%	Mo	100ppm	I	80ppm
P ₂ O ₅	22.5%	F	.5%	Co	150ppm	Zn	150ppm
CaO	28.0%	Fe	.2%	Se	40ppm		
ROVIMIX	1.2%	Cu	.1%	Mn	250ppm		

Experiment 2

For this trial we used Merino-Southdown cross lambs, 12-14 weeks old ($22.1 \pm .28\text{kg}$). As it was our intention to evaluate the performance under commercial conditions, no period of conditioning was allowed and lambs were fed diets with 2.56%N and various levels of energy for 39 days. Three replicates of 7 lambs were used per treatment. Treatments for this trial are shown in Table II. All rations were in pelleted form and contained the whole grain in an attempt to avoid the soft fat syndrome. (Ørskov, Fraser & Gordon, 1973). As there is some evidence suggesting that the heat treatment improves the efficiency of feeding (Schock, 1973) all rations (apart from control) were pressure cooked at 300°C for approx. 2 minutes prior to pelleting.

Lambs were starved of food and water for 24 hours and weighed three times (prior to experiment, after 18 days, and on completion of the trial). As in the previous trial all diets were offered ad lib and daily consumptions recorded. All animals used in both trials were slaughtered

and their carcasses graded using W.A. Lamb Marketing Board Grading System.

TABLE II

Composition of diets used in Experiment 2

Diet	1 Control	2	3	4	5	6	7
Barley %	68	55	36	68	46	83	57
Straw %	17.5	30	20	17.5	11	4	3
N supplement%	12.5	13	42	12.5	41	11	38
	Starea	Starea	Lupins	Starea	Lupins	Starea	Lupins
MVS*%	2	2	2	2	2	2	2

*Composition of Mineral-vitamin supplement is presented in TABLE I.

III. RESULTS

Results of 1973 and 1974 trials are presented in Tables III and IV respectively.

TABLE III*

Lamb performance in Experiment 1

Diet No	1	2	3	4	5	6	7
Mean L.W. gain (g/day).	99 ^a	243 ^b	242 ^b	157 ^c	153 ^c	177 ^d	181 ^d
Feed conversion Ratio	7.43 ^a	3.54 ^d	4.05 ^{cd}	6.69 ^a	6.26 ^{ab}	5.31 ^{bc}	5.00 ^{bc}

TABLE IV*

Lamb performance in Experiment 2

Diet No	1	2	3	4	5	6	7
Mean L.W. gain (g/day).	91	68	209 ^a	132	206 ^a	114	201 ^a
Feed conversion Ratio	7.24	9.47	4.51 ^a	5.78 ^b	3.98 ^a	5.84 ^b	4.50 ^a

During the conditioning in Experiment 1 and in the first two weeks of Experiment 2 we recorded a substantial loss of weight in nearly 90% of all animals. The voluntary intake increased significantly in all groups as the trials progressed. The diets containing sweet lupins were accepted most readily, while there was a delay of approx. 10 days before the consumption of diets with Starea component reached a similar level.

Consumption of diets containing urea and no N supplements did not at any time exceed 80% of the diets with the two previously mentioned N supplements. In both trials the form of N supplement had a major effect of performance, while the levels of N and energy used in this study had

*Means on the same row not having the same superscript are different (P<.05)

only marginal effects. No serious health problems, apart from the dust irritation, were recorded during the trial and only two and three animals died in Experiment 1 and 2 respectively.

IV. DISCUSSION

Lupins and Starea are suitable supplements for fattening of young lambs. Starea can be recommended only when feeding of longer duration is envisaged, as there is likely to be a period of adjusting to this feed. Sheihzadeh and Harbers, (1974) reported similar performance in lambs fed soybean meal or Starea supplemented diets while in our trials, sweet lupins always produced better results. Low palatability appears to be the major problem associated with using urea as an N supplement in lamb feedlots. There was no difference in yield and grading of similar size carcasses, but soft subcutaneous fat was recorded in Experiment 1 on some carcasses in all treatments. Pressure cooked diet used in Experiment 2 produced better results than the control. Daily gains of over 200g and feed conversion ratios of about 5:1 can be expected when barley based diets with lupins and 20-25% of straw are used in commercial situations. This can be further improved when more suitable breeds or crosses are used and when the shy-feeders (up to 15% in our experiments) are identified early and removed to be finished later when suitable pasture is available.

Lupin supplemented feeds, the most economically viable of the rations under the present price structure in W.A. are likely to generate profits only under specifically favourable market conditions. These conditions arise when lamb prices are high (such periods tend to be short-lived and occur at different times from season to season) and when feed costs are no more than 10% of lamb carcass returns.

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VI. REFERENCES

- AGRICULTURAL RESEARCH COUNCIL (1965) "Nutrient Requirements of Livestock-No. 2 Ruminants", A.R.C.: London.
- FRASER, C. and ØRSKOV, E.R. (1974). Animal Production, 18:75.
- HODGE, R.W. (1971). Ph.D. Thesis, University of Melbourne.
- MEAT AND LIVESTOCK COMMISSION (1971). Sheep Improvement Service Report No. 2.
- NATIONAL RESEARCH COUNCIL (1964). "Nutrient Requirements of Sheep". N.R.C.: Washington.
- ØRSKOV, E.R., FRASER, C., GILL, J.C., and CORSE, E.L. (1971). Animal Production, 13:485.
- ØRSKOV, E.R., FRASER, C., and GORDON, D. (1973). Research in Veterinary Science, 14:110.
- ØRSKOV, E.R. (1973). World Review of Animal Production, 3:58.
- SCHOCK, R.C. (1973). Proceedings Australian Stock Feed Manufacturers Conference, 2: 14.
- PEARCE, G.R. (1972). Australian Meat Research Committee Review, 6:1.
- SHIEHZADEH, S.A., and HARBERS, L.H. (1974). Journal of Animal Science, 38:206.
- WALKER, D.M., COOK, L.J., and JAGUSCH, K.T. (1967). The British Journal of Nutrition, 21:275.