

EFFECTS OF WEIGHT LOSSES ON GROWTH RATES AND
FEED CONVERSION EFFICIENCIES DURING RECOVERY OF
CORRIEDALE WETHERS

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Summary

The feed conversion efficiencies (FCE) and growth rates (GR) of Corriedale wethers on four different treatments; viz, continuous growth and three different weight loss - recovery paths were initially greater in those treatments in which weight loss occurred. The magnitude of liveweight loss had a greater influence than the rate of weight loss on subsequent FCE and GR during recovery.

I. INTRODUCTION

Variation in feed quality and quantity both within years and between years commonly occurs in Southern Australia. These variations cause liveweight fluctuations which range considerably in magnitude and duration. At present, little is known about the effects of such fluctuations on growth rates and feed conversion efficiencies.

This experiment reports the effects of various growth paths on recovery growth rates and feed conversion efficiencies in Corriedale wethers. The growth patterns followed in this experiment are representative of the range likely to occur under the varied field conditions in Australia.

II. MATERIALS AND METHODS

(a) Animals and their treatment

Forty-one Corriedale wethers of similar liveweight, selected from a commercial flock, were individually penned and fed a pelleted ration.**

There were four treatments, with 11 sheep in Group I and ten sheep each in Groups II, III and IV. One sheep each from Groups III and IV refused feed, and were removed. The results from these two animals are not included.

By controlling feed intake during the weight loss period, the sheep followed the planned growth paths shown in Figure I. Group I was the control group (AD:continuous growth). Groups II and III lost 20.6% of body weight at different rates and, when fed ad libitum, followed the recovery paths EF and GH respectively. Group IV lost 35.0% of body weight at the same rate as Group II and followed the recovery path JK. Sheep were slaughtered at regular intervals along each growth path, the number left within each 5kg liveweight range being shown in Table I. Slaughter data will be reported elsewhere.

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** Barastoc Sheep Cubes: 15% crude protein, 11% crude fibre,
Supplied by Barastock Products, 461 Bourke Street, Melbourne, 3000.

Dry matter intakes for individual sheep were recorded daily, liveweight was recorded twice weekly. No fasting period before weighing was imposed because this would have disturbed the planned growth paths.

Fleece-free liveweights were calculated using a sequential mid-side patch sampling technique (Moule 1965) to determine wool growth.

(b) Statistical analyses

Feed conversion efficiency was defined as kilograms change in fleece-free liveweight per kilogram dry matter intake.

To compare treatment effects upon both GR and FCE, group means were determined over 5.0kg intervals throughout the liveweight range of the experiment. Within each interval, t- tests were used to test differences between means. Where variances of the means were significantly different a non-parametric test was used (Sokal and Rohlf, 1969).

III. RESULTS AND DISCUSSION

(a) Growth rates

The GR of all groups decreased as liveweight increased (Table I). Similar changes were observed by Winter (1973).

TABLE I
Mean growth rates* of control (Group I) and treatments (Groups II, III and IV) during the recovery period. Growth rates calculated over 5kg intervals of fleece-free liveweight)

Weight Range (kg)	Group			
	I	II	III	IV
30.0 - 34.9	139 ^a	251 ^b	255 ^{ab}	239 ^b
SE	15.1	21.5	89.6	30.9
n	8	7	6	6
35.0 - 39.9	137 ^a	214 ^b	163 ^c	282 ^b
	11.2	39.9	20.7	32.3
	8	7	6	6
40.0 - 44.9	129 ^a	98 ^b	134 ^a	185 ^c
	21.7	31.0	34.3	34.5
	8	5	4	4
45.0 - 49.9	75 ^a	117 ^b	86 ^a	182 ^c
	15.2	25.6	15.5	34.2
	8	5	4	4
50.0 - 54.9	97	88	76	102
	15.5	17.9	27.1	27.1
	5	3	2	2

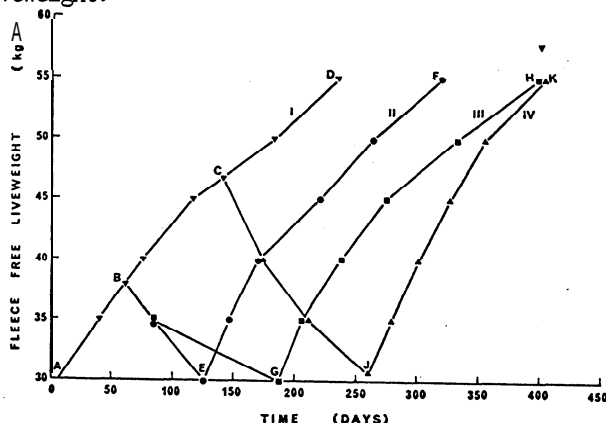
abc Values on the same line with different superscripts differ significantly at P<0.05.

* g/day

During the 30.0 - 34.9 kg increment of the recovery phase (Table I, Fig.1) Groups II (EF), III (GH) and IV (JK) all had GR higher than Group I (AB); however, only groups II and IV were significantly greater. In the 35.0 - 39.9 kg weight range all treatment groups had significantly higher GR than Group I while Groups II and IV were also significantly higher than Group III.

Although the recovery GR of Group IV was consistently higher than that of all other groups, above 50kg there was no significant differences between groups. The recovery growth paths of Groups II (EF) and III (GH) were not significantly different although the rates of loss from the same initial liveweight B were different. Compensatory effects were shown up to 40kg liveweight (Wilson and Osbourn, 1960). The net result was that Groups II and III both took c. 80% of the time required by Group I to growth from 30 - 50 kg liveweight.

Fig. I
Growth paths.



It may be concluded that the two rates of liveweight loss imposed from 37.8 - 30.0 kg had similar effects upon the recovery growth rates.

Where the same rate of liveweight loss was imposed on two groups of sheep with initially different liveweights (Groups II and IV, pathways BE and CJ, respectively) both groups showed enhanced growth rates compared to Group I. Group IV (JK) maintained a significantly higher GR to 50 kg and Group II (EF) to 40 kg, when compared with Group I. The results indicate that the greater the proportion of liveweight lost, the longer the period of compensatory growth with ad libitum feeding. Group IV required 54% and Group II c. 80% of the time required by Group I to grow from 30 - 50 kg, while Group IV reached 50 Kg 6 weeks earlier than Group II.

When considering recovery growth rates of sheep, the magnitude of weight loss was apparently a more important factor than the rate of liveweight loss.

(b) Efficiency of feed conversion

As liveweight increased, FCE decreased for all groups (Table 2). In the 30.0 - 34.9 kg increment of recovery, all treatment Groups had higher FCE than Group I: Groups II and IV were significantly greater. This increased FCE of treatment groups was maintained during the 35.0 - 39.9 kg increment with Group IV being significantly greater. Above 40 kg only Group IV had a significantly greater FCE than Group I, in the 45.0 - 49.9 kg range.

Rate of body weight loss did not appear to have any differential effect on subsequent FCW; i.e. differences between Groups II and III were not significant. However, the rate of liveweight loss may influence the total dry matter intake required to reach a particular weight; the longer the loss phase, the greater the maintenance requirements. During their weight loss - recovery periods to 50 kg Groups II and III required 91 and 96% respectively of the total feed required by Group I (ABCD).

TABLE 2
Feed conversion efficiency of control (Group I) and of treatments
Groups II, III, IV) during the recovery period (Efficiencies"
calculated over 5 kg intervals of fleece-free liveweight)

Weight Range (kg)	Group			
	I	II	III	IV
30.0 - 34.9	0.134 ^a	0.286 ^b	0.302 ^{ab}	0.337 ^b
SE	0.0107	0.0248	0.0959	0.0447
n	8	7	6	6
35.0 - 39.9	0.124 ^a	0.185 ^{ab}	0.163 ^{ab}	0.230 ^b
	0.0293	0.0188	0.0173	0.0258
	8	7	6	6
40.0 - 44.9	0.108	0.086	0.114	0.148
	0.0132	0.0162	0.0268	0.0222
	8	5	4	4
45.0 - 49.0	0.068 ^a	0.101 ^a	0.090 ^a	0.140 ^b
	0.0077	0.0169	0.0108	0.0209
	8	5	4	4
50.0 - 54.9	0.082	0.113		0.096
	0.0142	0.0816		0.0114
	5	3		2

* Efficiencies: kg fleece-free liveweight/kg dry matter intake.

ab Values on the same line with different superscripts differ significantly at $P < 0.05$.

For Groups II and IV the results indicate that FCE during recovery growth was affected by the magnitude of weight loss. Although FCE of Groups II and IV did not differ significantly except in the 40.0 - 49.9 kg range the recovery path of Group IV was more efficient than that of Group II. Group XV required 39% and Group II c. 90% of the total feed required by Group I to reach 50 kg. The greater efficiency of Group IV was maintained over the entire weight loss - recovery path.

It is concluded that the magnitude of weight loss was an important factor in influencing the FCE of the sheep during recovery growth.

This experiment indicates that growth rate and feed conversion efficiency during recovery after weight loss were more affected by the magnitude than the rate of weight loss. Sheep which suffered the greater weight loss, recovered more rapidly and made greater gains per kilogram of feed intake.

IV. ACKNOWLEDGEMENTS

The assistance given in the care and slaughter of the sheep by Mr D. Whitfield and Mr R. Thomas is gratefully acknowledge. This work was supported by a grant from the Australian Meat Research Committee.

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