Effect of shearing on meat and wool production from lambs reared on hill country

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ABSTRACT

Three hundred Romney, Coopworth and Perendale wether lambs reared at the Whatawhata Hill Country Research Station were shorn in either December and April, February and April or only in April before slaughter in May and either well or poorly fed between December and May. Shearing did not affect carcass weight, GR fat depth or export fatness grade. Lambs shorn in December grew most clean wool. Well-fed lambs had a heavier, fatter carcass with more graded P. There was no interaction between shearing treatment and level of feeding.

The trial was repeated on 11 commercial hill country farms in the northern half of the North Island using 150 lambs/farm. On 1 farm, where average growth rate exceeded 200 g/d, there was a positive effect on carcass weight from shearing lambs twice before slaughter. On all other farms (growth rates less than 150 g/d) there was no effect (9 farms) or a negative effect (1 farm) on carcass weight from shearing lambs at weaning. Export fatness grade was unaffected by shearing treatment. Wool production was unaffected by shearing treatment for 6 farms, greatest for 2 farms when shorn in December and April and greatest for 1 farm when shorn in February and April. Total net returns from meat and wool for the farm with the fastest growth rate were unaffected by shearing treatment. Total net returns for all other farms were greatest for the group shorn once prior to slaughter.

Seventy-four wether lambs and 105 ewe lambs were shorn either 3 weeks, 24 hours, or left unshorn before slaughter. Shearing treatment did not affect carcass weight, GR fat depth, export fatness grade or muscle pH.

Keywords Shearing; carcass weight; GR fat depth; export fatness grade; wool production

INTRODUCTION

It is common practice for export lambs on North Island hill country to be shorn once, and often twice, before slaughter. Despite the general acceptance of the practice there are only limited published data on production responses from different shearing regimes. Wallace (1960) and A. H. Kirton and J. N. Clarke (pers. comm.) have shown an increase in carcass weight of well-fed lambs at Ruakura that were shorn post-weaning compared with lambs that were not shorn. No comparative wool growth data are available. There are no published data for production responses to shearing export lambs on hill country.

This paper reports data obtained in the summer and autumn of 1982-83 on the effect of 3 shearing regimes on carcass weight and wool production from export lambs reared on hill country at 12 localities in the northern half of the North Island. The direct effect of shearing 3 weeks and 24 hours before slaughter on some carcass characteristics is also reported.

EXPERIMENTAL

Trial Design

Trial 1.

In a $3 \times 3 \times 2$ factorial trial, 100 wether lambs of each of the Romney, Coopworth and Perendale breeds at the Whatawhata Hill Country Research Station were shorn in either December (weaning) and April, February and April or only in April and offered a pasture allowance of either approximately 100 or 50 g DM/kg live weight/d between weaning and slaughter in May.

Trial 2.

One hundred and fifty wether lambs on each of 11 commercial farms in Taranaki, Northland, Bay of Plenty and Central Volcanic Plateau (Table 2) were randomly allocated to be shorn in either December (weaning) and April, February and April or in April only. Because of unusually dry conditions, trial lambs in flocks 9 and 10 were slaughtered prematurely in March. All other lambs were slaughtered between late April and early June.

Trial 3.

Half of a group of 74 Suffolk $\times$ Coopworth wether lambs reared at Ruakura Agricultural Research Centre and shorn at weaning (November) were reshorn in May. All lambs were slaughtered 3 weeks later.

Trial 4.

One hundred and five Romney ewe lambs reared at

Whatawhata Hill Country Research Station and previously shorn at weaning (December) were shorn either 3 weeks or 24 hours before slaughter in July.

General Management

Within each trial and/or property, all lambs were treated monthly with anthelmintic and except for Trial 1, grazed together at all times. Lambs in Trials 1 and 2 which were not shorn in December were crutched and dipped at weaning as a precaution against flystrike.

Measurements

Trial 1 and 2 lambs were weighed before the December and February shearing and after the April shearing. All lambs were weighed within 24 hours of slaughter. Individual carcass weight (hot weight less 4.5%) and export fatness grade were recorded for Trials 1, 3 and 4 and for 4 farms in Trial 2. Data on export fatness grades, pooled within-shearing treatment, were available for the remaining 7 farms in Trial 2. GR fat depth was measured over the 12th rib 11 cm from the midline for Trials 1, 3 and 4 and pH of the loin muscle was recorded for Trials 3 and 4. In Trial 2, net meat returns were calculated on the 1982-83 average schedule price with allowance for wool pull less New Zealand Meat Board levy and 50¢ freight deduction.

Individual fleeces were weighed at each shearing in Trials 1 and 2. In Trial 2, 100 g 'grab samples' were taken from each line of body and oddment wool at each shearing and assessed for New Zealand Wool Board type number and yield. Wool was valued at the 1982-83 average price for each type plus 20.9% SMP (weighted seasonal average) less 4% Wool Board levy and selling charges. Costs of shearing, crutching and dipping were assumed to be $1, 30¢ and 25¢/lamb.

RESULTS AND DISCUSSION

Mean initial live weight of Trial 1 lambs was 25.8 ± 3.9 kg with a mean pre-slaughter live weight of 29.4 ± 5.0 kg. Shearing had no effect on carcass weight, GR fat depth or total wool shorn from the lambs (Table 1). The lambs first shorn in December grew more clean wool than the other 2 groups. Improved feeding increased carcass weight, fat depth and total clean wool. There was no interaction between shearing treatment and level of feeding. The Coopworth and Perendale carcasses were heavier than the

TABLE 1 Least squares estimates of meat and wool measurements adjusted for age of dam and rearing rank, Trial 1.

Treatment	Carcass weight (kg)	GR fat depth (mm)	Total clean wool (kg)
Breed:			
Romney	12.2	3.7	1.78
Coopworth	13.7	5.5	1.75
Perendale	13.4	4.5	1.55
SED	0.3	0.4	0.06
Shearing times:			
Dec/April	13.1	4.5	1.77
Feb/April	13.3	4.6	1.69
April	12.8	4.5	1.61
SED	0.3	0.3	0.06
Allowance:			
High	15.1	6.4	1.93
Low	11.0	2.6	1.45
SED	0.2	0.5	0.05
Breed effect	***	***	***
Shearing effect	NS	NS	*
Allowance effect	***	***	***

TABLE 2 Least squares estimates of weight of carcass (kg) and total clean wool (kg) on 11 farms, Trial 2.

Farm No.	Locality	Breed[1]	Carcass				Wool			
			D/A[2]	F/A	A	Shearing effect	D/A	F/A	A	Shearing effect
1	Hawera	P	13.7	13.6	14.0	NS	2.70	1.69	1.53	*
2	Stratford	R	12.2	12.1	12.1	NS	1.88	1.98	1.92	*
3	Inglewood	R	13.1	12.8	12.9	NS	1.85	1.97	1.91	NS
4	Urenui	R	15.4	15.3	14.9	NS	2.14	2.34	2.11	*
5	Wellsford	C	11.2	11.5	11.5	NS	1.59	1.63	1.53	NS
6	Warkworth	P	13.4	13.3	13.3	NS	1.52	1.38	1.33	*
7	Warkworth	R	14.5	13.8	14.1	NS	2.04	1.94	1.96	NS
8	Te Puke	R	11.7	11.1	11.1	NS	1.79	1.71	1.72	NS
9	Reporoa	R	12.4	13.0	13.1	*	...	...	...	NA[3]
10	Ngongotaha	C	14.1	13.9	14.0	NS	...	...	...	NA[3]
11	Whakamaru	R	18.0	17.4	16.3	***	1.87	1.97	1.91	NS

[1] P = Perendale; R = Romney; C = Coopworth.
[2] D/A = Shorn December, April; F/A = Shorn February, April; A = Shorn April.
[3] Not applicable as slaughtered woolly.

Romney, with the Coopworth having the greater GR fat depth and the Romney the least. The high allowance Coopworths had a greater fat depth than the other 2 breeds. The Coopworth and Romney had heavier fleece weights than the Perendale. Export fatness grading was similar between breeds and shearing treatments. Forty-six percent more high plane than low plane lambs were graded P.

Mean initial live weight within individual farms in Trial 2 varied between 20.9 ± 2.5 kg (farm 10) and 26.2 ± 2.3 kg (farm 7). Growth rates attained in the early summer were not maintained through the late summer-early autumn period on any farm. Mean growth rates during December to February ranged from 41 g/d (farm 7) to 255 g/d (farm 11) while growth rates during February to April ranged from −10 g/d (farm 5) to 152 g/d (farm 11). Mean pre-slaughter live weight varied between 26.0 ± 2.8 kg (farm 8) and 39.3 ± 4.0 kg (farm 11). Shearing treatment did not affect carcass weight on 9 of the 11 farms (Table 2). On farm 9 the December/April group was lighter than the other 2 groups while on farm 11 the December/April group was heavier than the February-/April group, which was in turn heavier than the April only group. Flock 11 achieved the fastest growth rate throughout at 201 g/d. All other flocks averaged between 40 g/d and 150 g/d between December and April.

The proportion of carcasses in each export fatness grade was unaffected by shearing treatment on any farm. Wool production on 6 of the 9 farms where wool data were available was unaffected by the shearing treatment, 2 showed a decline in wool production (farms 1 and 6) as shearing was delayed, while on the other farm (farm 4) most wool was grown by the group shorn in February and April.

Lambs shorn once only in April consistently showed the highest net wool returns with the lambs shorn in December and April generally showing a higher return than those shorn in February and April (Table 3). Although the differences in net wool returns between the 3 treatment groups were due in part to different shearing and flystrike prevention costs there were also differences in average prices for the wools shorn from each group. Lambs wool received a premium for length commensurate with the premium for length applicable to hogget and mature wool (Wiggins and Beggs, 1979). On all except farm 11 total net returns (meat and wool) were highest for the lambs shorn once before slaughter. These were all farms where reduced pasture availability during summer limited lamb growth rate. On farm 11 where a good lamb growth rate was maintained during the summer the highest net return was obtained from shearing in early December and again before slaughter.

TABLE 3 Net returns ($/lamb) from carcass and wool on 9 farms, Trial 2.

Farm[1] No.	Carcass			Wool		
	D/A[2]	F/A	A	D/A	F/A	A
1	20.53	20.49	21.44	4.43	3.93	4.69
2	17.89	18.03	17.91	4.86	4.98	6.11
3	20.12	19.27	19.14	4.52	5.04	5.95
4	23.67	24.46	22.72	5.62	5.64	6.66
5	16.53	17.11	16.92	3.78	3.59	4.50
6	20.61	20.24	20.18	3.48	2.70	3.94
7	22.23	21.49	21.79	5.03	4.43	6.49
8	17.22	15.95	15.87	4.32	3.53	5.75
11	26.64	25.99	24.79	4.53	4.46	6.18

[1] Farms 9 and 10 omitted as slaughtered woolly.
[2] D/A = Shorn December, April; F/A = Shorn February, April; A = Shorn April.

In both Trial 3 and Trial 4 gross tissue deposition, as indicated by carcass weight, GR fat depth and export fatness grade, was unaffected by shearing either 3 weeks or 24 hours before slaughter. Similarly the pH of the loin muscle showed no indication of stress, sufficient to affect meat quality, having resulted from shearing either 3 weeks or 24 hours before slaughter. Mean carcass weight, GR fat depth, proportion of carcasses graded P and pH of the loin muscle were 15.1 ± 1.1 kg, 9.8 ± 2.7 mm, 81% and 5.62 ± 0.13, and 14.3 ± 1.9 kg, 5.7 ± 2.7 mm, 14% and 5.53 ± 0.09 respectively in Trial 3 and Trial 4.

Current wool price support schemes encourage farmers to shear export lambs prior to slaughter. These trials have shown shearing export lambs to have no short-term but a limited longer-term effect on economically important carcass attributes. Shearing hill country lambs growing at less than approximately 150 g/d only once close to slaughter in the autumn has been shown to have no effect on growth rate but to result in consistently higher total net meat and wool returns compared with shearing lambs twice during the summer and autumn. Where lambs were growing in excess of approximately 200 g/d a growth rate response resulted from shearing early in the summer. The resultant increased net meat returns were however partly offset by decreased net wool returns compared to the once-shorn wool.

Shearing is clearly not an effective management strategy to improve the growth rate of hill country lambs on most farms.

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