An alternative hogget-two tooth shearing policy for summer-dry regions in New Zealand.

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ABSTRACT

The policy on most New Zealand sheep farms is to pre-tup shear two tooths in late February/early March two to four weeks prior to mating. However, in summer-dry regions, where feed supplies are typically low in late summer, this practice may potentially depress two tooth performance because post-shearing increases in feed requirements cannot be met. An alternative hogget-four tooth shearing arrangement which does away with late summer/autumn two tooth shearing has therefore been investigated at Massey University's "Riverside" sheep farm in the Wairarapa; a farm prone to summer droughts In trials over three years the alternative shearing arrangement was found not to disadvantage ewe liveweight gains, fertility, wool production or financial returns. In addition to reducing autumn feed requirements, earlier objective selection of flock repalcements and hogget mating are potential benefits of the alternative shearing programme. A slightly poorer spring cashflow results but otherwise management requirements are similar.

Keywords Shearing; two tooth; live weight; wool production; wool income.

INTRODUCTION

The policy on most New Zealand sheep farms is to pre-tup shear two tooths in late February-early March two to four weeks prior to mating. This shearing arrangement has primarily been derived from the results of trials conducted at Whatawhata and central North Island hill country farms by Inkster (1959), McClure (1960) and Wodzecka-Tomaszewska and Dobbie (1967), which indicated that pre-tup shearing of medium sized (38-45 kg), two tooths could increase lambing percentages by up to 25%, provided high quality finishing pastures were grazed after shearing. In contrast, it was also shown that positive fertility responses were unlikely to be obtained in small (<38 kg) and very heavy (>49 kg) two tooths or where post-shearing feed was in short supply or of poor quality for flushing.

It is for these latter circumstances that the now widespread popularity of pre-tup shearing of two tooths can be questioned. First, insufficient high quality autumn pasture is available on many farms to meet post-shearing and flushing requirements. This results in liveweight losses prior to joining, especially in summer-dry regions (Parker, 1986; McMillan and Knight, 1982). Second, even under average management a significant proportion of two tooths are likely to exceed 49 kg at mating (Parker and Townsley, 1986).

This paper presents the results of a comparison of the now conventional two tooth shearing policy with an alternative hogget-two tooth shearing arrangement that may better suit farmers in summer-dry regions.

MATERIALS AND METHODS

The trials, repeated over three years, were conducted under commercial farming conditions at Massey University's "Riverside" property, 15 km north-east of Masterton. The farm is prone to dry summer conditions and autumn pasture production is highly variable (Parker *et al.*, 1989). The shearing policy at "Riverside" for flock replacements, which was implemented first in 1978 is shown in Fig. 1 together with the alternative policy examined in the trials reported here.

Animals and Management

The first two trials commenced in May 1985 and April 1986 respectively, when 200 of the replacement Romney ewe hoggets were shorn to implement the alternative (ALT) policy. The remaining flock replacements (n>1200) were used as a control group (TRAD). Live weights from a sample (n=50) from both shearing treatments were recorded at each shearing date

TABLE 1 Summary of lamb to four tooth shearing and crutching dates

	Sheep		Shearing policy	
	Age (months)	Description	Traditional	Alternative
December	4	Lamb	Full shear	Full shear
Apr/May	10	Hogget	Full flank crutch	Full shear
Sept/Oct	13	Hogget	Full shear	Button-hole crutch
December	16	Two tooth	Button-hole crutch	Full shear
Feb/March	19	Two tooth	Full shear	Tip crutch
August	24	Two tooth	Pre-lamb crutch	Pre-lamb crutch
December	28	Four tooth	Full shear	Full shear

and at 3-8 week intervals during the rest of the year. The last recorded live weights were obtained when ewes from both treatments had been shorn at 28 months of age. Fleece weights were collected at each shearing (n=40-50). Bellies and pieces were weighed separately to determine the proportion of main-line fleece wool sold. Gross wool returns per sheep at each shearing were derived from a wool buyer's valuations for composite samples of fleece wool, and bellies and pieces. These valuations corresponded to the prices quoted at the New Zealand Wool Board auction sale immediately following shearing. The Wool Board type was quoted for each sample. Sample weights of crutchings were also recorded.

Sheep from both treatments were grazed together and received identical stock management except for the times of shearing. Rams (1/100 ewes) were introduced to the two tooths during the second week of April. Pregnancy status of all replacement two tooths was recorded at an average of 50 days of gestation by realtime ultrasound scanning (Carter, 1986). Dry ewes were subsequently sold in accordance with normal farm practice.

In the third trial in 1987, 400 first cross Border Leicester-Romney ewe hoggets were shorn in May under the alternative shearing arrangement. In addition to the measurements recorded in the first two trials, 160 ewes from each shearing treatment were set stocked separately during the period from lambing to docking. Total lambs dropped, lamb survival, ewe casting and ewe deaths were recorded in each group. At docking, 30 ewe lambs from each lambing group were tagged to monitor growth rates to weaning.

Statistical Analysis

Live weights from the two shearing policies were compared at two tooth joining and at four tooth shearing using t-tests. For each shearing policy, the sample means of the three fleece weights were assumed to estimate total wool production from lamb to four tooth shearing. Since no record of total wool production from individual animals was available, a t-test for difference in total wool production was obtained using a variance estimate from assuming the three sub-samples were independent.

TABLE 2 Fleece-corrected ewe live weights (kg) of shearing treatments at two tooth mating (April) and the final four tooth shearing in December for Romney ewes in 1985 and 1986 and for Border LeicesterxRomney ewes in 1987

	Shearing policy				
	Traditional		Alternative		Signif.of diff.[1]
	Mean	SE	Mean	SE	
1985 trial					
at 2 tooth mating	55.5	0.53	55.7	0.61	NS
at 4 tooth shearing	52.6	0.81	53.6	0.89	NS
1986 trial					
at 2 tooth mating	54.4	0.55	56.1	0.78	#
at 4 tooth shearing	53.6	1.02	55.1	0.68	NS
1987 trial					
at 2 tooth mating	63.4	0.75	65.8	0.73	#
at 4 tooth shearing	59.3	1.11	51.5	0.96	NS

[1] t-test ; #, $P<0.10$; NS, $P>0.10$

RESULTS

Live Weights and Lambing Performance

Sheep from the two shearing policies did not differ significantly in live weight at the final four tooth shearing in any year of the trials although ewes from the ALT treatment were slightly heavier each year (Table 2).

During the 1986 flushing to mating period the TRAD shorn two tooths reached the same mating live weight as their ALT December-shorn counterparts. Similar levels of barrenness but more twins (35.1 *v* 31.7%, $\chi^2 > 0.10$) were recorded in the ALT treatment at pregnancy diagnosis (Table 3).

TABLE 3 Pregnancy status (% of ewes joined) as determined by realtime ultrasound scanning, of ewes subjected to different shearing policies.

	Shearing policy	
	Traditional	Alternative
1986 lambing		
Multiple	31.7	35.1
Single	62.2	38.9
Dry	6.1	6.0
Potential lamb drop[1]	125.6	129.1
1987 lambing		
Multiple	43.8	38.5
Single	50.3	57.6
Dry	5.9	3.9
Potential lamb drop[1]	137.9	134.6
1988 lambing[2]		
Multiple	61.3	61.8
Single	37.7	37.0
Dry	1.0	1.2
Potential lamb drop[1]	160.3	160.6

[1] The small number of triplet bearing ewes were treated as twin bearing. Within-year χ^2 tests for pregnancy status were not significant.

[2] Excludes third cycle ewes (2.3% of ewes mated).

Two tooth shearing of the ALT ewes was postponed from December to January in the 1986 trial because of an early summer drought and an associated feed shortage. However, the March 1987 pre-tup two tooth shearing coincided with February-April rainfall 53% above the long-term average and hence almost ideal conditions for pasture growth (Parker *et al* 1989). High flushing liveweight gains of 288 g/d and 273 g/d respectively were obtained in ewes from the TRAD and ALT treatments. Although the TRAD two tooths were 1.72 kg lighter ($P < 0.10$) at joining, 5.3% more multiple bearing ewes were present at pregnancy diagnosis ($\chi^2 > 0.10$) (Table 3).

Autumn weather conditions again favoured the TRAD policy at the 1988 two tooth mating (February-April rainfall was 57% above normal). Nevertheless, ALT ewes grew faster (252 g/d *v* 213 g/d) during the 5-week period prior to mating and were 2.44 kg heavier ($P < 0.10$) at mating on April 14. However the potential lamb drop in both treatments was almost identical (Table 3). This was confirmed by the paddock lambing record (Table 4), which showed lower ewe losses and better lamb survival in the ALT ewes. More of the shorter woolled TRAD shorn ewes became cast over the lambing period.

TABLE 4 Paddock lambing performance, spring 1988, of different shearing groups. Figures in brackets are percentages of ewes present, except for lamb deaths, which are percentages of lambs born.

	Shearing policy			
	Traditional		Alternative	
Number of ewes	160		160	
Ewe deaths	3	(1.9)	1	(0.6)
Ewes cast	7	(4.4)	3	(1.9)
Wet dry ewes	9	(5.6)	8	(5.0)
Lambs born	220	(137.5)	223	(139.4)
Lamb deaths to docking	32	(14.5)	23	(10.3)

Average lamb growth rates to weaning (mean ± SE) in 1988 were similar in both treatments with ewe lambs from the traditional and alternative shearing treatments reaching 22.0 ±0.6 and 21.2 ±0.7 kg respectively at an average age of eight weeks.

Wool Production and Wool Returns

Total greasy wool production from lamb shearing until the four tooth main shear only differed significantly ($P < 0.10$) between shearing

TABLE 5 Greasy wool weights (kg) and gross wool values per sheep (excluding crutchings) for different shearing policies.

Trial starting	Shearing month	Shearing policy: Traditional Wool weight[1] Mean	SD	Wool value ($)	Alternative Wool weight[2] Mean	SD	Wool value ($)
May 1985	May 1985	-	-	-	1.39	0.18	5.52
	Sep 1985	2.75	0.44	9.96	-	-	-
	Dec 1985	-	-	-	3.04	0.41	11.14
	Mar 1986	2.54	0.27	9.39	-	-	-
	Dec 1986	3.05	0.43	12.00	4.17	0.50	17.15
	Total	8.34	-	31.35	8.60	-	33.81
Apr 1986	Apr 1986	-	-	-	1.43	0.29	5.21
	Oct 1986	2.61	0.28	11.66	-	-	-
	Jan 1986	-	-	-	3.14	0.42	14.58
	Mar 1987	2.33	0.28	11.42	-	-	-
	Dec 1987	3.40	0.40	14.40	4.10	0.51	17.37
	Total[3]	8.34	-	37.48	8.67	-	37.16
May 1987	May 1987	-	-	-	1.54	0.22	7.02
	Oct 1987	3.70	0.43	16.71	-	-	-
	Dec 1987	-	-	-	3.00	0.38	13.97
	Mar 1988	2.03	0.32	9.69	-	-	-
	Dec 1988	3.48	0.46	16.72	4.65	0.58	23.44
	Total	9.21	-	43.12	9.19	-	44.43

1 Weight of crutchings (May as hoggets 0.08 - 0.1 kg; pre-lamb 0.12 kg - 0.17 kg = 0.20 - 0.27 kg/sheep).
2 Weight of crutchings (September as hoggets 0.05 - 0.08 kg; pre-tup crutching 0.01-0.02 kg; pre-lamb 0.14 - 0.20 = 0.20 - 0.30 kg/sheep).
3 Total greasy wool production differed significantly between shearing treatments at the 10% level. Differences between total greasy wool production for the 1985 and 1987 trials were non-significant.

treatments in the 1986 trial when the ewes on the alternative programme produced 0.33 kg more wool (Table 5). Total weight of crutchings removed (0.20-0.30 kg/sheep) was similar for each shearing treatment. Wool production therefore corresponded to the similar patterns of liveweight gain recorded for the treatments.

Gross wool returns per sheep favoured the ALT policy in the 1985 ($2.46/sheep) and 1987 ($1.31/sheep) trials. Shearing and crutching costs were the same for both treatments. For the ALT shearing arrangement the May shorn hogget wools were 75-100 mm in length and of good colour (Wool Board type 33F2J); December shorn two tooth wools were 100-125 mm in length (37F2E) and December shorn four tooth wools were 125-150 mm in length (37F2C). All these wools were acceptable to wool buyers, although December shorn wools were beginning to show some yellow discolouration in association with the natural seasonal trend in colour (Sumner, 1983).

DISCUSSION

This series of trials has demonstrated that the alternative shearing arrangement for flock replacements did not disadvantage liveweight gains, potential lambing performance or financial returns, despite autumn pasture growing conditions favouring the traditional pre-tup two tooth shearing arrangement. Overall live weights and greasy wool production tended to be slightly higher under the alternative shearing arrangement. The pregnancy diagnosis results agree with previous publications (e.g. Wodzecka-Tomaszewska and Dobbie, 1967) which indicated that fertility responses were unlikely in two tooths exceeding 49 kg at joning.

The five week interval between pre-tup shearing and joining was sufficiently long for any shearing effects to be manifested (McMillan and Knight, 1982).

The alternative shearing policy offers a number of practical advantages. First, pre-tup shearing during dry autumns can be avoided and additional pasture which would otherwise have been used to meet increased post-shearing feed requirements (Elvidge and Coop, 1974) can be conserved or used for flushing. Second, autumn hogget shearing can be combined with hogget mating and selection programmes. Autumn shearing encourages the onset of oestrus in ewe hoggets (Gandar 1966). This will benefit lifetime productivity of these ewes and will increase returns from hogget lambs (McMillan and Parker, 1981). Advancing the alternative shearing arrangement to commence in late March-early April to accommodate May 1 hogget mating, would allow the December two tooth shearing to be brought forward to early November. This would result in an improvement in wool colour and would provide a better distribution of seasonal work than the December shearings investigated in this study.

The alternative shearing programme reduces the spread of wool sales during the year and this will affect seasonal cashflow, particularly during September-November. However, proceeds from autumn hogget shearing will compensate for the income otherwise received from the sale of pre-tup shorn two tooth wools.

In some farming environments lamb shearing at weaning can be excluded from the alternative shearing arrangement, saving the cost of one shearing. However, while this option is unlikely to affect lamb liveweight gains during summer (Sumner, 1984), there is usually a strong market for the short, white and generally finer wools produced from lambs of 8-12 weeks of age.

The mechanism by which shearing affects fertility remains unclear. The trials reported, confirm a differential response according to live weight. McMillan and Knight (1982) also indicated that two tooth fertility responses, at least in ewes of medium live weight (41-45 kg), occurred only if the shearing interval prior to joining was of at least two weeks duration. These physiological aspects merit further study.

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