Effect of different shearing policies on sheep production in Northland

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ABSTRACT

Production data was collected from 400 mixed-age breeding ewes on each of 4 farms in the Kaiwaka area for 3 years between 1982 and 1986. Half the ewes on each farm were shorn once yearly and half twice yearly. Each farm had a different time schedule. The once-yearly shorn group were shorn in either February, June, October or November and the twice-yearly shorn group shorn in October and February, December and June, February and October or May and November respectively.

Ewes second shorn in February were heavier at main shearing in October than twice-shorn ewes. Ewe live weight on the other 3 farms was unaffected by shearing treatment. Total clean wool production of twice-shorn ewes was greater than once-shorn ewes on all farms with the effect being greater following second shearing in May and October. Mean staple length of the lines of fleece wool reflected the actual interval between shearings and the seasonal wool growth cycle. Mean fibre diameter was a direct reflection of the seasonal wool growth cycle. Once-shorn wools were more discoloured than twice-shorn wools. Wools shorn between May and October were less discoloured than wools shorn between November and February. Frequency of shearing did not affect ewe survival, reproduction rate or lamb weaning weight. Average net wool returns were greater for once-shorn ewes on all farms.

Keywords Shearing; Romney; Coopworth; live weight; wool production; reproduction rate.

INTRODUCTION

In a recent survey 85% of farmers in the Kaiwaka area of Northland were shearing their ewes more than once yearly (Livingston, 1983). Reasons for their decision to shear more than once yearly were easier management, associated with ease of mustering and shepherding, less dagging and crutching with improved control of fly-strike; increased wool returns; less casting and losses; improved cash flow and depending on the timing of shearing, increased lambing performance. No objective data on the effects of once *v* twice-yearly shearing on sheep production in Northland have previously been reported.

This paper reports the comparative effects of different shearing policies on sheep production on 4 farms in the Otamatea and Rodney Counties over 3 years.

EXPERIMENTAL

Trial Design

On each of 4 farms near Kaiwaka, where twice-yearly shearing was normal practice, 400, individually identified, mixed-age ewes were randomly allocated to be shorn either once (1/S) or twice (2/S) yearly for 3 years between 1982 and 1986 (Table 1). The 2/S groups were shorn at the normal shearing times for each farm, either pre-mating and pre-weaning (farms 1 and 3) or post-mating and post-weaning (farms 2 and 4). The 1/S groups were shorn either pre-weaning (farm 1), post-weaning (farm 2), pre-mating (farm 3) or post-mating (farm 4). On each farm the 2 shearing treatment groups were grazed with the main flock throughout the year, except between lambing and weaning, when the 2 groups were separated to enable the collection of lambing data. Time and frequency of crutching was at the discretion of each farmer. Trial ewes were culled for age at approximately 5 years of age following the once-

TABLE 1 Breed and shearing time on each farm.

Farm	Breed	Shearing treatment	
		Twice-yearly	Once-yearly
1	Coopworth	February/October	October
2	Romney	May/November	November
3	Coopworth	October/February	February
4	Romney	December/June	June

once-yearly shearing on each farm and replaced by young ewes between 1 and 2 years of age.

The 4 farms were within a 7 km radius of each other, on similar terrain and soil type.

Measurements

The trial ewes on each farm were weighed at approximately 6-monthly intervals; before the 2/S group were first shorn (second shearing) and again after both groups were shorn (main shearing). Individual greasy fleece weight and mean weight of greasy crutchings were recorded for all trial ewes on each farm. The resultant lines of shorn fleece and oddment wool were sampled for objective measurement and assessed for New Zealand Wool Board type number. Price data for each of the assessed wool types were obtained from the New Zealand Wool Board.

Mean lamb weaning weight for each shearing treatment group and, where possible, the timing of ewe deaths on each farm were recorded.

RESULTS AND DISCUSSION

Mean annual rainfall in the Kaiwaka area is approximately 1500±200 mm with no defined seasonal pattern. Rainfall during the summer of 1982-83 was 70% below normal and during the summer and autumn of 1984-85 more than 75% above normal. Pasture growth rates monitored on indicator farms in the area closely reflected short term changes in rainfall pattern (D. Armstrong, unpublished).

Differences in production data between shearing treatments within farms were analysed by *t*-test. Mean differences (2/S — 1/S) for ewe live weight, fleece weight, ewe survival, reproduction rate and lamb weaning weight are given in Table 2.

Mean live weight (kg) post-main shearing on each of the 4 farms was 40.9±4.6 (October), 50.2±5.1 (November), 54.3±5.5 (February) and 43.8±5.8 (June) respectively. Farm 3 was the only farm where there was a liveweight effect attributable to shearing treatment with the 2/S ewes being heavier in February after having been second-shorn the previous October. The farmer concerned considered the principal cause of weight loss for the 1/S ewes was that they experienced mild heat stress during January and early February prior to shearing when they spent comparatively less time grazing. Lambing performance on this farm was however unaffected by shearing treatment.

Mean total greasy wool production (kg) on each of the 4 farms was 3.65±0.54, 5.08±0.77, 4.18±0.52 and 4.12±0.54 respectively. Total greasy wool production of 2/S ewes shorn in either May (farm 2) or October (farm 3) was consistently greater than that of their 1/S flock mates whereas the total greasy wool production of ewes on farms 1 and 4 was unaffected by shearing treatment. After allowance for the lower grease content of second-shear wools, the 2/S ewes on all farms grew more total clean wool than their 1/S flock mates. The absolute increase in total clean wool due to twice-yearly shearing was greater for farms 2 and 3 than for farms 1 and 4. Farms 2 and 3 were second shorn in the autumn or spring respectively, when the availability of high nutritive value pasture is generally not limiting to meet the increased feed requirements necessary to maintain body heat production following shearing (Elvidge and Coop, 1974).

Staple length, extent of discolouration and mean fibre diameter, wool characteristics important in yarn manufacture, were affected by both time and frequency of shearing (Table 3). Variation in staple length between the 2/S wools on an individual farm

TABLE 2 Mean difference (2/S-1/S)(±SE) in ewe and lamb production between twice-yearly (2/S) and once-yearly (1/S) shorn ewes on each farm.

Parameter	Farm 1	2	3	4
Live weight (kg)				
Pre-second shear	−0.8±0.6	0.3±0.6	0.1±0.6	0.6±0.8
Post-main shear	−0.9±0.5	0.7±0.6	1.4±0.6*	−0.2±0.6
Fleece weight (kg)				
Total greasy	0.04±0.06	0.23±0.08***	0.25±0.05***	−0.03±0.06
Total clean	0.21±0.06***	0.44±0.08***	0.33±0.05***	0.21±0.06***
Ewe survival				
Summer (EPM/EPL)[1]	−0.03±0.05	0.03±0.05	−0.01±0.05	0.04±0.05
Winter (EPL/EPM)[1]	0.02±0.05	0.00±0.05	0.00±0.05	0.00±0.05
Reproduction rate (LW/EPM)[1]	0.02±0.04	0.01±0.04	0.05±0.04	−0.03±0.04
Lamb wean weight (kg)	−0.5±0.5	0.4±0.5	−0.5±0.5	−0.6±0.5

[1] EPM Ewes present mating; EPL Ewes present lambing; ELP[1] Ewes present earlier lambing; LW Lambs weaned

TABLE 3 Mean wool type number and measurements for twice-yearly (2/S) and once-yearly (1/S) shorn fleece wool on each farm.

Parameter	Farm 1		2		3		4		SED
	2/S	1/S	2/S	1/S	2/S	1/S	2/S	1/S	
Type number[1]	37F30	—	37F2L	—	37F3L	—	37F30	—	—
	37F3L	37F3D	37F30	37F3D	37F30	37F4D	37F2L	37F3D	
Fibre diameter (μm)	37.3	—	38.7	—	35.1	—	34.6	—	0.6
	33.1	35.0	35.3	37.4	41.1	37.4	36.8	36.0	
CIE Y value	59	—	57	—	56	—	56	—	1
	56	54	55	54	58	53	58	52	
CIE Y-Z value	4.8	—	5.8	—	5.3	—	7.4	—	0.1
	4.7	5.6	6.2	7.6	6.0	7.9	5.6	7.1	
Staple length (mm)	68	—	96	—	96	—	84	—	6
	90	140	86	164	82	158	90	158	

[1] Type number code sequence — Diameter/Catagory/Style/Length

was a reflection of both the seasonal wool growth cycle and the actual interval between shearings. The comparative staple length of the 1/S wools was a reflection of aspects of individual farm management rather than breed of sheep. Due to the manner by which fibres associate to form staples the apparent combined length of 2/S wool exceeds that of 1/S wool. Measured staple length aligned with the Wool Board staple length classification (D = 100 – 150 mm, L = 50 – 100 mm, 0 = 50 – 75 mm). The variation in length between lines of 2/S wool allocated to similar length groups within the Wool Board classification is likely to be of limited manufacturing significance in the formation of a processing blend. 1/S and 2/S wools however have different potential end uses with a resultant significant price differential (Stanley-Boden *et al.*, 1986) which for equivalent type wools ranged from 10 to 25 c/kg clean during the trial (L.K. Wiggins, pers. comm.). Unscourable yellow fleece discolourations develop during humid weather conditions, particularly in the late spring (Sumner, 1983), affecting dyeing capacity of the wool. Colour measurement (Hammersley and Thompson, 1974) showed the 2/S wools to be brighter (CIE Y value) and less yellow (CIE Y-Z value), with the possible exception of farm 4, than the 1/S wools. Also wools shorn between May and October were brighter and less yellow than wools shorn between November and February. The magnitude of these seasonal variations are of manufacturing significance for large lines of wool thereby incurring a price differential (Stanley-Boden *et al.*, 1986). However as only a proportion of wool sold at auction is presently colour measured prior to sale the differential has yet to be quantified. Similar trends were reflected to a lesser extent by the subjective Wool Board typing system (2 = B style, 3 = B/C style) where a price differential between style grades for equivalent wool types ranged from 3 to 8 c/kg clean during the trial (L.K. Wiggins, pers. comm.). Mean fibre diameter (Lynch and Michie, 1976) of each line of fleece wool reflected the asssociation between shearing time and the seasonal wool growth curve. Wools shorn between October and December were finer than wools shorn between February and June. The magnitude of these differences will have little processing significance for the main end uses of this wool. Trends in the mean fibre diameter of the 1/S wools reflect aspects of individual farm management rather than breed of sheep.

Neither farmer 1 nor farmer 2 considered the proportion of cast ewes during late pregnancy to be differentially affected by the shearing treatment. Both groups of ewes on farms 3 and 4 were carrying a similar length fleece during pregnancy. Total ewe deaths were unaffected by shearing treatment on any farm.

Reproduction rate (lambs weaned/ewes present at mating) ranged from 0.91 to 1.02 between farms in different years. There was a variable response in reproduction rate between different years on farm 1 following second shearing in February. During the second year, following a moist summer and autumn, 7% more lambs were weaned in the 2/S group (1.02 *v* 0.95) due to a reduction in barrenness with no increase in litter size. There was no effect on reproduction rate in the other 2 years on this farm. Similar variable responses in aspects of reproduction following shearing around mating have been reported previously (Sumner *et al.*, 1982). There was no effect of shearing treatment on reproduction rate on the other 3 farms.

Mean lamb weaning weight ranged from 18 to 24 kg between farms in different years. There was no effect of ewe shearing treatment on lamb weaning weight on any farm.

With wool being the only revenue earning production criteria consistently affected by the imposed shearing treatments, net wool returns were calculated for all shearing treatments using New

Zealand seasonal average prices and average prices in Auckland during the month after shearing (Table 4). Labour costs for pre-mating crutching, pre-lambing crutching and shearing were assumed to be 25c, 50c and 110c in 1982-83; 26c, 52c and 115c in 1983-84; 27c, 55c and 121c in 1984-85 and 29c, 58c and 128c in 1985-86. The overall mean net wool return for the 4 farms was $11.57 per head. Once-yearly shearing consistently resulted in higher net per head wool returns due to the price differential for longer wool which was partly offset by a small discount for increased yellowness. The financial advantage from once-yearly shearing was least for farms 2 and 3 where the increase in clean wool production following twice-yearly shearing was greatest. The marked difference between the 2 wool prices used, reflects the seasonal variability of different wools in relation to the demands of wool users (Stanley-Boden *et al.*, 1986).

TABLE 4 Mean difference (2/S-1/S) in net wool returns ($/head) between twice-yearly (2/S) and once-yearly (1/S) shorn ewes on each farm.

	Farm			
Base wool price	1	2	3	4
NZ seasonal average	−0.45	−0.05	−0.24	−0.48
Auckland monthly average for month after sale	−1.15	−0.14	−0.68	−1.64

CONCLUSION

This Northland trial confirms trial results in other areas of New Zealand (Parker, 1984; Sumner and Willoughby, 1985) that once-yearly shearing results in increased net wool returns compared with twice-yearly shearing despite increased wool growth of the twice shorn ewes. Northland farmers are however unlikely to revert to once-yearly shearing because of the perceived management benefits associated with shorter woolled sheep in their area and an improved cash flow, particularly for farms with a high debt loading at this time.

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