Effect of shearing once-yearly in January, once-yearly in July or twice-yearly in January and July on ewe performance

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ABSTRACT

Production data were collected over 4 years from a flock of 600 mixed-age Romney, Coopworth and Perendale ewes. There were approximately equal numbers of each breed. Ewes within breeds and age groups were randomly allocated to be shorn either once-yearly in January, once-yearly in July or twice-yearly in January and July. All ewes were grazed as a single mob throughout the year, except over mating when they were divided into breed groups and joined with rams of their own breed.

The twice-yearly shorn ewes gave birth to, and weaned, heavier lambs and grew more total clean wool than the 2 once-yearly shorn groups which were similar. Shearing treatment did not affect ewe live weight, aspects of lamb production other than birth weight and weaning weight or total greasy wool production. Incidence of casting was less than 1%.

Net wool returns from the ewes shorn once-yearly in July exceeded that of the ewes shorn twice-yearly which exceeded that of the ewes shorn once-yearly in January.

Keywords Shearing; Romney; Coopworth; Perendale; live weight; lamb production; wool production

INTRODUCTION

Wool is presently contributing more than 50% of the annual income of sheep farmers (Davidson, 1988). In the northern half of the North Island over three quarters of the sheep are shorn more than once-yearly with the practice increasing annually (New Zealand Wool Board, 1989). Most of these sheep are shorn twice-yearly for reasons of ease of management and improved cashflow (Livingston, 1983).

To quantify the effect of shearing once- and twice- yearly at different times on sheep performance, a 3 stage comparative trial was begun at Whatawhata Research Centre in 1977. Firstly shearing once-yearly in November and twice-yearly in May and November were compared (Sumner and Willoughby, 1985). Secondly the effects of shearing once-yearly in October and twice-yearly in February and October were compared (Sumner and Willoughby, 1988). Net wool returns were greatest for the once-shorn group in both these trials with shearing before mating increasing the number of lambs subsequently weaned. This paper reports the comparative effects of shearing once-yearly in either January or July and twice-yearly shearing in January and July.

EXPERIMENTAL

Trial design

Flocks of approximately 200 individually identified mixed-age Romney, Coopworth and Perendale ewes have been maintained at Whatawhata Research Centre since 1970. In January 1986 the ewes in each flock were balanced for age and previous shearing treatment (Sumner and Willoughby, 1988) and randomly allocated to be subsequently shorn in either January, July or January and July. The shearing treatments continued until July 1989. Sixteen month-old replacement ewes entered the flock in January each year, except in 1989, and were randomised on live weight to 1 of the 3 shearing treatments. Ewes in the July shorn group were culled for age as a 5 year-old after weaning in November each year. The twice-yearly and January shorn groups were culled for age 2 months later after shearing the following January.

General management

Trial ewes were grazed together throughout the year except over joining when they were separated into breed groups. The Romney and Coopworth ewes were joined with 4 rams of their own breed. Beginning in 1987 the Perendale ewes were single sire mated as part of studies on the inheritance of loose wool bulk (Sumner *et al.*, 1989; R.M. Sumner, unpublished). In 1988 and 1989 mating of the Perendale ewes was synchronised with the use of a progesterone impregnated controlled internal drug release device (CIDR - Carter Holt Harvey, Hamilton, New Zealand). Joining began in mid-March each year.

The January shorn group were crutched in July and the July shorn group crutched in January. All ewes were crutched at weaning as a precaution against flystrike.

Measurements

All ewes were weighed in January and July prior to the required groups being shorn. Individual greasy fleece weight was recorded for all ewes at each shearing. Post-shear live weight was calculated by subtracting the greasy fleece weight from the pre-shear live weight. Total greasy weight of crutchings for each breed x shear treatment group was also recorded. Lines of shorn fleece and oddment wool were assessed for yield and New Zealand Wool Board type. Auction prices for each of the respective types were obtained from the New Zealand Wool Board.

Lambs were individually identified and weighed at birth and weighed at weaning. Where possible the date and cause of ewe and lamb deaths were recorded.

RESULTS AND DISCUSSION

Production data from a total of 690 ewes in 1986, 614 ewes in 1987, 580 ewes in 1988 and 407 ewes in 1989 were collected. Live weight, mating and lambing data were compared directly across treatments. Fleece data were compared on the basis of summation of twice-yearly shearing in January and July (Jan/July) with once-yearly shearing in July (July) and twice-yearly shearing in July and January (July/Jan) with once-yearly shearing in January (Jan) (Table 3). Thus the means for the twice-yearly shorn group differed in comparisons with the respective once-yearly shorn groups. Data were analysed on a within year basis by analyses of variance or deviance adjusting for imbalance in breed, ewe age and shearing treatment. Lamb birth weight was also adjusted for birth rank. There were no breed x year born interactions for any of the recorded parameters.

TABLE 1 Average of within year adjusted means for live weight (kg).

Treatment	Jan v July/Jan		July v Jan/July	
	Pre-second shear (July)	Post-main shear (January)	Pre-second shear (January)	Post-main shear (July)
Shearing frequency				
Once-shorn	51.1	50.4	51.9	47.5
Twice-shorn	51.1	50.5	51.5	47.7
SED	0.4	0.4	0.5	0.4
Breed				
Romney	49.0	48.6	50.9	46.3
Coopworth	52.9	51.3	52.2	48.0
Perendale	51.1	51.2	51.9	48.1
SED	0.5	0.5	0.6	0.5
Shearing effect	NS	NS	NS	NS
Breed effect	***	***	NS	**

Adjusted means for live weight at each shearing are given in Table 1. There were no breed x shearing treatment interactions with the mean live weight being comparable to the earlier trials (Sumner and Willoughby, 1985; 1988). Live weight before and after shearing was unaffected by shearing treatment. Fleece free live weight of the Coopworth and Perendale ewes was similar and heavier than the Romney ewes in both January and July. The breed ranking pre-shearing was Coopworth, Perendale and Romney with the effect being significant in July.

Adjusted means for lambing performance are given in Table 2. There were no breed x shearing treatment interactions for the analysed parameters. Shearing treatment did not significantly affect proportion of dry ewes, ewes lambing multiples or lamb

TABLE 2 Average of within year adjusted means for lambing performance. Proportion of dry ewes, ewes lambing multiples and lamb survival analysed following logit transformation.

Treatment	Dry ewes (%)	Ewes lambing multiples (%)	Lamb birth weight (kg)	Lamb survival (%)	LW[1] EPM	Lamb weaning weight (kg)	WLW[2] EWL
Shearing frequency:							
Once-shorn Jan	20	43	3.89	80	0.96	20.0	26.0
Once-shorn July	23	40	3.94	81	0.91	20.2	25.7
Twice-shorn Jan/July	19	45	4.13	83	1.104	20.8	26.7
SED	5	4	0.08	4	-	0.4	-
Breed:							
Romney	20	38	3.92	81	0.92	19.5	23.7
Coopworth	16	51	4.16	83	1.132	20.7	28.1
Perendale	25	39	3.87	81	0.88	20.9	26.6
SED	5	4	0.08	4	-	0.4	-
Shearing effect	NS	NS	*	NS	-	*	-
Breed effect	NS	**	*	NS	-	***	-

[1] Lambs weaned/ewes present at mating.

[2] Weight lamb weaned/ewes weaning lambs (kg).

survival. The proportion of dry ewes were higher than previously reported for these flocks (Sumner and Willoughby, 1985; 1988). The higher value for the Perendale relative to the Romney and Coopworth can be attributed to experimental constraints associated with single sire mating. In addition the born 1984 ewes of all breeds consistently had a higher proportion of dry ewes than their adjacent age flock mates in all years except 1988. In that year all groups had a higher proportion of dry ewes indicating a possible exposure to facial eczema as hoggets in 1985 and prior to mating in 1988. As reported previously the Coopworths consistently had more multiple lambings. Within each birth rank the birth weight of the Coopworth exceeded that of the Romney and the Perendale. Lambs born to the twice-yearly shorn ewes were 0.23 kg heavier than lambs born to ewes shorn once-yearly in January with the lambs born to ewes shorn once-yearly in July being consistently intermediate in birth weight. The magnitude of the birth weight difference between the Jan and Jan/July shorn groups was similar to that reported by Armstrong *et al.* (1986) and Vipond *et al.* (1987) following shearing during week 16 of gestation. This equates with the mean stage of gestation for the ewes in this trial. A possible reason for the consistently lower lamb birth weight of the July shorn ewes compared to the Jan/July shorn ewes is unclear in view of the similar fleece free live weight of all 3 groups of ewes in July at the time of shearing. There was no birth rank x shearing treatment interaction for lamb birth weight. The ranking for shearing treatment effect on lamb weaning weight was similar to that for lamb birth weight. Breeds ranked Perendale, Coopworth, Romney for weaning weight with the Perendale being heaviest.

The combined effect of shearing treatment on lamb production was for the twice-yearly shorn group of ewes to wean more lambs per ewe present at mating than the 2 once-yearly shorn groups. Thus when combined with the greater weaning weight of this group the twice-yearly shorn ewes weaned a greater weight of lamb per ewe weaning 1 or more lambs. Generally this advantage of increased weaning weight could be ex-

TABLE 3 Average of within year means for total wool production (kg).

Treatment	Jan v July/Jan		July v Jan/July	
	Greasy weight	Clean[1] weight	Greasy weight	Clean[1] weight
Shearing frequency				
Once-shorn	3.78	2.80	3.87	2.86
Twice-shorn	3.78	3.03	3.81	3.06
SED[2]	0.07	0.07	0.07	0.07
Breed				
Romney	4.00	3.08	4.10	3.16
Coopworth	3.80	2.94	3.88	3.00
Perendale	3.55	2.73	3.53	2.72
SED[2]	0.08	0.08	0.08	0.08
Shearing effect	NS	**	NS	**
Breed effect	***	***	***	***

[1] Based on assessed yield.

[2] SED without crutchings included. Significance based on this estimate of SED.

pected to be carried forwards towards slaughter with the prospect of slightly increased lamb returns. Similar trends were reported by Everitt (1961) for 5 and 6 year-old Romney ewes shorn once-yearly in December and twice-yearly shearing in July and December at Ruakura. Allowing for the experimentally induced dry ewe problem in the Perendale the growth rate of the Perendale lambs was similar to the Coopworth. The Coopworth weaned the greatest weight of lamb per ewe weaning 1 or more lambs and the Romney the least.

Overall ewe losses were 5.3% being 0.2% from weaning to January shearing, 2.0% from January shearing to lambing, 1.5% during lambing and 1.6% from lambing to weaning. Ewe losses were unaffected by shearing treatment with the number of cast ewes less than 1%.

Total greasy wool production was unaffected by shearing treatment while total clean wool was greater for the twice-yearly shorn ewes when compared with both groups of once-yearly shorn ewes (Table 3). The increase in extra clean wool was 0.20 kg with an extra shearing in January and 0.24 kg with an extra shearing in July. The magnitude of this wool growth response following shearing is similar to that observed following shearing at other times of the year when the availability of high nutritional value pasture is non-limiting (Everitt, 1961; Sumner and Armstrong, 1987; Sumner and Willoughby, 1985; 1988). The effect arises from the utilisation of protein consumed during a period of up to 6 weeks increased voluntary intake following shearing while the sheep attempt to maintain their body heat production (Elvidge and Coop, 1974; Wodzicka-Tomaszewska, 1964). It is of interest in this trial that there was a wool growth response in January whereas with shearing in February at Whatawhata after the pasture has dried-off, no wool growth response has been evident (Sumner and Willoughby, 1988). The breed ranking for wool production was similar to the earlier trials with the Romney being heaviest and the Perendale the lightest (Sumner and Willoughby, 1985; 1988).

The New Zealand Wool Board type code numbers allocated to the fleece wool prior to sale (Table 4) indicated similar trends for subjectively assessed wool characteristics occurred between years. The diameter code is a reflection of breed type and not affected by shearing. Style grade is a reflection of unscourable discolouration (style 3 = B/C, style 4 = C) which develops under warm moist conditions in the spring and to a lesser extent in the autumn. Longer wools are more prone to discolouration than shorter wools particularly when shorn in summer as is evidenced with the 2 lengths of wool shorn in January (D length = 100-150 mm, E length = 100-125 mm, L length = 50-100 mm, 0 length = 50-75 mm). This trend was reflected in the assessed style grades. As the wools were binned in the woolstore no objective colour measurements of the fleece lines were available. Individual mid-side wool samples taken at shearing were objectively measured for colour (Hammersley and Thompson, 1974) and showed the January and July once-yearly shorn wools to differ by 1.8 Y minus Z units and the twice-yearly shorn wools to differ by 1.2 Y minus Z units (R.M.W. Sumner, unpublished) supporting the assessed trends reflected in the type code.

TABLE 4 Average fleece wool type code (Sequence/Diameter/Category/Style/Length).

Breed	Once-shorn		Twice-shorn	
	January	July	January	July
Romney & Coopworth	37F4D	37F3D	37F3L	37F30
Perendale	35F4E	35F3E	35F30	35F30

As in the earlier trials (Sumner and Willoughby, 1985; 1988) the net wool returns for each of the shearing treatments were calculated for 2 price bases (Table 5). Gross wool returns, based on within year adjusted mean wool production and either New Zealand seasonal average price or average price in Auckland during the month after shearing, for the various wool types produced, were calculated. Shearing and crutching costs were allowed for as $1.35 for shearing, 61c for a full crutch and 31c for a fly crutch in the 1986/87 season increasing by 7% per annum between seasons.

TABLE 5 Mean net wool return ($/head) for each once-yearly shorn group and difference in net wool return (once-twice) between each once- and the respective twice-yearly shorn group.

Base wool price	Shearing treatment			
	Jan	Jan-July/Jan	July	July-Jan/July
NZ seasonal average	13.84	-0.19	14.41	0.19
Auckland monthly average for month after shearing	12.67	-0.98	14.08	0.49

The lower mean wool returns derived from prices received in Auckland during the month after sale compared with the New Zealand average seasonal price for the same wool types is a possible artifact of within season price trends. Net returns for fleece wool types similar to those shorn in January were consistently lower than those for wool types similar to those shorn in July reflecting the depressing effect of increased fleece discolouration on wool price. The price depression was greatest for once-shorn wool sold in Auckland in February. In the earlier shearing trials with these flocks (Sumner and Willoughby, 1985; 1988) net wool returns for once-yearly shearing were consistently more than for twice-yearly shearing due to the combined effects of reduced shearing costs and a price differential for longer wool (Stanley-Boden *et al.*, 1986) which was partly offset by a small discount for increased discolouration (Stanley-Boden *et al.*, 1986). In this trial the returns from once-yearly shearing in July were also more than the returns from twice-yearly shearing. The returns from shearing once-yearly in January however, were less than the returns from twice-yearly shearing. This highlights the financial penalty wool growers receive when selling discoloured full length wool (Stanley-Boden *et al.*, 1986). An earlier trial (Sumner and Willoughby, 1988) showed pre-mating shearing in February increased lamb returns through a reduction in the proportion of dry ewes which offset the reduced returns from fleece discolouration with shearing at this time of the year. Shearing once-yearly in January showed no such effects on reproduction to offset against the effect of reduced wool returns.

Even though the net wool returns from once-yearly shearing in July exceeded those from twice-yearly shearing in January and July, the beneficial effect could be expected to be cancelled out by cashflow effects and associated interest payments.

CONCLUSIONS

In the light of present wool price trends, fleece discolouration associated with shearing once-yearly in January and management difficulties associated with drying long-woolled sheep for shearing in July in the Waikato hill country, neither of these once-yearly shearing policies can be recommended for sheep farmers in this area relative to a twice-yearly shearing policy shearing at the same times.

ACKNOWLEDGEMENTS

To I.W. Kitney, I.R. McMillan, G.J. Poff and A.W. Richards for stock management; Whatawhata Wool Section staff for data collection; A.D. Kellick and B.W. Dow for statistical analysis; Wiri Woolbrokers Ltd. for wool assessment and the New Zealand Wool Board for wool price data.

REFERENCES

Armstrong J.R.; Davis G.H.; Farquhar P.A.; Owens J.L. 1986. Effect of pregnancy, nutrition and pre-lamb shearing on lamb birth weights in prolific sheep. *Proceedings of the Australian Society for Reproductive Biology 18*: 46.

Davidson R.M. 1988. A review of current financial trends and farm incomes in the New Zealand sheep and beef industry. *New Zealand Meat and Wool Board Economic Service Paper No. 1980.*

Elvidge D.G.; Coop I.E. 1974. Effect of shearing on feed requirements of sheep. *New Zealand Journal of Experimental Agriculture 2*: 397-402.

Everitt G.C. 1961. Multiple shearing 2. Research findings. *Proceedings of the Ruakura Farmers' Conference 13*: 57-61.

Hammersley M.J.; Thompson B. 1974. Wool colour measurement. *Wool Research Organisation of New Zealand Communication No. 27.*

Livingston P.J. 1983. An analytical comparison of shearing practices adopted by New Zealand sheep farmers. *B. Agr. Sc. (Hons) Thesis.* Massey University.

New Zealand Wool Board 1989. *Statistical handbook 1988-89 season.* New Zealand Wool Board, Wellington.

Stanley-Boden I.P.; Carnaby G.A.; Ross D.A. 1986. An analysis of the relative prices paid for New Zealand wools. *Wool Research Organisation of New Zealand Communication No. C100.*

Sumner R.M.W.; Armstrong D. 1987. Effect of different shearing policies on sheep production in Northland. *Proceedings of the New Zealand Society of Animal Production 47*: 107-110.

Sumner R.M.W.; Clarke J.N.; Johnson D.L. 1989. Inheritance of loose wool bulk. *Proceedings of the New Zealand Society of Animal Production 49*: 297-301.

Sumner R.M.W.; Willoughby L.D. 1985. Effect of post-weaning and post-mating/post-weaning shearing on ewe performance. *Proceedings of the New Zealand Society of Animal Production 45*: 221-224.

Sumner R.M.W.; Willoughby L.D. 1988. Effect of shearing once-yearly in October or twice-yearly in February and October on ewe performance. *Proceedings of the New Zealand Society of Animal Production 48*: 213-217.

Vipond J.E.; King M.E.; Inglis D.M.; Hunter E.A. 1987. The effect of winter shearing of housed pregnant ewes on feed intake and animal performance. *Proceedings of the New Zealand Society of Animal Production 45*: 211-221.

Wodzicka-Tomaszewska M. 1964. The effect of shearing on the appetite of two-tooth ewes. *New Zealand Journal of Agricultural Research 7*: 654-662.