Effect of shearing once-yearly in October or twice-yearly in February and October on ewe performance

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ABSTRACT

Production data were collected over 3 years from a flock of 600 mixed-age ewes (approximately equal numbers of Romney, Coopworth and Perendale) shorn either once-yearly in October or twice-yearly in February and October. They 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.

Twice-yearly shearing depressed total annual greasy wool production but did not affect total annual clean wool production. Twice-shorn ewes weaned 7% more lambs because of a reduction in barrenness. Shearing treatment did not affect live weight either pre-shearing in February or post-shearing in October, nor did it affect ewe and lamb survival. Incidence of casting was less than 1%. .

Overall economic returns for the 2 groups of ewes were similar with the greater net wool returns of the once-shorn ewes offsetting the greater net returns from the extra lambs weaned by the twice-shorn ewes. Extrapolation of the observed production trends suggested the net returns from once-yearly shearing pre-joining would be greater than the returns from either once-yearly shearing in spring or twice-yearly shearing pre-joining and again in spring.

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

INTRODUCTION

More than 75% of sheep in the northern half of the North Island are shorn more than once yearly, with the practice increasing annually (New Zealand Wool Board, 1987), purportedly for ease of stock management and to improve cashflow (Livingston, 1983).

Recent trials have shown a consistently higher clean wool production with twice-yearly rather than once-yearly shearing (Parker, 1984; Sumner and Armstrong, 1987; Sumner and Willoughby, 1985) with the effect being greater following second shearing in spring or autumn than in summer (Sumner and Armstrong, 1987). While there was no consistent trend in profitability from wool between once- and twice-yearly shearing in the Wairarapa (Parker, 1984) once-yearly shearing policies consistently had higher net wool returns than twice-yearly shearing policies both in the Waikato (Sumner and Willoughby, 1985) and in Northland (Sumner and Armstrong, 1987). In Northland the difference in net wool returns between shearing policies was influenced by price fluctuations associated with the seasonal availability of different wool types (Sumner and Armstrong, 1987). Variable responses in aspects of reproduction following shearing around joining have been reported previously (Sumner *et al.*, 1982).

Beginning in 1977, a comparative shearing trial has been carried out at Whatawhata Research Centre. The results of Stage 1; comparing the effect of once-yearly shearing in November and twice-yearly shearing in May and November, were reported in 1985 (Sumner and Willoughby, 1985). This paper reports the results of Stage 2, comparing the effects of once-yearly shearing in October and twice-yearly shearing in February and October.

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EXPERIMENTAL

Trial Design

Romney, Coopworth and Perendale flocks of approximately 200 individually identified mixed-age ewes have been maintained at Whatawhata Research Centre since 1970. Between 1981 and 1985 2-year-old ewes were randomly allocated to be subsequently shorn either once-yearly post-lambing in October or twice-yearly pre-joining in February and post-lambing in October. Half the ewes in each shearing treatment were immunized annually with androstenedione for use in a concurrent trial (Smith *et al.*, 1987). Ewes were culled for age as 5-year-olds after weaning in November.

General Management

Trial ewes were grazed together throughout the year except over joining when they were separated into breed groups and joined with rams of their own breed for 6 weeks beginning in late March. The once-yearly shorn ewes were crutched pre-joining. Both groups of ewes were rotationally grazed during winter and crutched pre-lambing.

Measurements

All ewes were weighed and scored for presence or absence of dags in February prior to shearing of the

twice-yearly shorn group and crutching of the once-yearly shorn group. The ewes were again scored for dagginess prior to both groups being shorn in October and weighed after shearing. Individual greasy fleece weight was recorded for all ewes at each shearing. Total greasy weight of crutchings for each breed x shear treatment group was also recorded. The lines of shorn fleece and oddment wool were assessed for New Zealand Wool Board type. Prices for each of the respective types were obtained from the New Zealand Wool Board.

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

RESULTS AND DISCUSSION

Production data from a total of 579 ewes in 1983, 605 ewes in 1984 and 651 ewes in 1985 were collected. Data were analysed on a within year basis by analyses of variance or deviance adjusting for imbalance in breed, ewe age, shearing treatment and androstenedione treatment. Androstenedione treatment affected aspects of reproductive performance (Smith *et al.*, 1987) but did not affect live weight or wool production. There were no significant interactions between the shearing and androstenedione treatments. To allow comparisons with an earlier shearing trial (Sumner and Willoughby, 1985) reproductive data from non-immunized ewes only is presented in this paper. There were significant breed x year born interactions for live weight and wool production.

Adjusted means for live weight and lambing performance are given in Table 1. There were no breed x shearing treatment interactions. Live weight prior to the February shearing or after shearing in October was unaffected by shearing treatment. Perendales were the heaviest breed in February and Romneys the heaviest breed in October while the Coopworths were the lightest breed at both weighings being lighter than in the earlier shearing trial (Sumner and Willoughby, 1985).

The mean proportion of dry ewes within the flocks increased from 8% in 1983 to 18% in 1985 while shearing pre-joining reduced the overall proportion of dry ewes by 5% in 1983, 8% in 1984 and 10% in 1985. The pre-joining shearing treatment did not affect either the proportion of ewes lambing multiples or lamb survival with the result that the twice-yearly shorn ewes weaned 6%, 10% and 6% more lambs than the once-yearly shorn ewes between 1983 and 1985 respectively. Shearing ewes with lambs at foot caused management problems associated with preparing sheep for shearing and *mothering up* afterwards, the trial design precluded measurement of the effect of ewe shearing at this time on either lamb survival or growth rate to weaning as all ewes were shorn in October. Overall, lamb survival in the Whatawhata flocks has been similar following shearing either with lambs at foot or at weaning (Sumner and Willoughby, 1985). The mean weight of lamb weaned/ewe weaning 1 or more lambs

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

Treatment	Live weight February (Pre-shear)	Live weight October (Post-shear)	Dry ewes (Logit)	Ewes lambing multiples (Logit)	Lamb survival (Logit)	LW[1] / EPM	WLW[2] / EWL
Shearing frequency							
Once-shorn	51.2	49.7	-1.73(15)[3]	-0.16(46)[3]	1.58(82)[3]	0.98	25.8
Twice-shorn	51.6	50.1	-2.33(9)	-0.44(39)	1.78(85)	1.05	26.1
SED	0.4	0.6	0.30	0.19	0.20	-	-
Breed							
Romney	51.1	50.5	-1.75(15)	-0.69(33)	1.52(81)	0.89	23.2
Coopworth	50.8	49.0	-1.87(13)	0.19(55)	1.63(84)	1.08	28.4
Perendale	52.2	50.1	-2.46(8)	-0.47(38)	1.88(86)	1.06	26.1
SED	0.6	0.7	0.39	0.24	0.28	-	-
Shearing effect	NS	NS	*	NS	NS	-	-
Breed effect	†	†	NS	**	NS	-	-

Interaction terms not significant.

[1] Lambs weaned/ewes present at mating.

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

[3] Fitted proportion(%).

TABLE 2 Average of within year adjusted means for wool production (kg).

Treatment	Greasy fleece weight				Total	Total clean fleece weight
	Feb shear	Pre-mate crutch	Pre-lamb crutch	Oct shear		
Romney						
Once-shorn	-	0.16	0.35	4.16	4.67	3.53
Twice-shorn	1.97	-	0.14	2.45	4.56	3.59
Coopworth						
Once-shorn	-	0.14	0.27	3.87	4.28	3.23
Twice-shorn	1.77	-	0.10	2.21	4.08	3.21
Perendale						
Once-shorn	-	0.12	0.26	3.37	3.75	2.87
Twice-shorn	1.56	-	0.10	1.95	3.61	2.88
SED	0.04	-	-	0.06	0.08[1]	0.07[1]
Shear effect	-	-	-	-	**	NS
Breed effect	***	-	-	***	***	***
Interaction effect	-	-	-	-	NS	NS

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

was 26.0 kg and was unaffected by shearing treatment. Coopworth ewes gave birth to more multiples than Romney ewes with the Perendale being intermediate. Barrenness and lamb survival were unaffected by breed.

Ewe losses were unaffected by shearing treatment being 0.4% from weaning to February shearing, 3.7% from February shearing to lambing, 1.4% during lambing and 1.5% from lambing to weaning. The number of cast ewes was less than 1%.

Dagginess was unaffected by shearing treatment as those not shorn in February were crutched pre-joining and both groups were crutched pre-lambing. Fifty six percent of the ewes were daggy prior to crutching and shearing in February and 46% prior to shearing in October. More Romney (68%, 68%) than Perendale (32%, 26%) ewes were daggy with the Coopworth (66%, 45%) being intermediate at the February and October shearings respectively.

Total greasy wool production of the twice-yearly shorn ewes was consistently less than that of the once-yearly shorn ewes (Table 2). When adjusted for washing yield there was no effect of shearing treatment on total clean wool production. While it is recognised that shearing can result in increased feed requirements (Elvidge and Coop, 1974) and increased voluntary intake (Wodzicka-Tomaszewska, 1964) it appears the magnitude of any wool growth response is influenced by feed availability after shearing (Smith *et al.*, 1980). Wool growth of ewes in Northland following shearing in December and February (summer) when pastures were beginning to *dry-off* and available green pasture was limiting, was less than following shearing in either October (spring) or May (autumn) when available green pasture was non-limiting (Sumner and Armstrong, 1987). This may also explain why the results of this trial differ from the earlier trial in this series where the ewes were second shorn in May (Sumner and Willoughby, 1985). It is notable that in this trial, where the wool growth response following shearing pre-joining appears to be less than in Northland, there was a more consistent effect of reduced barrenness. There was no breed x shearing treatment interaction for wool production in this trial in contrast to the May shearing when the climatic conditions prevailing after shearing were more favourable (Sumner and Willoughby, 1985). The relative breed ranking for wool production was Romney (heaviest), Coopworth and Perendale (lightest) as reported previously (Sumner and Willoughby, 1985).

TABLE 3 Fleece wool type code (Sequence - Diameter/Category/Style/Length).

Breed	Once-shorn	Twice-shorn	
	October	February	October
Romney and Coopworth	37F3D	37F2L	37F3J
Perendale	35F3G	35F2O	35F3L

The main raw wool characteristics of crossbred wool which affect manufacturing performance are staple length and extent of unscourable discolouration. Staple length, in association with tensile strength, affects suitability for a particular processing

system and hence end-use, while the extent of unscourable discolouration affects dyeing capacity. New Zealand Wool Board type coding includes a subjective assessment of mean fibre diameter, unscourable discolouration and staple length. The type numbers allocated prior to sale to the wools in this trial reflected similar within year trends each year (Table 3). Twice-shorn fleece wools shorn in October were both more yellow (style 2 = B, style 3 = B/C) and longer (length J = 75 - 100mm, length L = 50 - 100mm, length 0 = 50 - 75mm) than twice-shorn fleece wools shorn in February. Both once-yearly and twice-yearly shorn wools shorn in October were assessed as having a similar degree of discolouration. Although the lines of wool were not objectively measured for colour pre-sale, individual mid-side fleece samples taken at shearing were objectively measured for colour (Hammersley and Thompson, 1974) and showed twice-yearly shorn wools shorn in October to be 0.8 Y - Z units higher (more yellow) than twice-yearly shorn wool shorn in February and once-yearly shorn wools shorn in October to be 1.5 Y - Z units higher than twice-yearly shorn wools shorn at the same time (R.M.W. Sumner, unpublished). These trends in objective measurement reflect the effects of fleece length in combination with seasonal influences on fleece discolouration. Objective colour measurement is in the process of being introduced as a standard pre-sale measurement to specify more accurately wools on offer at auction. Due to the process of fibre entanglement associated with staple formation once-yearly shorn wool appears to be shorter (length D = 10- - 150mm, length G = 75 - 125 mm) than the sum of the 2 composite twice-yearly shorn clips. Perendale wools were classified as being finer (35 μm) than Romney and Coopworth (37 μm) wools due to an increased crimp frequency characteristics of the breed.

The difference in net wool returns between the 2 shearing policies was calculated and equated with the likely net market value of the extra lambs weaned with second shearing pre-joining. Gross wool returns based on within year adjusted mean wool production were calculated using both New Zealand seasonal average prices and average prices in Auckland during the month after shearing for the wool types harvested. 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. Overall mean net wool returns were $10.98/ewe for seasonal average prices and $10.49/ewe for average month after shearing prices. Regardless of the basis of wool price assessment used net wool returns were consistently higher for once-than twice-yearly shorn ewes due to lower shearing costs and a price differential for longer wool (Standly-Boden *et al.*, 1986) partly offset by a small discount for increased discolouration as reflected in style grade (Stanley-Boden *et al.*, 1986). The price differentials evident during this period, for wools similar to those in the trial, were 10 to 15c/kg clean between equivalent once- and twice-yearly shorn wools and 3 to 8c/kg clean between adjacent style grades (L.K. Wiggins, pers. comm.). The combined effect of these price differentials on the difference in net wool returns between the 2 shearing treatments varied between years and between price bases reflecting the effect of seasonal variation in supply on price relativities between wool types (Table 4).

The reduction in net wool returns with second shearing pre-joining in this trial was offset by a consistent increase in lambs weaned averaging 7%. With lamb value being dependent on time of sale and carcass weight, both of which are interrelated with available pasture supply, a direct comparison between the 2 shearing policies is difficult. However with an assumed net lamb value of $10 the difference in net lamb returns would be 70c in favour of the twice-yearly shorn ewes. If net lamb value increased to $15 the difference in net returns per ewe would increase to $1.05. An alternative once-yearly shearing policy within this sequence of operation would be to shear pre-joining. A direct comparison of the production implications of shearing once-yearly in either spring or autumn at 1 location has not been carried out. However extrapolation of the data from this series of trials would suggest that ewes shorn once-yearly in February would be likely to grow less total wool, which would also be more discoloured, than if they were shorn in October. The reduction in wool returns would however be less than the increase in lamb returns from the extra lambs born following pre-joining shearing, particularly if green pasture was not limiting during summer. The resultant effect, disregarding interest, would be for the total net returns from shearing once-yearly pre-joining to exceed the returns from either shearing once-yearly in spring or shearing twice-yearly pre-joining and in spring.

TABLE 4 Mean difference (once-twice) in net wool returns ($/head) between once-yearly and twice-yearly shorn ewes during the trial.

Base wool price	Year			Mean
	1983	1984	1985	
N.Z. seasonal average	0.63	0.30	1.12	0.68
Auckland monthly average for month after shearing	0.81	1.66	0.86	1.11

CONCLUSIONS

While many *on-farm* management and financial factors influence the choice of shearing time for an individual farm, present economic conditions with high interest rates favour either shearing twice-yearly pre-joining and again in spring or shearing once-yearly pre-joining rather than only once-yearly in spring.

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REFERENCES

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

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 1987. Statistical handbook 1986-87 season. New Zealand Wool Board, Wellington.

Parker W.J. 1984. Management implications:second versus once a year shearing. *Wool* **7** (6): 49-52.

Smith J.F.; Knight T.W.; Sumner R.M.W. 1987. Effect of breed, age and year on androstenedione antibody titres and related reproductive performance of ewes. *Proceedings of the 4th Animal Science Congress of the Asian-Australasian Association of Animal Production Societies*. Hamilton, p. 241.

Smith M.E.; Bigham M.L.; Knight T.W.; Sumner R.M.W. 1980. Review of effects of shearing on sheep production. *Proceedings of the New Zealand Society of Animal Production* **40**: 215-220.

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.; Bigham M.L.; Knight T.W.; McMillan W.H.; Wiggins L.K. 1982. Shearing — Its effect on production. *Proceedings of the Ruakura farmers' conference* **34**: 3-34.

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.

Wodzicka-Tomaszewska M. 1964. The effect of shearing on the appetite of two-tooth ewes. *New Zealand journal of agricultural research* **7**: 654-662.