The development of an autumn lambing flock of Dorset x Romney ewes without the use of hormones

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ABSTRACT

A flock of 224 Dorset x Romney ewes was converted from September lambing in 1977 to 96% autumn lambing (mean 16 May) in 1983 while increasing flock size by 50%. Although various techniques of oestrous induction through teasing were used, it was considered that simply introducing entire rams at least 1 cycle before successful tupping was required, eventually gave good results.

For autumn lambing the interval between joining and the first known conception of mature ewe was 35 d during the early years, and declined to 5 d in 1983 to 1987. This decline is suggested to be a genetic change. After the capacity for out-of-season breeding had been developed in all ewes (1982 to 1987), ewes lambing in spring, when subsequently mated to lamb in autumn after a 7 month lambing interval, showed only an 8% disadvantage in conception over those mated to lamb in the following spring after a 12 month lambing interval.

Changes in the flock were brought about by culling of spring-lambing ewes and selection of replacements primarily from early lambers. From 1980, rams born to early lambing ewes were used and their first offspring lambed in 1982. This appears to have had a marked effect on 2-tooth lambing times.

Keywords Autumn lambing, Dorset x Romney, natural mating, inherent trait.

INTRODUCTION

It is only in recent years that interest has developed in New Zealand in producing lambs over an extended period of the year. Rumball (1980) drew attention to some anomalies in the fit of traditional lambing patterns and pasture growth in Northland. Taylor (1982) discussed some of the advantages of spreading the lamb kill and results of lamb production have been reported (Andrewes and Taylor, 1986; McQueen, 1986).

A basic problem with out-of-season lamb production is the restricted oestrous cycles of most breeds of ewes. One method of inducing oestrous common overseas is the use of hormones as a combination of progesterone and pregnant mare serum gonadotrophin (PMSG). This technique has also been used in New Zealand (Andrewes and Taylor, 1986). However, it has some disadvantages in the cost of materials and labour.

Certain sheep breeds, such as Dorset and Merino, have the reputation for an extended breeding season. The Dorset appears to have had this ability for over 200 years (Fogarty, 1979). Although the Dorset is a minor breed in New Zealand, if it were possible for the trait for out-of-season breeding to be incorporated in a crossbreed, then the scope for producing lambs in autumn or winter without recourse to hormones would be greatly increased.

METHODS

A flock of 224 first cross Dorset x Romney ewes and 7 first cross rams were transferred from Whatawhata Research Centre to Punakitere (near Kaikohe) in December 1977. These ewes and their forebears had always lambed in spring. A policy was applied of trying to maintain a 50:50 crossbred flock through the use of first cross Dorset x Romney rams or of rams bred within the flock. Selection of replacement ewes was from early lambing ewes within the constaints of essential culling and the need to increase numbers.

Over the years the flock was moved, often during tupping, from Punakitere to Kaikohe Demonstration Farm then to Trounson Kauri Park Farm and finally to Kamo Agricultural Centre where they currently reside. Each move required redevelopment of facilities and was usually accompanied by a change of staff.

The flock was received in December 1977 but the rams could not be put out until January 1978. In 1979-80 an unsuccessful attempt was made to stimulate oestrus using testosterone injected wethers and vasectomised rams, and entire rams were joined in January 1980. In all other years, rams were joined in early to mid November. In 1981-82 and 1982-83 teaser rams of Booroola Merino, Dorset and Dorset x Romney breeds were introduced to between 60 and 80 ewes each for 3 to 4 weeks before being replaced with Dorset x Romney rams. Included in each tupping group in 1983-84 were 10 ewes treated with progesterone impregnated controlled internal drug releasers (CIDR) and PMSG.

RESULTS

Fig. 1 shows the spread of lambing, mean lambing date and the number of ewes of all ages lambing in autumn/winter and spring, in each of the past 10 years.

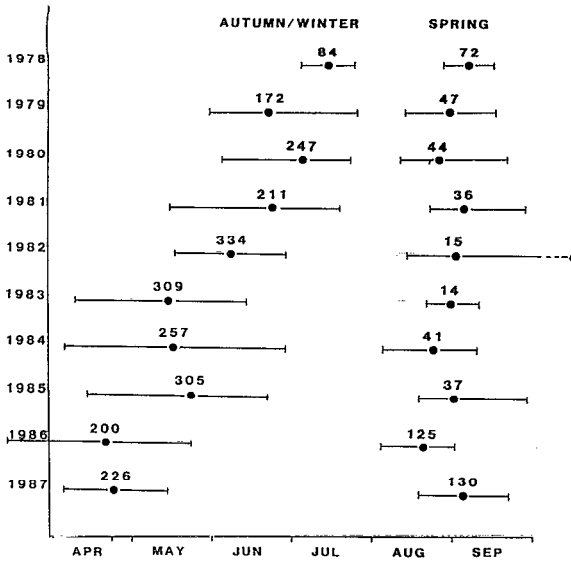

FIG. 1 Progressive changes in mean lambing date, lambing spread and number of ewes lambing in either autumn/winter or spring during the development of an out-of-season lambing Dorset x Romney ewe flock.

TABLE 1 Time interval (± S.D.) between joining and the first conception assuming a 147 d gestation for the first lamb born.

		Time (days)	
		Autumn lambing	Spring lambing
Mature ewes	1979-82	34.8 ± 19.0	3.0 ± 2.4
	1983-87	5.0 ± 5.0	-1.4 ± 4.4
Two-tooth ewes	1979-82	53.3 ± 26.9	6.3 ± 6.7
	1983-87	17.2 ± 14.5	-1.2 ± 5.9

Total ewe numbers increased until 1982, from which year they stabilised at between 300 and 350. The number lambing in spring was kept low by more stringent culling during early years. From 1986, a policy change required more spring-born lambs and the balance was deliberately modified.

November joining was not accompanied by a consistent start of lambing over the first 4 to 5 years (Fig. 1). This is also shown in Table 1, as the period between joining and the first conception (calculated from lambing dates). For spring-lambing ewes there was little difference in the delay between joining and first conception between the early years (1979 to 1982) and more recently (1983 to 1987), or between mature ewes or 2-tooths. Among autumn-lambing ewes, first conception occurred much sooner after introduction of rams in the years 1983 to 1987 than in 1979 to 1982 being 5.0 d compared with 34.8 d in mature ewes. Two-tooth ewes were always slower to take the ram than were mature ewes. In all categories there were greater delays in conceiving for autumn-lambing (summer mating) than for traditional spring-lambing (autumn mating).

The use of testosterone-injected wethers and vasectomised rams for 1980, delayed the start of autumn-lambing compared with both 1979 and 1981. Although there were no differences between the breeds of ram used as teasers in 1981-82 and 1982-83, the start of lambing did advance by 5 weeks between 1982 and 1984 with a similar difference in mean lambing date.

While the mean lambing date in autumn or winter was being shifted earlier (Fig. 1), the proportion of the flock lambing over that period increased to a peak in 1982 and 1983 of over 95% (Fig. 2). Subsequently, with the increased requirement for spring-born lambs, the proportion lambing in autumn/winter was decreased deliberately.

Mature ewes showed some ability to lamb early almost from the onset, but 2-tooths were less amenable. Heavy culling of spring-lambing ewes was applied to mature ewes. Two-tooths could not, of course, be culled on this basis prior to entering the flock, but were selected where possible from autumn-lambing ewes.

Replacement rams were also selected from the earliest lambing ewes. The first 2-tooth progeny of these early-born rams lambed in 1982. It is notable

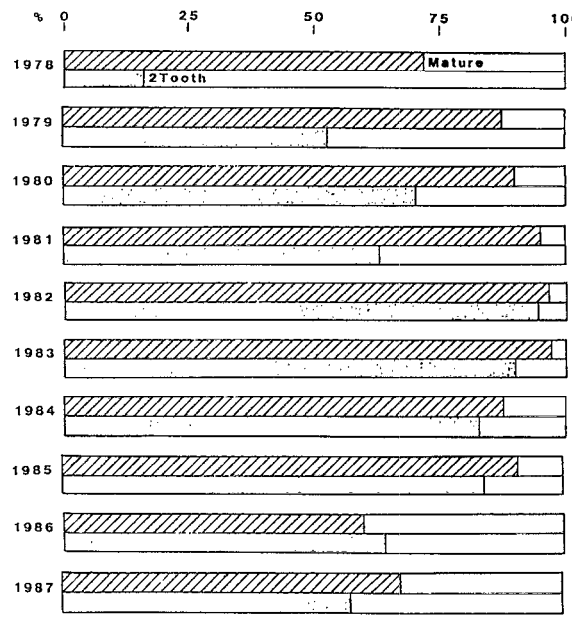

FIG. 2 Proportions of mature and 2-tooth Dorset x Romney ewes lambing in either autumn-winter or spring.

TABLE 2 Lambing performance of ewes that lambed in spring and lambed in either the following autumn or spring between 1982 and 1987.

Performance	Subsequent lambing time	
	Autumn	Spring
No. joined with ram	85	104
No. lambing	68	91
No. ewes lambing/no. ewes joined	0.80	0.88

that over 90% of these 2-tooths lambed in autumn that year and the percentage lambing early remained within 10% of that in the mature ewes subsequently.

Although the above data refer only to ewes actually lambing, the numbers of dry/dry ewes were similar to those reported elsewhere for autumn lambing (Andrewes, 1983). The proportion of dry/dry ewes was highly variable, ranging from 2 to 14% for mature ewes and from 1 to 27% for 2-tooths. The occasional high figures coincided with years of low live weight following feed shortages.

Over the last 5 years (1983 to 1987), the mean autumn-lambing dates were in April or May and the capacity for autumn-lambing can be claimed to be established. Even ewes lambing in spring may be supposed to carry the trait for autumn lambing as most were withheld from the ram in the summer. It is interesting therefore to consider the mating performance of spring-lambing ewes according to whether they lambed the following autumn or spring thereby having either a 7 or 12 month lambing interval respectively (Table 2). Although numbers are small, the data suggest that there were only 8% less pregnancies at the shorter interval showing that ewes lambing in spring were capable of taking the ram in summer after a short anoestrous period.

DISCUSSION

Although it has been accepted that some sheep breeds are capable of lambing over a much more extended period than others, there have been few attempts to capitalise on this trait in New Zealand. Even in North America and Europe, various forms of accelerated lambing have generally been based on oestrous stimulation through hormone therapy. The only published work on natural spring mating in New Zealand is that of Andrewes (1983) with a Poll Dorset flock. He successfully achieved a mid-April mean lambing date by restricting joining periods, but at the expense of a reduction in the proportion of ewes lambing.

While the presence of a breed-related characteristic of an extended breeding season infers a genetic base, nothing is known of the mechanism of such inheritance. The choice, and maintenance, of a nominal 50:50 cross of Poll Dorset with Romney breeds would be expected to dilute traits associated solely with each breed. Nevertheless 70% of the crossbred mature ewes showed some ability to lamb early from the start. Compared with the results of Andrewes (1983), advancement of mean lambing date was slow. This seems to reflect a comparatively slow onset of oestrus among Dorset x Romneys in the years prior to 1983. As this delay was much less in later years, when selection had time to take effect, it is presumed that early lambing may be of genetic origin. This is supported by the greatly improved performance of the 2-tooth ewes once the offspring of early born rams entered the flock.

Further support for a genetic change in the ability to lamb in autumn comes from a comparison of the performance of the original spring-lambing flock, with that of spring-lambing ewes mated in early summer of the years 1982 to 1987. Not only was the proportion conceiving for autumn-lambing lower in the original ewes, but the mean lambing dates were in July, compared with April-May in more recent years. The rapidity with which extended oestrus was obtained in a flock where there had been no previous selection for that characteristic suggests a strong heritability. There was no indication of any linked characteristics. If these propositions are correct, it is probable that an extended breeding season could be developed in most commercial flocks without undue difficulty.

Progress in this direction with this Dorset x Romney flock was probably slower than it need have been. Apart from red herrings in the form of teasing trials, and the constraint of increasing numbers, the flock was subject to 4 changes of location in the 10 years and 5 changes of technicians in charge. Only 2 of the latter had previous shepherding experience. There were no sources of rams with known extended breeding season capability. It is a tribute to the adaptability of staff that development was not even more delayed.

It is true that an immediate change of season would have been obtained through the use of progesterone and PMSG. However, this ongoing and not inconsiderable cost in labour and materials has to be measured against the convenience and simplicity of developing sheep with an in-built flexibility of time of lambing.

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REFERENCES

Andrewes W.G.K. 1983. Performance of an autumn lambing Poll Dorset flock in Northland. *Proceedings of the New Zealand Society of Animal Production* **43**: 49-51.

Andrewes W.G.K.; Taylor A.O. 1986. Autumn and winter lambing strategies in Northland. *Proceedings of the New Zealand Grassland Association* **47**: 81-87.

Fogarty N.M. 1979. Dorset Horn sheep: their origin and development in Australia. *Journal of the Austalian Institute of Agricultural Science* **45**: 14-20.

McQueen I.P.M. 1986. Ewe performance and lamb liveweight gains compared following autumn and spring lambing. *Proceedings of the New Zealand Grassland Association* **47**: 77-80.

Rumball P.J. 1980. Correlating stock and pasture production in Northland. *Proceedings of the New Zealand Society of Animal Production* **40**: 85-91

Taylor A.O. 1982. Seasonality in the meat industry. *New Zealand agricultural science* **16**: 169-176.