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Early lambing in Hawkes Bay: Use of the ram effect

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ABSTRACT

A low cost system for producing early lambs is desirable both to capitalise on Hawkes Bay's climatic advantage of a mild winter and to minimise the feed deficit that results from a dry summer. A series of trials was undertaken to develop a system for using the "ram" effect to stimulate early oestrus (December/January) in otherwise anoestrous Romney ewes.

When Poll Dorset rams (5%) and oestrous Poll Dorset ewes (10%) were joined with Romney ewes in early December, more ewes were mated after 3 cycles than when Poll Dorset rams alone were joined. The effectiveness of social facilitation appeared to vary between years with between 39 and 97% of Romney ewes mated after 3 cycles to an early December joining. The social facilitation effect also appeared to be less marked at a January joining.

Romney ewes with a range of lambing dates from May to September and mean lactation periods of 12 weeks were weaned at varying intervals (12, 6 and 0 weeks) prior to ram introduction in early December. There was no difference in rate of onset of oestrus. Mean lambing dates for 90% of the ewes in the 3 groups were 18th, 12th and 10th June, respectively. There was no effect of live weight or body condition on date of first oestrus.

Romney ewes were exchanged between Hawkes Bay and Wanganui to examine the effect of genotype and environment on the onset of oestrus. Poll Dorset rams (6%) were introduced on 30th November. By the 27th January 87% of ewes had been mated at the Hawkes Bay site compared with 15% at Wanganui. At each location there was little difference between ewes from the two sources in rate of onset of oestrus.

Keywords Early lambing; Romneys; social facilitation; previous lambing history; environment

INTRODUCTION

Hawkes Bay's mild winters and frequent summer droughts lend the area to early lamb production. A number of options are open to producers such as using less seasonal ewe breeds e.g. Poll Dorset or Poll Dorset crosses as practised in Northland (Andrewes, 1983; McQueen and Reid, 1988; Reid *et al.*, 1988) or using conventional drug treatment e.g. progesterone followed by treatment with pregnant mares serum gonadotrophin (Robinson, 1954). However the lighter fleece weights of Poll Dorsets has led to an unwillingness to change from the predominant Romney and Coopworths breeds. This together with the cost of "drug" induced oestrus and a trend towards more residue free produce means that these two options are not popular. Moreover a few producers in Hawkes Bay are able to lamb Romney and Coopworth ewes in June and one, in particular, is lambing in May (Catley, 1986). Widespread adoption of natural early lambing in Hawkes Bay has not occurred because of a local belief that early lambing is due to an environmental effect rather than any management practice.

Romney ewes usually commence ovarian activity in Hawkes Bay in early February and there

is evidence that this may be several weeks earlier than Romney ewes in other areas of the Southern North Island (Knight *et al.*, 1989). However it is not known whether this effect is attributable to genotype or environment. Introduction of rams can stimulate a silent ovulation prior to the breeding season (Knight *et al.*, 1978) and social facilitation can improve this stimulatory effect (Oldham, 1980; Knight, 1985). No studies have examined social facilitation and the ram effect several months before the breeding season.

Four experiments were carried out in Hawkes Bay with Romney ewes to find a practical system of using the ram effect to obtain early winter born lambs. The role of environment and the effect of previous lambing date on the date of first oestrus were also examined.

METHODS

Experiment 1

One hundred and forty mixed age spring lambing Romney ewes (weaned and shorn in mid November) at the Takapau Research Station, Central Hawkes Bay were weighed (mean 52.2 kg) and allocated to four treatment groups on 1st

December 1986. Two active entire Poll Dorset rams were joined to each of groups 1 to 3 and two sexually active Romney rams to group 4. In addition 4 oestrous Poll Dorset ewes and 4 Romney ewes which had been induced into oestrus with progesterone and 500 IU PMSG (Folligon, Intervet) were introduced to groups 1 and 2, respectively and replaced with fresh ewes at 17 day intervals until late January. Mating groups were separated by distances of 100 to 200 metres. Tup marks were recorded every 17 days and lambing dates and number of lambs born recorded for individual ewes.

Experiment 2

Five hundred 1-year-old Romney ewes at Te Hauke, Central Hawkes Bay were allocated to three treatment groups on the 8th January 1988, with groups 1, 2 and 3 consisting of 300, 100 and 100 ewes, respectively. A representative sample of 40 ewes were weighed and averaged 45.4 kg. Nine oestrous Poll Dorset ewes, together with 9 entire Poll Dorset rams were introduced to group 1. Three Poll Dorset and 3 Romney rams were joined with groups 2 and 3, respectively. Mating groups were separated by distances of 0.5 km. Tup marks were recorded over the subsequent 3 cycles (i.e. at 17 day intervals). At these times a further 9 oestrous Poll Dorset ewes were introduced to group 1.

Experiment 3

This study was conducted from December 1987 to February 1988 at the Takapau Research station. One hundred and seventy five mixed age Romney ewes with a spread of lambing dates from May to September were weaned on the basis of lambing date into three groups as follows.

Group 1: Lambed May - June; Weaned 1st September (55 ewes)

Group 2: Lambed June - July; Weaned 15th October (55 ewes)

Group 3: Lambed Aug - Sept; Weaned 2nd December (65 ewes)

Mean lactation periods for the ewes in each group were approximately 12 weeks. Ewes were

shorn in November and nutritionally managed to achieve similar mean group live weights at mating. On the 4th December ewes were weighed and condition scored using a scale of 1 to 5 (Jefferies, 1961) and 3 mature Poll Dorset rams and 6 natural oestrous Poll Dorset ewes introduced to each mating group. Tup marks were recorded at 17 day intervals and Poll Dorset ewes replaced. Lambing dates were recorded for each ewe.

Experiment 4

On November 15th 1988, 94 mixed age Romney ewes from the Takapau Research Station (Latitude 39°57' S, Longitude 176° 20' E) were split into two groups on the basis of age and live weight. Ewes had previously lambed in winter and been weaned in September. A similar procedure was undertaken at the Wanganui Hill Country Research Station (Latitude 39°54' S, Longitude 175°20' E) with 94 mixed age wet/dry Romney ewes which had lambed in August/September. On the 15th November 47 ewes from each source were exchanged. On the 30th November groups of ewes from the two locations were mixed at each site and introduced to 6 mature Poll Dorset rams. The rams used were the same age and were all from the Takapau Research Station. Tup marks were recorded at fortnightly intervals.

All tupping data were analysed using Chi-squared analyses. The effect of body condition and live weight on onset of oestrus in Experiment 3 was analysed by linear regression.

RESULTS AND DISCUSSION

Social Facilitation and the Ram Effect

In Experiment 1, Poll Dorset rams and oestrous Poll Dorset ewes gave the best results in terms of ewes tupped early in the breeding season (Table 1) with first matings of Romney ewes occurring in group 1 in mid to late December. After three cycles, 39% of ewes in group 1 had been mated, compared with 16%, 3% and 12% in groups 2, 3 and 4 respectively ($\chi^2 = 13.9$, $P < 0.001$). Mean lambing dates for 90% of the ewes in groups 1, 2, 3 and 4 were 28 June, 6 July, 12 July and 16 July

respectively. The social facilitation effect of using Poll Dorset rams and oestrous Poll Dorset ewes varied between years with 39% being mated by the end of the 3rd cycle in 1986 (Experiment 1) and 97% in 1987 (Experiment 3).

TABLE 1 Cumulative percentage of ewes that mated in 4 successive 17-day intervals as a result of a range of ram and oestrous ewe treatments.

Date ram introduced	Treatment	Cumulative % of ewes mated during 17-day period no			
		1	2	3	4
1 Dec 1986 (Experiment 1)					
	Dorset ram, oestrous Dorset ewe	0	8	39	70
	Dorset ram, oestrous Romney ewe	0	2	16	52
	Dorset ram	0	0	3	58
	Romney ram	0	0	12	39
8 Jan 1988 (Experiment 2)					
	Dorset ram, oestrous Dorset ewe	0	86	93	NR
	Dorset ram	2	71	89	NR
	Romney ram	0	0	21	NR

NR = Not recorded

A comparison between years (Table 1) suggests that onset of oestrus was more rapid with a later joining. However, social facilitation appeared more effective at an earlier joining, with 36% more ewes mated over three cycles in Experiment 1 ($\chi^2 = 12.2, P < 0.001$) and 15% more ewes mated over 3 cycles in Experiment 2 ($\chi^2 = 11.6, P < 0.001$) when oestrous Poll Dorset ewes were included, compared with Poll Dorset rams alone. These results are within the range reported by Andrewes *et al.* (1987) of between 2% and 34% more Perendale ewes lambing when run with treated ewes, compared to those run with rams alone.

In the present studies, Romney rams alone gave poorer overall results than Poll Dorset rams.

Effect of Previous Lambing/Weaning Date

Mean ewe live weight at joining was 62.2 kg (range 40.9 to 83.4 kg) and condition scores ranged from 1 to 5 with an overall mean of 4.1. However early weaned ewes were both slightly heavier and in

TABLE 2 Effect of previous lambing/weaning date on date of first oestrus in mixed age Romney ewes. Ewes in Groups 1, 2 and 3 were weaned 12, 6 and 0 weeks before introduction of Poll Dorset rams on 4 December.

	Treatment group			LSD ($P=0.05$)
	1	2	3	
Number ewes	55	55	65	
Weaning date	1 Aug	15 Oct	2 Dec	
Condition score	4.4	4.1	3.8	0.27
Live weight at joining (kg)	63.7	63.2	60.1	2.58
Cumulative % ewes mated in cycle				
1	0	0	2	
2	36	56	40	
3	86	96	97	
Mean lambing date (90% of ewes)	18 June	12 June	10 June	

better condition than later weaned ewes (Table 2). In spite of this there were no significant differences in onset of oestrus although there was a trend for early weaned ewes to have a slower onset of oestrus. This trend was reflected in lambing date with mean lambing dates for 90% of ewes in each group being the 18th, 12th and 10th June, respectively, for groups weaned 12, 6 and 0 weeks. Although Andrewes *et al.* (1987) observed that autumn lambing Poll Dorset x Perendale ewes had a better response to an early mating this was not the case in the Romney ewes in the present study.

Since there were no differences between treatments in terms of rate of onset of oestrus all three groups were analysed together to examine the effect of live weight and body condition on date of first oestrus. There was no effect of either parameter on date of first oestrus.

Effect of Site and Source of Ewes

Ewes differed in live weight at joining, with Takapau and Wanganui ewes weighing 59.6 and 50.6 kg, respectively. Although there was similar date of onset of first oestrus (14th to 28th December) there were differences in number of ewes mated in subsequent cycles (Fig. 1). By the 27th January more ewes (87%) at Takapau had been mated, compared with 15% of ewes at Wanganui ($\chi^2 = 95.5, P < 0.001$). Takapau ewes

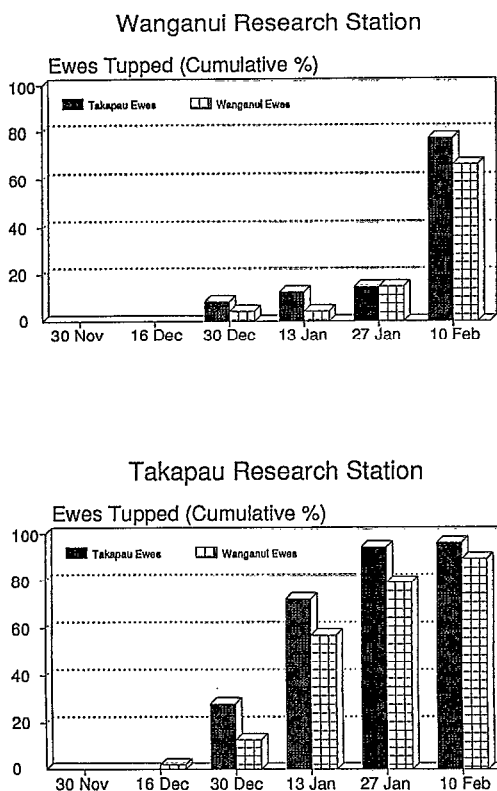


FIG. 1 Effect of environment on onset of oestrus in Romney ewes

appeared to have a slightly higher rate of onset of oestrus at both locations although the differences were not significant. It would appear that the differences in onset of ovarian activity observed by Knight *et al.* (1989) may be attributable more to environment than to genotype of the ewes.

CONCLUSION

Not only does Hawkes Bay have climatic advantages suiting it to early lambing, there also appear to be environmental effects predisposing early oestrus in Romney ewes. Social facilitation improved the ram effect, particularly when rams were introduced well before the breeding season. Results varied between years, with between 39% and 97% of Romney ewes being mated in the 2nd and 3rd cycles after ram introduction in early December. Previous lambing/weaning history did not appear to affect the onset of early oestrus in

Romney ewes, nor did live weight or body condition.

A system is envisaged of introducing vasectomised Poll Dorset rams and oestrous Poll Dorset ewes to 1 or 2 year ewes early in December followed by the introduction of harnessed entire Poll Dorset rams in the subsequent cycle. All ewes marked over the following two cycles would be removed to form a June lambing flock. Harnessed entire rams could be joined later with this group to identify ewes that had failed to conceive.

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