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Breeding season of Romney and Poll Dorset ewes at different locations and the reproductive penalties of a June joining

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ABSTRACT

The proportions of ewes ovulating and ovulating multiples were recorded monthly from July-April in Poll Dorset ewes at 2 locations, and in Romney ewes at 4 locations. Flocks of 50-100 ewes were split into two groups and alternated from being isolated to being with vasectomised Dorset rams. Romney ewes differed between locations in ovarian activity even in July (83 and 56% ovulating at Levin and Ohakune). Romney ewes were anovular by September-October. By contrast, Poll Dorset ewes had a similar decline in ewes ovulating but never became completely anovular. Ewes ovulating multiples followed a similar trend to ewes ovulating. Poll Dorset ewes at both locations returned to full ovarian activity between late December and January. In Romney ewes there were differences between locations in onset of ovarian activity, with the earliest location being Takapau, and Ohakune the latest. Onset of ovarian activity was 2-3 weeks earlier for teased than for isolated Romney ewes. The response to teasing at the end of the breeding season was small (12-15%) compared to the beginning of the season (44%).

In a second experiment, 2500 mature Romney ewes were randomly allocated to two groups. One group was joined on 15 April and the other on 10 June. There were no differences in ewes lambing (96 v 97%) but multiple births declined from 44% for the early to 18% for the late joined ewes. This was partially offset by higher lamb survival in the later joined ewes (88 v 79%).

Keywords Romney; Poll Dorset; ovulations; breeding season; lambing; teaser ram effect.

INTRODUCTION

Demand for year round supply of lambs for the growing chilled meat trade has increased interest in lambing either earlier or later than the traditional spring lambing. In summer wet areas, a late October-November lambing could provide heavy weight 12 month old lambs for the high priced October to December period. Unfortunately the Romney ewe and its crosses have a restricted breeding season (Knight *et al.*, 1983). There is some evidence of variation between location in the onset of the breeding season in the Romney (Averill, 1964; Quinlivan and Martin, 1971) and possibly there is variation between locations in the end of the breeding season. The breeding season can be extended by using the teasing effect of the ram to stimulate ewes to ovulate at the beginning (Knight, 1983) and end of the breeding season (Riches and Watson, 1954).

Poll Dorset ewes in Australia have an extended breeding season with 60-80% of the ewes ovulating and exhibiting oestrus when teased with

rams in November and December (Phillips *et al.*, 1984). In contrast Kelly *et al.* (1976) found the mean onset of oestrus in Dorset Horn ewes in New Zealand was 27 February.

The aims of the experiments in this paper were to compare the end and onset of ovarian activity in Romney ewes at four locations and Poll Dorset ewes at two locations. Also the reproductive performance of Romney ewes mated in June was compared with those mated in April.

MATERIALS AND METHODS

Experiment 1

The four locations of the ewes and the number of ewes of each breed at each location are given in Table 1. Three of the comparison sites were MAFTech research stations and the fourth (Ohakune) was a commercial farm.

Romney ewes at the respective locations had been obtained from the surrounding district or had been on the location for at least 2 years. Poll Dorset ewes were purchased from one

TABLE 1 The effect of location and breed on ewe live weight, ewes ovulating and ewes ovulating multiples per ewe ovulating at the first laparoscopy in July.

Location	Latitude	Longitude	Altitude (m)	Breed	No ewes	Live weight (kg)	% Ewes ovulating	% Ewes ovulating multiples
Taranaki	39°30'S	174°15'E	122	Romney	50	47.9	58	17
				Dorset	42	54.8	93	41
Levin	40°39'S	175°16'E	46	Romney	53	63.0	82	25
				Dorset	50	53.4	86	42
Ohakune	39°25'S	175°25'E	600	Romney	93	46.0	53	6
				Takapau	39°57'S	176°19'E	335	Romney

commercial flock in Northland in November the previous year and a random sample of ewes went to Levin and Taranaki. Romney and Poll Dorset ewes at these two locations grazed together whenever possible.

The ewes were withheld from rams over the breeding season and isolated from rams for at least one month before the first laparoscopy in July. Ewes of each breed were randomly divided into two groups and teaser rams were introduced to one group. Fourteen days later the teaser rams were switched to the second group. Teaser rams remained in these groups for 28-30 days then switched back to the first group of ewes. Thus rams were changed between groups in the middle interval between laparoscopies. This continued until the Romney ewes became anovular and until 23-24 December for Poll Dorset ewes. After this the Romney ewes were kept isolated from rams while Poll Dorset ewes remained with teaser rams and continued to be laparoscoped every 28-30 days.

For the determination of the onset of ovarian activity the Romney ewes at Levin and Taranaki were randomly allocated to two groups while those at Ohakune and Takapau were randomly allocated to 3 groups. The Romney ewes had been isolated from rams for at least one month and the first group of isolated ewes at each location were laparoscoped (21 January Levin; 23 January Taranaki; 28 January Takapau and 12 February Ohakune) and then joined with teaser rams. Fourteen days later these ewes plus another group of isolated ewes were laparoscoped and the previously isolated ewes joined with teaser rams. At Levin and Taranaki the previously teased ewes

were re-isolated while at Ohakune and Takapau they remained with the teaser rams. Again, 14 days later, the teased ewes and a group of isolated ewes were laparoscoped. Thereafter the Romney ewes were run with the teaser rams and laparoscoped every 28-30 days along with the Poll Dorset ewes.

Vasectomised Poll Dorset rams were used as teasers at a minimum ratio of 2 rams for 50 ewes with the teasers being replaced on a rotational basis with fresh teasers every 14-18 days. Isolated ewes were grazed in paddocks with at least one paddock separating them from rams and bucks.

Experiment 2

On a commercial farm at Apiti, in a summer wet area of the southern North Island, 500 mature Romney ewes were randomly divided into two groups. One group (Early Flock) was joined on 15 April, and the other on 10 June (Late Flock). Three fresh Romney rams fitted with harnesses and crayons were used at each joining and joining lasted five weeks.

The colour of the crayons was changed every two weeks and marked ewes recorded. The pregnancy status of the ewes was identified 5-7 weeks after the end of joining using real time ultrasound. Over lambing the farmer counted the dead lambs and the number of lambs and ewes present were counted at docking and weaning.

Ewes were weighed on 18 March and each flock was weighed a month before joining (pre-joining weight) and on the day of joining (joining weight). A pre-lambing weight was recorded on 18 August for the Early Flock and 21 September for the Late Flock.

RESULTS

Experiment 1

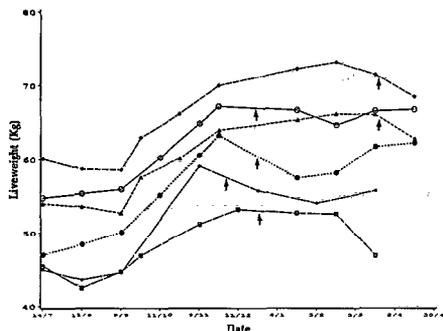


FIG. 1 Mean live weight of Romney ewes at Levin (◇---◇); Takapau (■—■); Taranaki (●---●) and Ohakune (*—*), and of Poll Dorset ewes at Levin (Δ---Δ) and Taranaki (○—○). Vertical arrows indicate time of shearing.

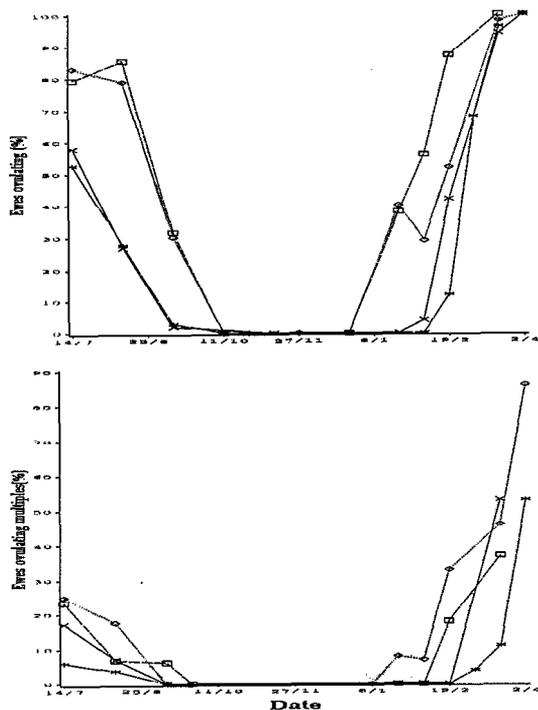


FIG. 2 Percentage ewes ovulating (a) and percentage ewes ovulating multiples / ewes ovulating (b) for Romney ewes at Levin (◇····◇), Takapau (■—■), Taranaki (X—X) and Ohakune (*—*).

between the Poll Dorset ewes at the two locations and between Poll Dorset and Romney ewes at the same locations (Figure 1 and Table 1). Over the duration of the experiment live weights increased ($P < 0.001$) at all locations and in both breeds.

Romney ewes at Taranaki and Ohakune had started to enter their non-breeding season by the first laparoscopy in July (Figure 2). There were already fewer ($P < 0.001$) ewes ovulating in these flocks than in Romney ewes at the other locations and than the Poll Dorset ewes (Table 1). The ewes at Taranaki and Ohakune became anovular by September. In contrast, 70-100% of the Romney ewes at Levin and Takapau and the Dorset ewes at both locations were ovulating in August (Figures 2 and 3). The percentage of ewes ovulating then declined rapidly with the Romney ewes becoming anovular in October. While the percentage of Poll Dorset ewes ovulating reached a low level in October there were always 5-15% of ewes ovulating from October to December.

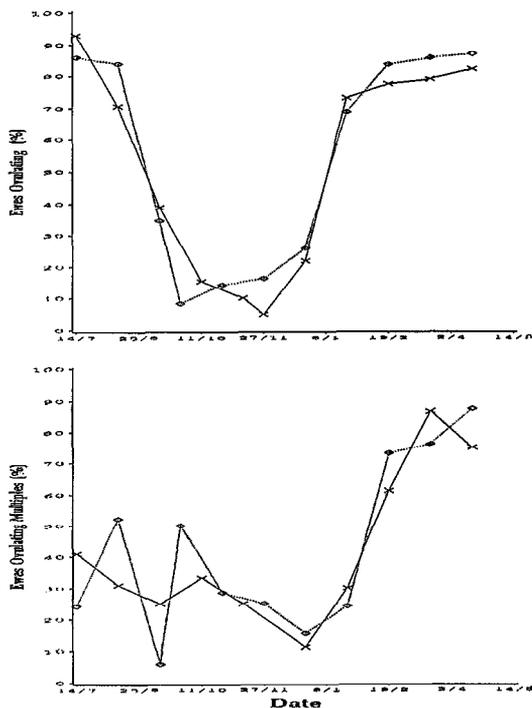


FIG. 3 Percentage ewes ovulating (a) and percentage ewes ovulating multiples / ewe ovulating (b) for Poll Dorset ewes at Levin (◇····◇) and Taranaki (X—X).

There were differences ($P < 0.001$) in live weight between the Romney ewes at the 4 locations,

There were fewer ($P < 0.05$) multiple ovulations in the Romney ewes at Ohakune (Table 1) and the proportion of multiple ovulations in all the Romney ewes declined ($P < 0.05$) from July - October (Figure 2). The decline in the percentage of Poll Dorset ewes ovulating multiples was not significant. Even over October - December, 15 - 30% of Poll Dorset ewes ovulating had multiple ovulations (Figure 3).

Onset of the new breeding season in the Poll Dorset ewes was indicated by a small increase in ewes ovulating in late December but by mid-January most of the ewes were ovulating (Figure 3). Ewes ovulating multiples also had a large increase from mid January to late February and March. At no time over the experiment were there significant differences in ewes ovulating or ovulating multiples between Poll Dorset ewes at the two locations.

The onset of Romney ewes ovulating was delayed until late January to late February and the onset differed significantly ($P < 0.01$) between locations, especially for ewes isolated from rams (Figure 2 and 4). Romney ewes at Takapau and Levin had a 2-3 week earlier ($P < 0.01$) onset of ovulatory activity than ewes at Taranaki and Ohakune.

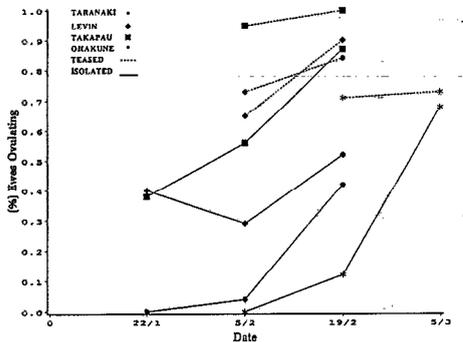


FIG. 4 Percentage ewes ovulating in the isolated and teased Romney ewes at Levin, Takapau, Taranaki and Ohakune.

At the end of the breeding season teasing with rams increased ($P < 0.01$) ewes ovulating by 15% in Romney ewes and 12% in Poll Dorset ewes. This response to teasing was small compared with the response at the beginning of the breeding season. In Romney ewes the increase ranged from

4 - 81% with a mean response of 44% (Figure 4). Teasing was equally effective at all locations but the response declined as the breeding season approached because more of the isolated ewes were ovulating.

Experiment 2

Despite flocks being of similar weight at the commencement of the experiment the Late Flock was 4 kg heavier ($P < 0.001$) at pre-joining and joining and 2 kg heavier ($P < 0.001$) at the pre-lambing weighing (Table 2). There was a within flock effect ($P < 0.01$) of joining weight on percentage ewes lambing multiples and the relationship between these two variables was the same in both flocks.

TABLE 2 The live weights of the ewes in the early and late mated flocks in Experiment 2

	Early flock	Late flock	Significance
Ewe live weights (kg)			
18 March	53.0	53.6	NS
Pre-Joining weight	53.0	56.9	***
Joining weight	55.2	59.2	***
Pre-lambing weight	54.6	56.5	***

TABLE 3 Reproductive performance of early and late flocks in Experiment 2

	Early flock	Late flock	Signif.
% ewes mated in tup periods			
1	85.4	81.6	
2	23.3	24.3	
3	0.5	2.5	*
% total ewes mated	100.0	99.0	
% ewes lambing / ewes joined	95.9	96.6	
% ewes lambing multiples / ewes lambing	44.1	8.5	***
% lambs born / ewes joined	138.2	114.5	
% lamb survival to weaning / lambs born	79.1	87.5	*
% lambs weaned / ewes joined	109.3	100.2	

Reproductive traits have been corrected for pre-joining live weight of the ewes.

The overall mating performance and conceptions to first service were similar in the two flocks (Table 3). Delaying joining had no effect on the percentage of ewes lambing but there was a decrease ($P < 0.001$) in the proportion of ewes lambing multiples in the Late Flock. However the lower proportion of lambs born in the Late Flock was offset by a higher ($P < 0.01$) lamb survival which meant that by weaning the number of lambs present in the Late Flock was only 9% below that of the Early Flock.

DISCUSSION

Joining in June-July to produce lambs in November-December for slaughter at premium prices 12 months later would be feasible on some farms but not others. There was a difference even in July between locations for the proportion of Romney ewes ovulating. The Romney ewes at Taranaki and Ohakune had already started to become anovular by July while the Romney ewes at Takapau and the Romney and Poll Dorset ewes at Levin had not started to become anovular until after August. The decline in the Romney ewes ovulating was accompanied by, and in the case of the Romney ewes at Levin and Takapau preceded by, a decline in ewes ovulating multiples.

The decline in multiple ovulations was reflected in the lower twinning rate in the Romney ewes joined in June in experiment 2. While the decline in twinning rate was similar to that reported by Lewis (1970) in Otago, there was no accompanying increase in the proportion of barren ewes. The improved lamb survival in the later lambing flock could be due to a combination of higher survival of single born lambs (Dalton *et al.*, 1980), and the warmer drier weather over lambing in November-December.

Since local Romney ewes were used at each location, it was not possible to determine if the differences between locations for the onset and end of ovarian activity was due to genetic or environmental factors. Quinlivan and Martin (1971) suggested there was a delay in onset of the breeding season with increasing altitude while Knight *et al.* (1983) found an increase in the onset of the non-breeding season with decreasing live

weight. Neither of these factors can explain the differences in the onset and end of ovarian activity between locations in the present experiment.

As expected, the teasing of ewes at the beginning of the breeding season had a large effect on ewes ovulating (Knight *et al.*, 1983; Knight, 1983) and there was a rapid change in the responsiveness of the ewes to the rams. The delay of 2 to 3 weeks in the onset of ovarian activity in the isolated ewes was similar to the 2 week delay in oestrous activity between teased and isolated Romney ewes reported by Knight *et al.* (1983). Teasing ewes at the end of the breeding season did increase the proportion of ewes ovulating but the response was smaller.

The failure of the Poll Dorset ewes to become completely anovular and the relatively high incidence of ewes ovulating multiples was similar to Poll Dorset ewes in Australia (Hall *et al.*, 1986) as was the onset of ewes ovulating and ewes ovulating multiples from late December- January.

CONCLUSIONS

The ability to undertake both early and late joining to supply the chilled meat trade with out of season lambs will vary with location. However the premium for 12 month old lambs in November - December will have to be high enough to compensate for the lower twinning rate in the flock. Teaser rams can be used with advantage at both the beginning and end of the breeding season. The earlier onset of ovulatory activity of the Poll Dorset ewes confirms their role in early lambing but their breeding season was not early enough to use them for autumn lambing. However since they do not become completely anovular there is scope for selection of even earlier lambing Poll Dorset flocks so that they can be used for autumn lambing.

ACKNOWLEDGEMENTS

To Waitaki International for financial assistance; Messrs P. MacDonnell and A. Buckman for use of their sheep; Miss H. Dick for the biometrical analysis and the technical assistance of the staff at Taranaki, Levin and Wanganui Research Stations.

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