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Feasibility of intensive artificial insemination programmes using natural oestrus subsequent to synchronisation with CIDR-G in Merino ewes

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INTRODUCTION

The development, in 1982, (Killeen *et al.*, 1982) of the technique of (IU) insemination of sheep with the aid of an endoscope has facilitated the use of deep frozen semen in sheep genetic improvement programmes.

In the New Zealand fine wool industry the technique has been applied in Merino flocks to enable use of deep frozen semen imported from leading Australian Merino stud flocks. Conception rates have ranged from 0% to 85% with a mean of approximately 50% (van Reenen, unpublished).

Improved conception rates have been reported after insemination is performed during natural oestrus compared with synchronised oestrus (T. Harvey and R. Tervit, pers. comm.). In an attempt to exploit this apparent advantage a small trial was devised to determine whether an intensive artificial insemination (AI) programme employing natural oestrus one cycle subsequent to synchronised oestrus was viable in a group of selected Merino ewes.

METHOD

In May 1989, 250 mixed age Peppin strain Merino ewes on a Central Otago property were synchronised using CIDR-G (Carter Holt Harvey, Hamilton, New Zealand) for 13 days. Fourteen days following simultaneous removal of all CIDRs, teaser rams were introduced to the flock. Marked ewes were drafted off at 12 hourly intervals and inseminated 12 hours later. One hundred and thirty one of the ewes were selected on the basis of fleece quality to be inseminated with deep frozen imported Australian Merino semen. The remainder were inseminated, IU with freshly collected semen. The selected ewes were lambed separately and lambing data was recorded.

RESULTS

Results for timing of oestrus are shown in Table 1.

TABLE 1 Timing of onset of natural oestrus subsequent to CIDR G withdrawal

	Onset of oestrus at various intervals (days) after CIDR withdrawal						
	16	16.5	17	17.5	18	18.5	19
No. ewes showing oestrus	2	5	5	86	93	32	1
% showing oestrus	1	2	2	34	37	13	0.4

Twenty-six (11%) ewes did not exhibit oestrus between day 14 and day 20. Of the 131 ewes inseminated with frozen semen, 9.9 (76%) lambed producing 104 lambs (70% lambs born/ewes mated).

DISCUSSION

Because of the high technical and labour input in AI programmes using frozen semen, it is necessary to have a high submission rate over a relatively short period. In this trial 85% of ewes programmed were in natural oestrus over a 36 hour period.

There are several possible reasons for the improvement in conception rate achieved in this trial in comparison with fixed time programmes in comparable flocks. Sperm viability and survival has been shown to be significantly impaired during oestrus immediately following progesterone impregnated sponge withdrawal (Quinlivan and Robinson, 1969). Imbalances in uterine tract bacterial microflora and changes in phagocytic white blood cell concentrations within the uterine mucosa are suggested to be involved. It is possible that a progesterone device such as a CIDR may have a

similar effect (K.L. MacMillan pers. comm.).

The control of timing of insemination in relation to onset of oestrus facilitated in this trial may have resulted in the improved conception rate independent of natural vs synchronised oestrus effects.

The timing of ovulation, duration of oestrus, sperm survival time and ovum survival time create a comparatively narrow window of potential fertilisation. In "fixed time" programmes where sheep with a range of ages, body condition and social status are being submitted, the margins of this window are frequently exceeded. The primary objective in conducting this trial was to investigate means of improving the efficiency of the AI procedure. Currently the average cost per dose of imported Australian Merino semen is \$100. This is almost 10 times the cost of insemination itself. Another major cost of non pregnancy in flocks using the technique is the genetic loss of potential progeny from the selected ewes. Because of the continuing close synchrony of oestrus in ewes not conceiving to A.I. in these programmes subsequent successful natural mating frequently involves group mating with a team of rams in which any genetic superiority is substantially diluted.

The 76% conception rate achieved in this trial therefore represents a satisfactory level of efficiency in regard to semen cost and genetic gain potential.

CONCLUSIONS

1. The pattern of oestrus observed in this trial clearly demonstrates that an intensive AI programme employing the natural oestrus subsequent to synchro-

nised oestrus is viable in a group of selected Merino ewes.

2. Conception rate and lambing data are between 10 and 20% better than averages obtained in fixed time programmes using frozen semen in other comparable Merino flocks. They are also on par with conception and lambing performance following natural mating within this same flock in previous years.
3. AI at a natural oestrus subsequent to synchronised oestrus has the potential to improve the efficiency of the technique especially by reducing semen cost per lamb born.

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