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PRACTICAL APPLICATION OF ARTIFICIAL INSEMINATION IN CONJUNCTION WITH SYNCHRONIZATION OF HEAT CYCLE IN THE EWE

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Summary

Results of artificial insemination in Merino sheep conducted by the producer over a five year period in conjunction with the use of intravaginal sponges for heat synchronization are presented. The ewes were inseminated on the second and third cycles following withdrawal of sponges. Percentages of ewes lambing and of lambs born to ewes lambing for the five subsequent years were 89, 90, 89, 77, 76, and 112, 104, 102, 148, 112 per cent. respectively.

I. INTRODUCTION

Synchronization of the heat period allows large numbers of ewes to be inseminated in a short period to limited numbers of proven sires, and also facilitates progeny testing of young rams. This method allows best utilization of the staff and man-power available.

A programme of artificial insemination in conjunction with synchronization was begun at "Eedgworth", Yass, in 1966 with help and guidance from the Department of Animal Husbandry, University of Sydney. This report presents the lambing results obtained during a five-year period, and shows the practical usefulness of the controlled · artificial breeding method.

II. MATERIALS AND METHODS

The animals used were fine wool Merinos, and ages of the ewes varied from three to eight years. Maiden ewes were excluded. The matings took place in March/April. Six weeks before commencement of the programme the rams were brought to the shed to become accustomed to the surroundings and handling. Training of rams to mount into the artificial vagina started after being in the shed for two weeks.

The ewes were synchronized by using intravaginal sponges which were inserted 32 days before starting the insemination. Two men were able to insert sponges into 800-900 ewes per day. Fifty per cent of ewes were unplugged 15 days later and the remainder on the 16th day. Vasectomized rams (4 per cent) fitted with Sire-sine harnesses were joined 17 days after sponge withdrawal. Thus the ewes were inseminated on the second heat following hormone treatment.

*"Ledgworth", Yass, N.S.W. 2582.

TABLE 1

Number** of ewes inseminated and **lambing percentages

Year	Ewes			Total ewes served	Ewes lambing		Lambs born to ewes lambing %	Lambs marked to ewes lambing %
	Inseminated 2nd cycle No.	Returned for 3rd cycle %	Returned for 4th cycle %		No.	%		
1966	775	36	26	702	692	89	112	73
				* 73	69	9	77	54
				775	761	98	109	71
1967	884	34	25	811	795	90	104	68
				* 73	71	8	107	65
				884	866	98	104	67
1968	734‡	31	35	655	655	89	102	80
				* 79	64	9	76	48
				734	719	98	100	75
1969	796	39	30	704	589	77	148	100
				* 92	64	5	116	88
				796	653	82	147	99
1970	1301†	34	19	1219	995	76	112	79
				* 82	152	12	76	57
				1301	1147	88	108	76
Totals	4490	35	26	4091	3736	83	114	79
				* 399	410	9	88	60
				4490	4146	92	112	77

*Paddock joined for 4th cycle.
‡Inseminated 3rd and 4th cycle.
†532 ewes not synchronized.

Oestrous ewes were drafted twice daily, morning and evening. The ewes drafted at the evening were inseminated the following morning with the morning's draft mob.

For semen collection the rams were prepared by carefully cleaning the prepuce. Particular attention was paid to the proper preparation of the artificial vagina and to the use of sterile and warm collecting glasses. The semen was placed in a water bath at 30°C immediately after collection and examined for motility and density. For insemination the semen was used either undiluted, or diluted (1 : 1 — 1 : 2) with heated fresh cow's milk, depending on the number of ewes allocated to individual rams. The insemniating dose was 0.10 — 0.20 ml.

The ewes returning to service were detected by vasectomized rams on the third cycle, and by entire rams on the fourth cycle following withdrawal of sponges. Returns on the third cycle were inseminated again. The inseminations were carried out over a period of eight to twelve days.

Ewes received similar nutrition and management, and were counted regularly. At lambing, dead lambs were counted every morning. Lambs were marked at three to six weeks of age.

III. RESULTS AND DISCUSSION

The results of the five-year period are shown in Table 1. There was a reduction in the percentages of ewes lambing in 1969 and 1970, as 16 per cent and 10 per cent respectively of ewes were removed with foot abscesses during the wet winters, and results not recorded. Also another 2 per cent of ewes died. Percentages of lambs born and marked following paddock mating (including 30 per cent maiden ewes) during the same five years are shown in Table 2.

TABLE 2

Percentages of lambs born and marked following paddock mating

Year	No. of ewes lambing	Lambs born to ewes lambing %	Lambs marked to ewes lambing %
1966	2345	95	78
1967	2224	94	71
1968	2638	90	73
1969	3295	107	76
1970	2229	106	70
Total	12731	99	74

Artificial insemination resulted in 15 per cent higher births than paddock mating (Tables 1 and 2), but there were 10 per cent more losses among the lambs obtained from artificial insemination. As 85 per cent of ewes to be artificially inseminated had exhibited heat over a 4 days period on the second cycle (Table 3), the majority of ewes lambed over 10 days. The inclement weather during this period was mainly responsible for the heavy losses. The concentrated lambing

has a number of advantages; however, one has to take the risk of such losses when winter lambing is programmed. Lambing in a shed or temporary shelter under closer supervision could certainly minimize lamb losses, and such an arrangement is planned for future programmes.

TABLE 3

Percentages of ewes exhibiting heat

Year	Days after withdrawal of sponges							
	17	18	19	20	21	22	23	24
1966	1*	2*	11	32	30	12	3*	1*
1967	2*	5*	17	33	27	10	2*	—
1968†	4*	6	17	18	19	11	7	—
1969	—	5*	22	38	22	4	—	—
1970	—	—	19	24	28	13	2	—

*Hand serviced.
†1968 — drought at mating — 3rd cycle.
1970 — continuous rain at mating.

In the experiments with intravaginal sponges conducted in 1965 at "Ledgworth" by Sydney University workers (Robinson 1967), fertility at the first induced heat was low (34 per cent), but 65.5 per cent and 78.8 per cent conception rates were obtained at the second and third cycles. This pioneer work was a stimulus for our planned artificial breeding programme, and the results over the five-year period presented here could be considered as satisfactory. Coordinated work of a well trained team, use of proper equipment, good yarding and shed facilities were important factors in securing the results. The team consisted of a semen collector, two inseminators and five additional men giving assistance in drafting and presenting the ewes for insemination. This team was able to handle and inseminate 70 ewes per hour. The key members, inseminator and semen collector, received one week's training during which they acquired the technical details of collecting, handling, assessing, diluting the semen and of inseminating.

For restraining the ewes during insemination a Trangie type crate (Morrant and Dun 1960) modified by us was used during the first three years. In the last two years the ewes were presented to the inseminator by lifting the hind of the animal over one side of an indoor race capable of holding 20-25 ewes. This method was simpler, allowed more efficient work, and reduced animal stress.

Initial training of rams to mount into the artificial vagina was an important aspect of the programme. There was no difficulty in training settled mature rams having previous mating experience, which responded in a few hours or in a maximum of 1-2 days. Young inexperienced males needed more patience and skill from the operator, and in some cases one to two weeks of training was necessary. It was important to learn and respect the peculiar habits of the rams. Once the ram was trained it responded to the artificial vagina without hesitation during subsequent years.

The records of the characteristics of ejaculates, such as volume and density, throughout the whole programme was useful additional information concerning the performance of individual rams. The number of rams used varied from 4 to 18 (average 9). One ram was used until it reached an advanced age (11 years) and its semen quality and fertility were constantly good during the five-year period of use (mean of 1.8 ml of semen per ejaculate with a density of 4-5, and a motility rating of 4.5-5). Young rams (18 months old) gave only 0.8 ml of semen per ejaculate. Rams were taught to double ejaculate into the same collecting glass to save time.

Cost of the programme depends on the number of ewes to be inseminated. In 1970 the cost was $0.55 per ewe for synchronization and labour. This was reduced to $0.40 per ewe by inseminating unsynchronized ewes at the same time. Materials averaged about $0.10 per ewe, but the cost of intravaginal sponges are not included, as commercial manufacture has ceased. Facilities are also used for other purposes.

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V. REFERENCES

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