S.Afr. J. Anim. Sci. 11, 49 – 52 (1981)

RESEARCH NOTE

THE SYNCHRONISATION OF OESTRUS IN SHEEP: 6. EVALUATION OF SYNCHRONISATION AND AI TECHNIQUES

Receipt of MS 03-11-1980

J.M. van der Westhuysen*, J.P.C. Greyling, P.G. Loubser and C.P.J. Coetzee
Department of Human and Animal Physiology, University of Stellenbosch, Stellenbosch 7600

(Key words: *Synchronisation, AI, techniques)*
(Sleutelwoorde: *Sinkronisasie, KI, tegnieke)*

The control of oestrus and ovulation in sheep has been researched for more than 3 decades and still continues. Both in South Africa and abroad, much research has been done on the use of intravaginal progestagen sponges alone (Robinson, 1967; Van der Westhuysen, Van Niekerk & Hunter, 1970; Hunter, Belonje & Van Niekerk, 1971) or with Pregnant Mare Serum (PMS) (Boshoff, 1972; Le Roux, 1974). Attention has also been given to the use of orally active progestagenes (Southcott, Braden & Moule, 1962; Hulet, 1966) and more recently prostaglandin $F_2\alpha$ (Fairnie, Cumming & Martin, 1976; Greyling, Van der Westhuysen & Van Niekerk, 1979; Greyling & Van der Westhuysen, 1979).

The practical acceptance of these techniques depends on the success achieved in relation to the financial cost and labour input. These techniques have been developed to alleviate problems that arise in farming practice and the results or a series of experiments on various techniques of synchronisation and artificial insemination are reported here.

In a 2 x 2 factorial experiment with 160 South African Mutton Merino ewes during March, the oestrous and lambing responses of equal sized groups were determined when 2 different types of intravaginal progesterone sponges viz., methyl acetoxy progesterone (Repromap: Upjohn) and fluorogestone acetate (Syncromate: Searle) were used for 14 days, with or without 300 IU PMS injected subcutaneously at sponge withdrawal. Ewes were inseminated twice at 12-hour intervals using 0,1 ml fresh undiluted semen and, starting 12 hours after the first positive test for oestrus.

Conception rates were not significantly affected by the different progestagens, but the injection of PMS increased the lambing rate by 30% ($p < 0,01$). In addition, the occurrence of oestrus was more concentrated in the FGA than in the MAP treated group and in both groups the addition of PMS increased this concentration further (Fig. 1).

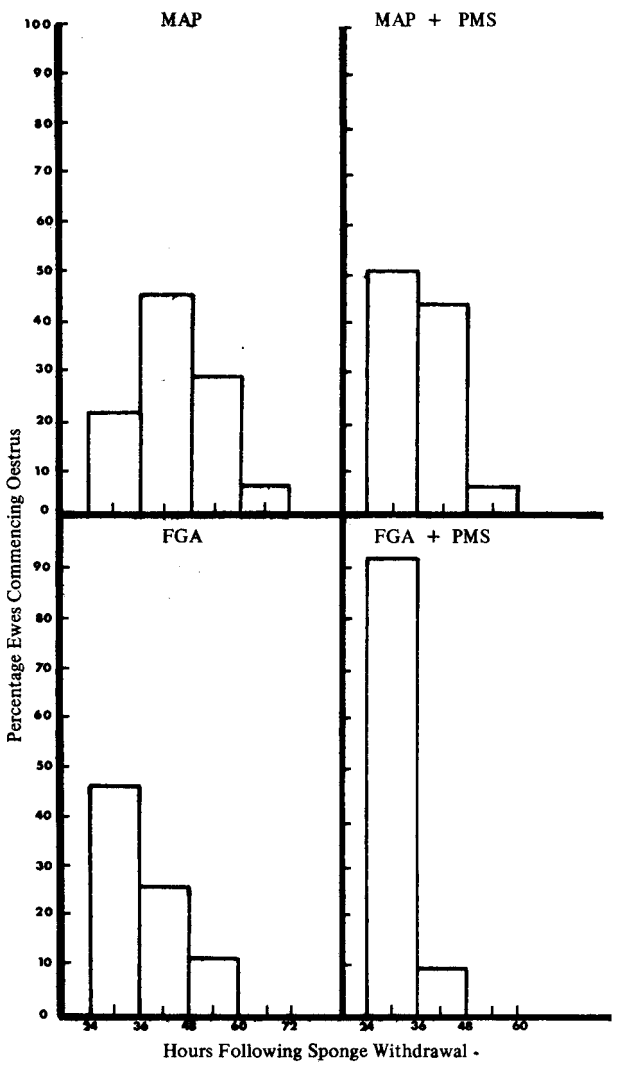

Fig. 1 The effects of methyl acetoxy progesterone (MAP) or fluorogestone acetate (FGA) impregnated sponges with or without PMS on the distribution of oestrus in sheep

* Present Address: Mohair Board, P.O. Box 2243, Port Elizabeth 6056

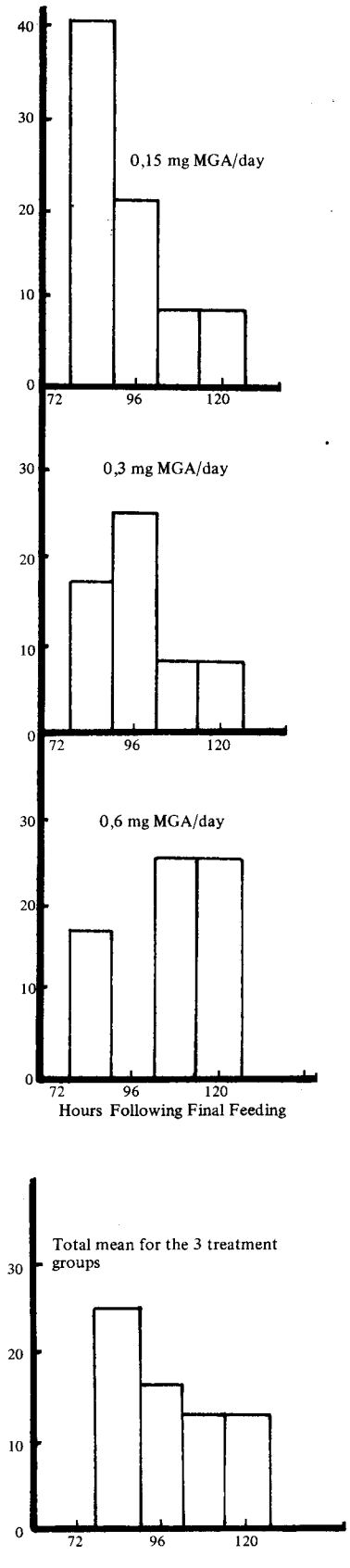

Fig. 2 The distribution of oestrus following the synchronisation of oestrus with oral administration of 0,15 mg; 0,3 mg and 0,6 mg melengestrol acetate (MGA) daily for 12 days

As the detection of oestrus is time and labour consuming and not always very accurate when AI is applied in large groups, this close synchronisation of oestrus makes AI on a time basis, without oestrus detection, possible. Therefore a further experiment was performed to test the feasibility of AI at a pre-determined time.

In a 2 x 2 factorial designed experiment (March), 75 South African Mutton Merino ewes were included to test the effects of AI on a fixed time basis (48 and 60h following sponge withdrawal) as compared to AI at the observed oestrus (12 hours following observed oestrus and again 12 hours later). The ewes were treated with MAP sponges for 14 days, with or without 300 iu PMS, injected subcutaneously at sponge withdrawal.

The injection of PMS increased the fecundity by approximately 30% ($P < 0,01$) and the conception rate to AI at observed oestrus was higher (average 10%) than the conception rate to AI at a fixed time (Table 1).

In order to verify these results and also test the use of prostaglandin $F_2\alpha$ in the synchronisation of oestrus a further experiment was performed. During April, 96 South African Mutton Merino ewes were randomly allocated to the following 2 x 2 x 2 factorial treatment groups.

(i) Two injections of 250 μg cloprostenol, a prostiglandin $F_2\alpha$ (Estrumate: ICI 80996), at a 12 day interval vs FGA impregnated intravaginal sponges for 14 days.
(ii) Insemination at observed oestrus vs insemination at a fixed time.
(iii) One insemination (12h following the onset of oestrus or 48h following sponge withdrawal in the case of the fixed time insemination groups) vs 2 inseminations (12h following the first insemination) using 0,1 ml fresh undiluted semen.

From these results (Table 2) it is evident that lambs born/ewe treated following 2 inseminations was significantly higher ($P < 0,01$) than after a single insemination. In addition, in the sponge-treated group conception rates following fixed time AI were significantly lower ($P < 0,01$) than insemination at the observed oestrus. No significant differences were found between the postaglandin and sponge treated groups.

As the use of intravaginal sponges is not always possible (e.g. maiden ewes), the use of orally active progestagens was investigated. Three groups of 12 South African Mutton Merino ewes per group were fed 250 g maize meal containing 0,6; 0,3 and 0,15 mg melengestrol acetate (Anestrol: Upjohn) daily for 12 days. Following the cessation of treatment, ewes were tested for oestrus and mated with entire rams. Synchronisation of estrus was adequate in all groups (Fig 2), but conception rates were significantly reduced at the first post-treatment oestrus (Table 3).

Table 1

The effect of Pregnant Mare Serum and fixed time insemination of the reproductive performance of sheep following synchronisation with intravaginal prosgestagen sponges (MAP)

	PMS		CONTROL	
	AI at Oestrus	AI at Fixed Time	AI at Oestrus	AI at Fixed Time
Number of ewes	18	17	18	22
Ewes showing oestrus	18	-	18	-
Ewes lambing/Ewes treated (%)	11 (61,1)	10 (58,8)	14 (77,8)	13 (59,1)
Lambs born/Ewes treated (%)	116,67	105,88	122,22	90,9
Lambs born/Ewe kidding	1,91	1,80	1,57	1,53

Table 2

The oestrous response, lambing rate and fecundity following synchronisation with 2 injections prostaglandin (cloprostenol) at a 12 day interval or intravaginal sponges (FGA) for 14 days using 1 or 2 inseminations at oestrus or at a fixed time

	Cloprostenol				FGA			
	AI at Oestrus		AI at Fixed Time		AI at Oestrus		AI at Fixed Time	
	1	2	1	2	1	2	1	2
No. Ewes	12	12	11	12	12	12	12	12
No. Ewes showing oestrus	12	11	-	-	9	12	-	-
Ewes lambing/Ewe treated (%)	50,0	50,0	27,3	50,0	41,7	75,0	8,3	50,0
Lambs born/Ewe treated (%)	58,3	75,0	36,4	66,7	50,0	91,7	16,7	66,7
Lambs born/Ewe lambing	1,17	1,5	1,33	1,33	1,2	1,22	2,0	1,33

Table 3

The overall oestrus response, lambing rate and fecundity following treatment with orally active progestagens (Anestrol) daily for 12 days

	First No.	Oestrus Percentage	Second No.	Oestrus Percentage
Total No. Ewes treated	36		29	
Total No. Ewes showing oestrus	25	69,4	28	96,6
Ewes lambing/Ewes treated	7	19,4	26	89,7
Lambs born/Ewe treated	8	22,2	33	113,8
Lambs born/Ewes lambing	8	114,3	33	126,9

From these experiments and considering previous work (Van der Westhuysen, 1969; Boshoff 1972, 1980; Le Roux, 1974; Greyling, 1978) it is concluded that for the practical control of oestrus, the intravaginal sponge is as safe and as good as any other technique. In addition, at least 2 inseminations should be performed and when fixed time AI is applied. The addition of 300 IU PMS and/or 3 insemination (48, 60 and 72h following sponge withdrawal) may improve conception and lambing rates.

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