

INDUCTION OF FERTILE OESTRUS IN PREPUBERTAL EWES DURING THE ANOESTROUS SEASON*

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Induction of fertile oestrus during the anoestrous season in mature lactating and dry ewes is possible with the proper sequence of hormone treatments. Wagner (1964) found 0.5 or 1.0 mg of 6-chloro-6-dehydro-17 α acetoxyprogesterone (CAP) per head per day in the feed for 16 days and 1000 i.u. pregnant mare's serum gonadotrophin (PMSG) injected 36 hr and 18 days later to be effective in producing fertile matings. The best regimen resulted in 77% of the treated ewes lambing. Hansel (1964) observed that treating lactating Western White-faced ewes with 750 i.u. of PMSG on Days 1 and 15 and feeding 60 mg of 6-methyl-17-acetoxyprogesterone (MAP) daily from Days 7 to 14 resulted in 65% of the treated ewes lambing. Hulet & Foote (1967), testing various combinations of CAP, MAP and PMSG on dry and lactating anoestrous ewes, found CAP and MAP, fed from Days 1 to 14 followed by PMSG injected on Days 15 and 31, resulted in 60% of the treated ewes lambing. However, little work has been done on the induction of fertile oestrus in ewe lambs. Foote & Bennett (1968) induced oestrus in eighty-four ewe lambs at 5 and 8 months of age, using a combination of 1 mg of oestradiol-17 β on Day 1 followed by daily injections of 12 mg of progesterone for 14 days and 600 i.u. of PMSG 2 days after the last injection of progesterone. Using this treatment, 87% of the ewe lambs at 8 months were in oestrus and ovulated. By 25 days after mating, 60% were pregnant.

The purpose of this study was to evaluate hormonal treatments that will induce fertile oestrus in ewe lambs, followed by a high pregnancy rate as observed by laparotomy.

One hundred ewe lambs of approximately 11 to 12 months of age were randomly assigned to the hormone treatments (Table 1). All ewes received an average of 1 mg CAP daily from Days 2 to 14 by group feeding ground barley containing this compound. On Day 1, approximately half of the ewes received an injection of 1 mg of oestradiol-17 β (i.m.), while the other half were untreated. On Days 13, 14, 15 or 16 and Day 40, all the ewes, except those in Treatments 1 and 2, were injected with 800 i.u. of PMSG (Table 1). Ten fertile rams with ochred briskets were run with the ewes until Day 45. Oestrus was checked daily throughout the experimental period. Thirty-five days after the last observed

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oestrus, the ewes were subjected to a mid-ventral laparotomy, and the ovulation rate and pregnancy status were determined by visual observation.

All treatments, except those in which no PMSG was given, were effective in inducing oestrus in prepubertal ewes during the anoestrous season (Table 2). This agrees with previously published reports (Gordon, 1963a, b, c; Hansel, 1964; Wagner, 1964; Hulet & Foote, 1967) which show that progesterone treatment of mature ewes followed by PMSG was effective in bringing ewes into oestrus. In this study, pre-treatment with 1 mg of oestradiol-17 β 1 day before progesterone treatment resulted in an additional 30% ($P < 0.01$) of the ewes

TABLE 1
ALLOTMENT OF THE YEARLING EWES TO THE VARIOUS HORMONE TREATMENTS

Treatment no.	No. of ewes	Days from start of experiment						
		1	2-14	13	14	15	16	40
1	10	E*	CAP					
2	10		CAP					
3	11	E*	CAP	PMSG				PMSG
4	8		CAP	PMSG				PMSG
5	10	E*	CAP		PMSG			PMSG
6	8		CAP		PMSG			PMSG
7	11	E*	CAP			PMSG		PMSG
8	11		CAP			PMSG		PMSG
9	10	E*	CAP				PMSG	PMSG
10	11		CAP				PMSG	PMSG

* E 1 mg/head oestradiol-17 β .

CAP 1 mg/head/day of 6-chloro-6-dehydro-17 α acetoxyprogesterone.

PMSG 800 i.u. pregnant mare's serum gonadotrophin (i.m.).

coming into oestrus after the PMSG treatment 13 to 16 days later. Moreover, fertility at the first oestrus, as measured by the number of ewes pregnant, was 15% higher in the ewes pre-treated with oestradiol than in those which received no oestradiol. These data agree with the data of Foote & Bennett (1968), who observed that 87% of the ewes came into oestrus and of these, 60% were pregnant 25 days after mating when treated in a similar manner. Following the second injection of PMSG, four ewes returned to oestrus in the groups pre-treated with oestradiol. In the groups that were not pre-treated with oestradiol, seven ewes returned to oestrus for a second service. Of the ewes, four that came into oestrus after the second injection of PMSG had not been observed in oestrus after the first injection of PMSG. Since none of the ewes was subjected to laparotomy between the first and second injections of PMSG, it is not known whether these four ewes ovulated and failed to show oestrus or did not ovulate (Table 2). Although there was no difference in the pregnancy rate resulting from both first and second services when only ewes that came into oestrus were considered, there was a 13% difference between the two groups when all the ewes were considered.

Ovulation rate was significantly affected ($P < 0.05$) by the time of the PMSG injection in relationship to the last feeding of CAP. The mean ovulation rate in the animals which became pregnant after the first PMSG injection was 3.6, 2.4,

TABLE 2
THE EFFECT OF OESTRADIOL, CAP AND PMSG ON THE INDUCTION OF OESTRUS, PREGNANCY RATE AND OVULATION RATE IN EWES LAMBS

Treatment no.	No. of ewes	No. of ewes in oestrus (%)			No. of ewes pregnant (%)			Ovulation rate, 1st PMSG
		1st PMSG†	2nd PMSG‡	Total§	1st PMSG†	2nd PMSG‡	Total§	
1	10	0	0	0	—	—	—	—
2	10	0	0	0	—	—	—	—
3	11	11	1	11	7	1	8	3.4
4	8	4	5	7	2	5	7	4.0
5	10	10	1	10	6	1	7	2.1
6	8	5	1	6	3	1	4	2.3
7	11	11	0	11	10	0	10	2.0
8	11	8	2	8	5	2	7	2.0
9	10	9	2	9	7	1	8	1.1
10	11	9	3	9	5	2	7	2.8
Oestradiol	42	41 (98)**	4	41 (98)**	30 (73)	3 (75)	33 (80)	2.2
No oestradiol	38	26 (68)	11	30 (79)	15 (58)	10 (91)	25 (83)	2.6

** ($P < 0.01$).

† No. of ewes in oestrus or pregnant after PMSG injections on Day 13, 14, 15 or 16.

‡ No. of ewes in oestrus or pregnant after PMSG injection on Day 40.

§ Total no. of ewes in oestrus or pregnant after the first and second PMSG injections.

1.9 and 1.8 for ewes injected with PMSG on Days 13, 14, 15 and 16, respectively. Ewes not pre-treated with oestradiol had a higher ovulation rate than those which were so pre-treated (Table 2). This agrees with the finding of Hulet & Foote (1967), who reported that the ovulation rate of ewes injected with PMSG 4 days, 2 days or 0 days before withdrawal of fluorogestone acetate pessaries, which were used to synchronize oestrus, was 2.92, 1.80 and 1.93, respectively. It can be tentatively concluded from this study that pre-treatment with oestradiol- 17β 14 days before PMSG was injected increased the number of ewes expressing oestrus and also increased the percentage of the ewes in oestrus which became pregnant. The time of the PMSG injections relative to the withdrawal of CAP significantly affected the ovulation rate in the pregnant ewes.

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