

**THE SYNCHRONISATION OF OESTRUS IN SHEEP.
5. THE INTERVAL BETWEEN PROSTAGLANDIN INJECTIONS IN
THE DOUBLE INJECTION REGIME**

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OPSOMMING: SINKRONISASIE VAN ESTRUS BY SKAPE. 5 DIE INTERVAL TUSSEN PROSTAGLANDIEN INSPUITINGS BY DIE DUBBELE INSPUITINGSTEGNIEK

Die aanteeltoetreffendheid van ooie wat met twee inspuitings prostaglandien (cloprostenol) 9, 10 of 11 dae uitmekaar behandel is, is vergelyk. Die besettingssyfer (vrugbaarheid) van die ooie in hierdie behandelingsgroepe was 11,1%, 40,0% en 70,0% respektiewelik, terwyl die van die kontrolegroep 82,4% was. Hierdie verskille in vrugbaarheid dui op die noodsaaklikheid om die twee inspuitings cloprostenol ten minste 11 dae uitmekaar te gee.

SUMMARY:

The reproductive efficiencies of ewes treated with two injections of prostaglandin (cloprostenol) administered at intervals of either 9, 10 or 11 days, were compared. The conception rate of ewes in these treatment groups was 11,1%, 40,0% and 70,0%, respectively and that of the control group 82,4%. These differences indicate the importance of injecting cloprostenol at an interval of at least 11 days.

To ensure that all ewes are at an appropriate stage of the oestrous cycle to respond to prostaglandin treatment, the double injection regime has been developed as a method of synchronising oestrus (Haresign, 1976). By this technique 2 injections of prostaglandin are given at an 8 or 9-day interval (Haresign, 1978). Although the effect of the interval between the two injections has apparently not been investigated, in 2 separate experiments Greyling (1978) noted that when the interval was increased from 9 to 10 days this was accompanied by an increase in fertility. Accordingly an experiment was conducted to investigate the effect of variations in this interval on the subsequent oestrous response and conception rate.

Procedure

Towards the end of the breeding season (July) 50 mature Merino ewes were randomly divided into 4 groups and the groups received the following treatments:

Group 1 : 20 control ewes.

Group 2 : 10 ewes each receiving a double intramuscular cloprostenol (ICI 80996) injection (125 μ g) at a 9-day interval.

Group 3 : 10 ewes each receiving a double intramuscular cloprostenol injection (125 μ g) at a 10-day interval.

Group 4 : 10 ewes each receiving a double intramuscular cloprostenol injection (125 μ g) at an 11-day interval.

For the sake of convenience, the oestrous cycles of the control ewes were synchronised 2 cycles previously with the aid of intravaginal progestagen (MAP) sponges and observations were made at the second subsequent oestrous period. All 3 treatment groups received the same treatment, except that the time interval between the 2 injections for the respective groups varied. The treatments were also timed so that all 3 groups received their final injection on the same day.

Following the last injection, the ewes from all 4 groups were regularly tested (07h00 and 16h00) for oestrus with the aid of vasectomised rams. Insemination was performed 12 hours after the onset of oestrus and again 12 hours later. Fourteen days after the first ewes showed oestrus, the ewes were again tested for oestrus. Ewes not returning to service were assumed to be pregnant.

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Results

The time interval (in hours) between the last injection of prostaglandin and the times at which the ewes showed oestrus, are set out in Table 1 and Fig. 1. Of the 50 ewes, 4 did not show oestrus — 3 of which were in the control group and 1 in Group 3 (9-day interval). The onset of oestrus was more closely synchronised for the treatment incorporating the 11-day interval, but differences between the respective treatment groups were not significant. Similarly, there was no significant difference in the incidence of oestrus for the different groups.

From the results in Table 2 it is apparent that as the interval between the two injections of cloprostenol was increased from 9 to 11 days, the conception rate increased correspondingly. Consequently, the conception rates of all the prostaglandin treated groups (days 9, 10 and 11) differed significantly from each other ($P < 0.05$). The conception rate of ewes with an 11-day interval between injections did not differ significantly from that of the control ewes.

Discussion

Although the interval between the 2 injections of prostaglandin had no significant effect on the oestrous response of ewes, as the interval between treatments decreased below 11 days, the fertility was significantly impaired. The reason for the impaired fertility is unclear, but it would appear that the hormonal events preceding oestrus play an important role in the fertility at that oestrus. So for instance the short progestational phase may affect sperm transport (Hawk, 1973). Fairnie, Wales & Gherardi (1977) found that prostaglandin treatment 8 days apart reduced the life span of the corpus luteum and thus limited the exposure of the reproductive tract to progesterone prior to oestrus and insemination. However, on the evidence of this experiment and previous results (Greyling, 1978) it has been clearly demonstrated that the interval between injections should not be less than 11 days and could possibly be extended to a maximum of 13 to 14 days (Fukui & Roberts, 1977; Fairnie, Martin, Rogers, 1978). This conclusion is supported by the results of Fairnie *et al.* (1977) where a fertilisation rate of 25% was obtained in an 8-day interval group compared to 90% in a group injected at a 14-day interval.

Table 1

The latency to onset of oestrus following a double injection of prostaglandin F_{2α} (cloprostenol) given at different intervals

n	Group 1	Group 2	Group 3	Group 4
	Control ewes	Ewes injected at a 9-day interval	Ewes injected at a 10-day interval	Ewes injected at an 11-day interval
	20	10	10	10
Number in oestrus	17	9	10	10
Interval between final injection and oestrus (h) mean ± SD	98,12 ± 18,12	58,67 ± 9,38	55,2 ± 10,12	52,8 ± 6,2

Table 2

The conception rates following a double injection of prostaglandin F_{2α} (cloprostenol) given at 9, 10 and 11 day intervals respectively

Group 1 Control		Group 2 9 Days		Group 3 10 Days		Group 4 11 Days	
No. Ewes Inseminated	Ewes not returning to service	No. Ewes Inseminated	Ewes not returning to service	No. Ewes Inseminated	Ewes not returning to service	No. Ewes Inseminated	Ewes not returning to service
17	14	9	1	10	4	10	7
% 85,0	82,4	90,0	11,1	100,0	40,0	100,0	70,0

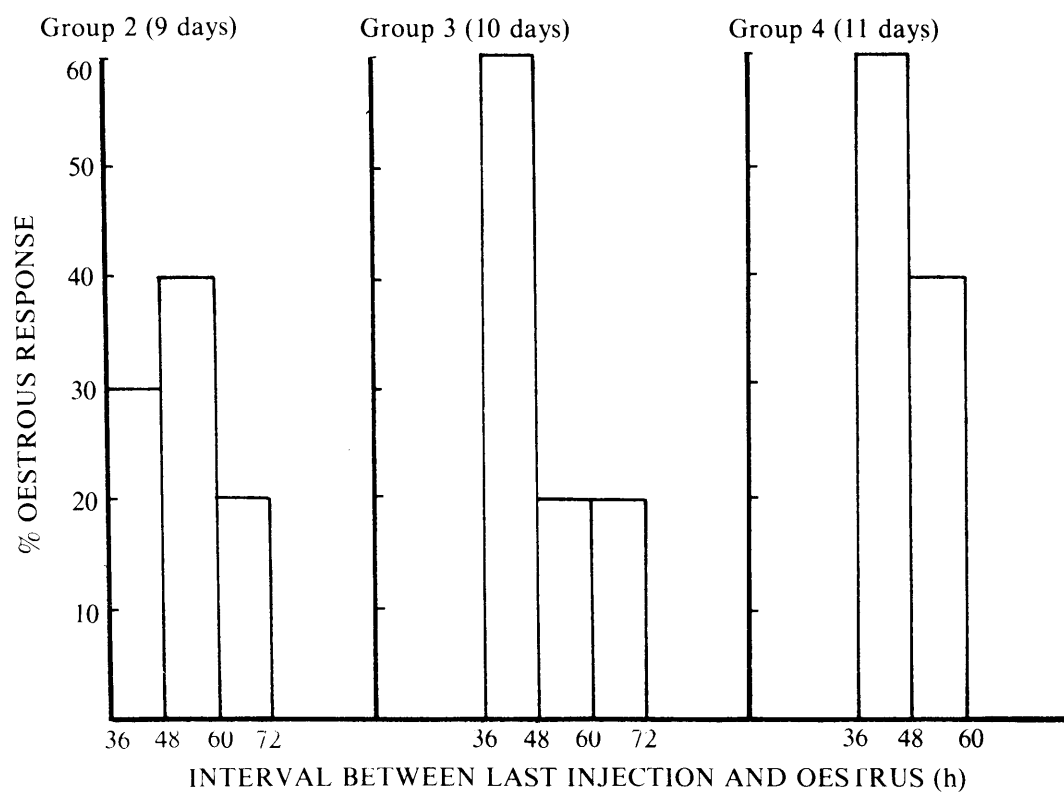


Fig. 1 The distribution of the occurrence of oestrus in ewes receiving a double injection prostaglandin 9, 10 and 11 days apart

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