

Control of Estrus and Lambing Time in Black Najdi Ewes

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ABSTRACT. The experiment was conducted to compare and examine the use of medroxyprogesterone (progestagen) and prostaglandin $F_{2\alpha}$ tromethamine salt ($PGF_{2\alpha}$) for synchronization of lambing in black Najdi ewes. Synchronization with either progestagen or $PGF_{2\alpha}$ did not change fertility percentage significantly over the control ewes.

Ewes, on progestagen treatment, lambed in relatively wider period than those that received $PGF_{2\alpha}$ treatment. In the treated groups, lambing was synchronized into two noticeable peaks but control ewes lambed uniformly throughout a thirty day period.

Under optimum environmental conditions, a compact lambing is desirable to simplify lambing management and to allow lambs to be batched for finishing. This can be achieved by using estrus synchronization techniques to control the timing of ovulation and mating. The natural estrus can be manipulated by giving exogenous progesterone or a multitude of progestagen treatments administered either orally, by injection, subcutaneous implant, intra-vaginal pessary or most recently by a silicone-rubber intravaginal releasing device (Lammond and Lambourne 1961, Southcott *et al.* 1962, Robinson 1964 and 1979, Welch 1982), or by inducing premature regression of the corpora lutea through injection of prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) currently available in synthetic or analogue form (Thimonier 1979, Narendran *et al.* 1983).

Although, synchronization will not enhance the fertility nor solve fertility problems (Scott 1975), it is helpful technique, especially in Saudi Arabia, to select in advance the most convenient time for a compact lambing and to allow the planned use of available labour. The present study was undertaken to determine the effect

of two estrus synchronizing compounds on the reproductive performance of local black Najdi ewes under the conditions of year-round confinement. This may have practical application in this fat-tailed, non-seasonal breed, since lamb birth weight is significantly affected by birth month (Abouheif and Alsobayel 1983).

Material and Methods

One hundred and eight black Najdi ewes averaging 47.2 ± 2.1 kg in body weight were used to evaluate the efficacy of two estrus synchronization compounds at King Saud University Experimental Livestock Farm, Riyadh, Saudi Arabia. All ewes were 2-year-old or older ages and had previously lambed. Normal husbandry practices were carried out on the flock and the ewes were considered to be in good condition for mating. Ewes studied were randomly assigned to three treatment groups. The experimental routine in each treatment group was as follows:

1. Control Group

Thirty-five ewes were placed with fertile rams and served as naturally bred controls. The rams ran freely with the ewes for 35 days, thenafter, were removed.

2. Progestagen Treated Group

Thirty-five ewes were treated on the same day with veramix sheep sponges from Upjohn International Inc.

Each sponge, containing 60 mg medroxyprogesterone acetate, was applied intravaginally and removed on day 14 of the treatment. Two days after the sponge removal, rams were turned in with the ewes and removed at the completion of a 35-day mating period.

3. Prostaglandin Treated Group

Thirty-eight ewes were treated with $\text{PGF}_{2\alpha}$ tromethamine salt, commercially available under the trade name Lutalyse from Upjohn International Inc. Two intramuscular injections, each of 12.5 mg $\text{PGF}_{2\alpha}$, were administered to all ewes on day 1 and day 12 of the treatment. The rams were turned in with the treated ewes 2 days following the second injection and stayed for 35-day breeding period.

As a general practice, the flock was divided into small groups for mating, with not more than 7-8 ewes per ram. All rams were sexually mature and of proven fertility. During the 35-day breeding period, rams were circulated around the small groups every 13 days to avoid any probable problems that may result from preference for certain ewes. The incidences of all lambings traced out and recorded as days from rams turned in with control and treated ewes. Statistical significance of treatment effects was examined by using Chi square test.

Results and Discussion

Distribution of lambing for treated groups and for ewes managed in the usual manner are shown in Fig. 1. All studied groups began lambing after 146 days following the first day of turning rams in with ewes. The trend was for synchronized ewes that conceived at first service to lamb during a 7-day period in the progestagen treated group and over a 3-day period in the $\text{PGF}_{2\alpha}$ treated group. Practically, no lambs were born for the next 8 to 14 days, then ewes that conceived at second service lambd during 3 to 4-day period. In the control group, the occurrence of lambing was widely spread over a 29-day lambing period.

The overall lambing percentages presented in Table 1 show no differences between the two synchronization treatments and the control group. These results are comparable to other report of ewes treated with prostaglandin analogue and found that fertility percentage was similar in a control group and in those ewes which were treated (Fairnie *et al.* 1976). Although, the overall fertility of the ewes under this investigation were looked upon as very low, 60.0-63.2 percent is consid-

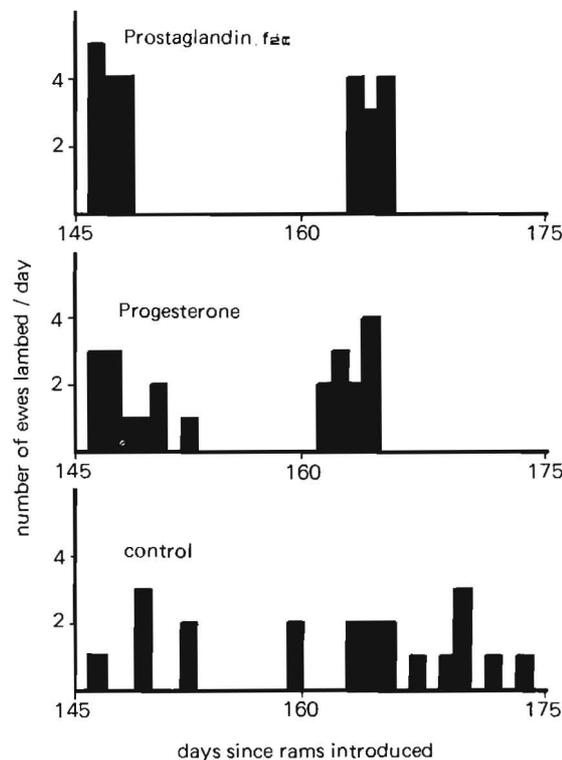


Fig. 1. Distribution of lambing in different groups of black Najdi ewes.

Table 1. Influence of synchronization treatments on fertility percentages of black Najdi ewes.

Trait	Control	Progestagen	Prostaglandin F _{2α}
% lambing from 1 st estrus.	–	31.4 (35)*	34.2 (38)
% lambing from 2 nd estrus.	–	45.8 (24)	44.0 (25)
% overall lambing.	60.0 (35)	62.8 (35)	63.2 (38)

* Number of exposed ewes.

ered within the reported range of fertility for black Najdi under the local environment of Riyadh area (Abouheif and Alsobayel 1982). However, lambing percentages gave no evidence of change in fertility of ewes due to synchronization treatments with progestagen or PGF_{2α}.

Fertility at the first synchronized estrus, which were 31.4 and 34.2% in the progestagen and prostaglandin F_{2α} analogue treated groups respectively (Table 1), was not as high as desired. This low lambing performance may be due to reduction in fertility or failure of ewes to exhibit estrus shortly post-treatment. The intra-reproductive tract environment may not be suitable for sperm transportation and survival resulting in low fertility rates (Allison and Robinson 1972, Croker *et al.* 1975). The poor rate of absorption of the steroid compounds (Robinson 1979) and the early release of pre-ovulatory luteinizing hormone in respect to the onset of estrus (Lintin and Lamming 1973) resulted in an asynchrony of estrus and ovulation in progestagen treated ewes. In addition, results presented in Fig. 1 show that lambing in control group was also very low during the first 16 days (22.9%) in comparison with the treated groups. This low lambing performance may be due to the effect of a temporary stress or a disturbance which occurred for a short period of time after 7 or 8 days from the beginning of the mating period. Elevation of body temperature, having ewes in unfamiliar surroundings, or any disturbance, especially around the time of estrus, can cause a pronounced reduction in fertility (Scott 1975).

In either synchronized group, ewes bred at synchronized estrus that returned to heat were still synchronized, although the range of lambing dates at second synchronized lambing was about 3 days shorter in the progestagen treated group. Table 1 showed a slightly higher percentage of ewes lambing at the second synchronized lambing than in the first synchronized lambing. Lightfoot *et al.* (1979) indicated that delaying mating until the first natural estrus after synchronization resulted in increase of fertility.

Generally, results from using medroxyprogesterone acetate and the synthetic prostaglandin F_{2α} tromethamine salt were comparable. One exception was noted:

ewes on progestagen treatment lambled in relatively wider period than those received prostaglandin treatment. Cumming (1979) concluded that the interval from ceasing progesterone treatment to the onset of estrus varies widely with season, age of ewes, breed of ewes and the type and amount of progesterone used. On the other hand, the premature destruction of corpus luteum during the estrus cycle due to PGF_{2α} treatment results in relatively faster response in the onset of estrus and ovulation.

The results presented herein demonstrate that use of drugs or hormones to synchronize estrus in black Najdi sheep of Saudi Arabia requires careful economic justification. Thus, unless there is a special demand for more uniform liveweight in lambs, ease of fostering lambs, and more widespread use of superior genotypes in artificial breeding programs, it would seem inadvisable to introduce sophisticated and expensive techniques to non-seasonal sheep of low genetic merit for reproductive performance.

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التنظيم الهرموني لمواعيد ولادة الحملان في الأغنام النجدية السوداء

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أجريت التجربة لمقارنة واختبار تأثير مركب الميدروكسي بروجستيرون (البروجستيرون) ومركب الدينوبروست ترومثامين (البروستا جلاندين) على عملية تنظيم ولادة الحملان في النعاج النجدية السوداء كنتيجة لتنظيم مواعيد دورات الشياح فيها. وقد دلت النتائج على عدم وجود فروقات معنوية بين النعاج المعاملة بالبروجستيرون أو البروستا جلاندين أو غير المعاملة هرمونيا في النسبة المئوية للخصوبة. كانت الولادات في النعاج المعاملة بالبروجستيرون تتركز في فترات أطول نسبيا عما في حالة النعاج المعاملة بالبروستا جلاندين، وبصورة عامة فالنعاج المعاملة هرمونيا تركزت ولاداتها في فترتين متميزتين بعكس النعاج غير المعاملة والتي انتشرت ولاداتها طوال فترة التجربة. بلغت النسبة المئوية لخصوبة النعاج المعاملة هرمونيا خلال دورة الشياح الأولى حوالي 4, 31-2, 34% فقط بينما ازدادت هذه النسبة خلال دورة الشياح الثانية.