

EFFECT OF ORALLY ADMINISTERED
PROGESTERONE COMPOUND ON EGYPTIAN SHEEP

By

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SUMMARY

Egyptian sheep belong to the fat-tail type. They are continuous breeders; however, they are seldom allowed to lamb twice a year. Mating season is limited to the months of May and June, so that ewes lamb during fall and early winter when the weather is mild and the green feed available. No doubt that any practical method of controlling the estrous cycle would be a useful tool to the sheep industry. The purpose of the present work was to study the effect of orally administered Provera (2) on the estrous cycle of Egyptian Rahmani ewes and on their fertility.

REVIEW OF LITERATURE

McKenzie and Terrill (1937) in their classical work on a number of breeds of sheep in the U.S.A. stated that the breeding season of ewes was from September to January. This is in contrast to the Egyptian sheep which are continuous breeders (Hafez, 1953 and Mounib, et al., 1956). The former workers also reported that the average estrous cycle was 16.72 days; and that silent heat occurred and many cycles were multiple of 2, 3 or 4 times the normal length.

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In England, Averill (1955) gave the percentage of silent heat as 9.00 per cent ; being higher before the onset and near the end of the breeding season. In the Egyptian Rahmani sheep, Mounib, et al. (1956) reported that the mean estrous cycle was 17.39 days. Of all the cycles studied, 84 per cent were single and 16 per cent were multiple cycles. The same authors also found the average percentage of silent heat to be 16.7 per cent ; ranging from 6.4 per cent in November to 31.8 per cent in June.

Dutt and Casida (1948) were successful in controlling estrus and ovulation in ewes by using progesterone injection. The availability of orally effective progestational compounds opens a wide field of investigation. Provera was used by several workers to synchronize estrus and ovulation in cattle, swine and sheep. Combs, et al. (1961), Evans, et al. (1961), Hinds, et al. (1961) and Hogue, et al. (1961) were successful in synchronizing estrus in sheep by feeding Provera.

In two trials, Evans, et al. (1962) fed 50 to 90 mg. Provera daily to ewes, and were able to inhibit estrus and ovulation in most of them as long as the treatment continued. About 89 per cent of the ewes returned to heat within 8 days after the end of the treatment ; and 63 per cent of them lambed after breeding of the first posttreatment estrus.

MATERIALS AND METHODS

Forty mature Rahmani ewes averaging 46.85 Kg. in body weight were taken at random from the flock kept by the Faculty of Agriculture, Cairo University. Their average age was 3.8 years ranging from 2 to 7 years. The previous estrus in these ewes was not determined ; and it was hoped that by their random selection from the flock that most of the different stages of the estrous cycle were represented.

Each ewe was individually given 1.760 gm. of Repromix daily (containing 58 mg. Provera, 17 Alpha-Hydroxy-6 Alpha-Methylprogesterone). Feeding Provera continued for 18 days, except for 3 ewes which were fed for 26 days as will be explained later in the discussion. Rams were used to check heat twice daily at 8.00 AM and at 5.00 PM. Mating was allowed only at the first post-treatment estrus, but not at the subsequent cycles. Ewes showing heat were mated twice 12 hours apart. They were returned to the remainder of the group 3 days later to check for the next estrus.

Eleven days after the end of feeding Provera, 6 of the 11 ewes which did not show signs of heat were killed, and information regarding their uteri and ovaries were recorded. Twenty-one days posttreatment, two more ewes were also killed. Ovarian follicles were divided according to their size into two categories ; those less than 5 mm. in diameter and those 8 mm. or more. Ewes showing no heat within 50 days after mating were considered pregnant and conception rate was calculated on this basis.

RESULTS AND DISCUSSION

As long as feeding Provera continued, estrus was prevented in all the ewes except three which came in heat on the third day of treatment. This was postulated either to be due to individual variation or the possibility that the treatment started too late in the estrous cycle of these three ewes. It was thought advisable then to extend the treatment period for these latter ewes only for 26 instead of 18 days as the case in the rest of the ewes. If this exceptional behaviour were due to individual variation, then these three ewes should have their second heat before feeding Provera ended. They, however, did not show any signs of heat except 3 to 4 days after stopping their treat-

ment. This is a strong indication that they apparently were treated too late in their estrous cycle and thus the treatment had no effect. Of course this point could be answered more fully by feeding Provera at known stages of the estrous cycle.

Three days after Provera feeding was terminated, ewes started to come in heat; and within 8 days heat was detected in 27 of them (67.50 per cent). The average interval from the end of the treatment to estrus was 4.63 days. Within 10 days post-treatment, the total number of ewes showing heat was 29 (72.50 per cent); with 4.96 days as the average interval from the end of treatment to estrus (Table 1). In the present study, the percentage of ewes showing heat was lower than that reported by Combs, et al. (1961), 92.6 per cent; Hinds, et al. (1961), 86 per cent; Hogue, et al. (1961), 92.5 per cent and Evans, et al. (1962), 89.3 per cent. However, this point will be discussed in detail later on.

The average interval from the end of the treatment to estrus in the present study was higher than that reported by Evans, et al. (1962) and others. No explanation could be offered here. Furthermore, the observation found by Evans, et al. (1962) that ewes fed Provera for a longer time came in heat later, was not substantiated by the present work. Two of the three ewes fed Provera for 26 days came in heat 3 days post-treatment, and the third came in heat a day later.

Out of 29 ewes served, 19 were considered pregnant, with a conception rate of 65.52 per cent. A point which may be stressed here, and may be studied later on, is the fact that none of the three ewes fed Provera for 26 instead of 18 days was pregnant after mating at the first post-treatment estrus. The above mentioned conception rate compares favourably with that reported by Evan, et al. (1962).

Thirteen ewes which continued to come in heat were observed for a maximum of 3 estrous cycles. A total of 20 heat cycles was determined; of which 15 were 14 to 18 days, while 5 cycles were 30 to 35 days in length. The latter estrous cycles are presumed to have been double heat periods, with a silent heat intervening. It was also found that subsequent estrous cycles remained essentially cynchronized, at least for three consecutive cycles.

On the eleventh day post-treatment, when six of the eleven ewes failing to show heat were killed, some interesting points were revealed (Table 2). One ewe (974) had abnormal genitalia attached to the viscera and filled with pus. Her ovaries had no follicles of measurable size (gun shot). She should be discarded, since the treatment was not responsible for her condition.

The other five ewes showed almost identical picture to each other. The mean body weight was 48.33 Kg.; and the average carcass percentage was 48.27 per cent. Both ovaries in each ewe had from 3 to 9 small follicles, and usually one large follicle. One of the ovaries invariably contained a corpus luteum, pinkish in colour and weighing 0.368 gm. on the average. The mean weight of both ovaries was 2.055 gm.; and the average weight of the uterus was 39.000 gm. (Table 2). The weight of the ovaries and the number and size of the small and large follicles in the present study fall within the range reported by McKenzie and Terrill (1937) for the breeds of sheep in the U.S.A. From the weight of the corpus luteum and its colour, it is judged to be about 5 to 8 days old. On the basis of this assumption, these five ewes, and supposedly the remaining five ones failing to show heat post-treatment, must have had silent heat few days after the termination of Provera feeding.

TABLE 1.—Frequency of Ewes Coming in Heat Post-Treatment

Number of Days Post-Treatment	Number of Ewes in Heat
2	0
3	3
4	9
5	10
6	5
7	0
8	0
9	1
10	1
Total Average 4.96	29

Twenty-one days after the treatment was ended, one ewe (1165) showed her first post-treatment estrus. She was killed the same day along with another ewe (979) which never showed signs of heat. In both ewes, the mean weight of uterus and both ovaries was 46.650 gm. and 2.700 gm., respectively. In the former ewe, there were 4 small ovarian follicles and a large one (11 mm. in diameter) which was about to rupture. Furthermore, there was a pale corpus luteum weighing 0.230 gm., presumed to be of the previous estrous cycle. It is concluded that this ewe has had a silent heat few days post-treatment, followed by the present regular estrus 16 to 18 days after the silent one.

The ovaries in the second ewe (878) had 5 small ovarian follicles and a large one, almost the size of an ovulatory follicle (9 mm. in diameter, Table 2). She had a pale corpus luteum weighing 0.220 gm., and also presumed to be of the previous heat, a silent one, which must have occurred few days after the termination of feeding Provera. Apparently this ewe was due to come in heat in the next few days, if she were not killed. Whether this expected estrus was going to be a regular or silent one could not be predicted.

The data on the eight ewes killed on days 11 and 21 posttreatment give a strong indication that all the ewes, excluding the abnormal one, which failed to show signs of heat within 10 days after the termination of Provera feeding, must have had silent heat few days post-treatment. On the above assumption, it could be concluded that the percentage of ewes showing silent heat to the total of the experimental ewes was 25.64 per cent. Although this is a high incidence of silent heat, it is acutally less than that reported by Mounib, et al. (1956) for the same breed during the month of April (29.20 per cent). It should be added then that Provera treatment should not be held responsible

TABLE 2.—Data on Eight ewes Killed on Day 11 or Day 21 Post-Treatment

Number of Ewe	Day Post-Treatment When Killed	Weight Kg.	Carcass Weight Kg.	Carcass Percentage Age	Uterus Weight gm.	Weight of ovaries gm.	Number and size of Follicles		Weight of Corpus Luteum gm.
							No.	Size	
892	11	55.00	25.00	45.45	38,000	2,550	7	2—3 8	0.380
933	11	41.00	19.00	46.32	38,000	1,998	1	2	0.430
974	11	51.00	27.00	52.94	43,000	2,550	1	8	—
1032	11	49.00	24.00	48.98	41,000	1,550	Gun	Shot	—
1067	11	43.00	20.00	46.51	38,000	2,180	3	2	0.350
1152	11	51.00	25.00	49.02	36,000	1,500	1	8	0.330
							0	8	0.350
Average	48.33	23.33	48.27	39,000	2,055	—	—	0.368
979	21	65.00	32.00	48.23	55,000	3,700	5	2—4	0.220
1165	21	41.00	19.00	46.32	38,000	1,700	1	9	0.230
							4	1—2	
							1	11	
Average	53.00	25.00	48.11	46,650	2,700	1	11	0.230
verage	53.00	25.50	48.11	46,650	2,700	—	—	0.225

for such high percentage of silent heat ; since it must be inherent in this breed of sheep. However, every effort should be made to look into this problem ; especially that its frequency is the highest during the mating season.

The observation by Evans, et al. (1962) that ewes fed Provera for a longer time came to heat later was not substantiated by the present work. However, there were only three ewes in this study to warrant a serious comparison.

From the present study, some additional information is worth mentioning. Twinning is apparently quite seldom in the Rahmani breed. When lambing time for the experimental animals arrived, four ewes which continued to cycle after mating during the first posttreatment estrus, and which were presumed to be barren lambed exactly five months after mating. These ewes then must have been pregnant, yet exhibiting signs of estrus. Two of these four ewes had estrus four times during their first two months of pregnancy ; while the other two had estrus once during the same period. This incidence amounts to 21.05 per cent of pregnant ewes ; and thus raising the conception rate from 65.52 per cent as mentioned before to 79.24 per cent. Whether ovulation accompanied estrus in these cases remains to be studied.

It could be concluded that the Rahmani ewes behaved about the same manner to Provera feeding as the American breeds of sheep. As long as feeding Provera continued, estrus was prevented ; especially if given earlier than three days before the expected heat. Within 10 days after the termination of the treatment, 100 per cent of the ewes, the abnormal one excluded, either showed signs of estrus or had silent heat.

Another point which needs further investigation is the failure to conceive for the three ewes fed Provera for 26 instead of 18 days. Whether this was a coincidence or

due to the prolonged treatment awaits careful study. It is also hoped to extend the present work after grouping the experimental animals according to their stages of their estrous cycles after determining the dates of their previous heat.

SUMMARY

Forty mature Rahmani ewes were individually fed 58 mg. Provera daily for 18 days. The treatment was successful in preventing estrus as long as feeding Provera continued; especially if the treatment started earlier than 3 days before next estrus. Within 10 days after the termination of feeding Provera, 72.50 per cent showed signs of heat; while the remainder had silent heat. The treatment was not responsible for this high incidence of silent heat. In ewes not conceiving when mated at the first post-treatment estrus, heat was essentially synchronized. Conception rate was 65.52 per cent. However, four ewes which continued to cycle after mating and which were presumed barren, lambed 5 months after service at the first post-treatment estrus. These four ewes then showed signs of heat while pregnant, and thus should be added to raise the conception rate to 79.24 per cent.

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المخلص

تأثير التغذية بمركب البروجسترون على الأغنام المصرية

غذيت أربعين نعجة رحمانى تامة النمو على مادة البروفيرا بواقع ٥٨ مللجم لكل نعجة يوميا لمدة ١٨ يوما .

وقد كانت المعاملة ناجحة في منع ظهور الشبق طول مدة المعاملة خصوصا إذا أعطيت مبكراً عن ثلاثة أيام قبل ميعاد الشبق التالى . وفى خلال ١٠ أيام من انتهاء التغذية على هذه المادة ٧٢٥/ من النعاج ظهرت عليها علامات الشبق وكانت نسبة الحمل فى هذه النعاج ٦٥٢/٦٥٠ كما أن النعاج التى لم تحمل تكررت فيها دورة الشبق فى مواعيد متناسقة .

أما فى النعاج التى لم تظهر عليها علامات الشبق فقد كان سبب ذلك راجعاً إلى الشبق الصامت . ولم يكن راجعاً لتأثير المعاملة .