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ESTRUS SYNCHRONIZATION AND KIDDING RATE IN DOES TREATED WITH VAGINAL SPONGE

(With 3 Table)

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تنظيم الشبق ومعدل الولاده في الماعز بواسطة الاسفنجه المهبليه

جمال العمراوى ، فكرى حسين ، إيمان البواب

تم اجراء تنظيم للشبق فى ماعز من نوع السنن (saanen goat) باستخدام الاسفنجه المهبليه أثناء وفى غير موسم التكاثر. أجريت الدراسه بتجربتين اشتملت على ٦٠ حيوان للمعالجه و٣٠ حيوان كمجموعه ضابطه لكل تجربه. فى موسم التكاثر حقنت الماعز بـ٤٠٠أو ٥٠٠ وحده دوليه من مصل الافراس العشار (PMS) فى يوم ازالة الاسفنجه المهبليه أما فى غير موسم التكاثر فقد حقنت الماعز بـ٦٠٠ أو ٧٠٠ وحده دوليه من مصل الافراس العشار وذلك قبل ازالة الاسفنجه بيومين. جميع الاناث التى أظهرت الشبق تم تلقيحها باستخدام جديان خصبه وبعد ذلك تم الكشف عن الحمل عند اليوم الخمسين باستخدام الموجات فوق الصوتيه وبعد ذلك تم حساب عدد الحيوانات العشار بعد الوثبه الاولى وكذلك عدد السخلان المولوده (مفرد - توأم - ثلاث). أشارت النتائج الى الآتى : كل الحيوانات التى عولجت بالاسفنجه المهبليه فى أثناء وفى غير موسم التكاثر ظهرت عليها علامات الشبق. نسبة الحمل والولاده كانت أعلى فى الحيوانات التى عولجت فى موسم التكاثر عنها فى غير موسم التكاثر . الحيوانات التى حقنت بجرعه أقل من مصل الافراس أثناء موسم التكاثر أو فى غيره أعطت نسبه عاليه من معدل الحمل والولاده وأيضاً نسبه أعلى من ولادة التوأم و الولاده الثلاثيه وذلك أكثر من الحيوانات التى حقنت بجرعات أعلى.

SUMMARY

Estrus was synchronized in Saanen goats by using vaginal sponge during breeding and non breeding season. Two experiments were conducted (60 treated and 30 non treated goats in each experiments). In the breeeding season, the goats were injected with 400 or 500 IU PMS, which was carried out at the day of sponge removal. While outside the breeding season, the doses of PMS were 700 or 600 IU and the injection was 2 days before sponge removal. The goats exhibiting cyclicity were allowed to be serviced by fertile bucks. The pregnant does were detected at day 50 post service by using the scanning technique. The total numbers of parturient does and type of birth were recorded. The results of the present investigation indicated that all the treated goats exhibited cyclicity during the breeding and non-breeding season. The treated goats gave a higher percentage of pregnancy and kidding rates during breeding season than outside the breeding one. The animals that were injected with low doses of PMS gave a high percentage of pregnancy and kidding rates during the breeding and outside the breeding season, a high incidence of twins and triplets was recorded between the goats that were injected with low doses of PMS.

INTRODUCTION

During the breeding season, oral administration of 6-methyl-17 acetoxy progesterone was used to synchronize estrus in sheep and cattle *(EVANS* et al., *1962; HINDS* et al., *1964; DHINDSA* et al., *1966 and DHINDSA* et al., *1967). VELLE* et al. *(1964)* reported that about 80% of goats treated orally with 6-methyl-17 acetoxy-progesterone (MAP) came in estrus on the third or fourth day following cessation of the later treatment with a conception rate of 77% following artificial breeding on the first estrus.

Programs for synchronization of estrus and ovulation in goat have been based on the use of progestogen *(DHINDSA* et al., *1971; FUENMAYOR* et al., *1973 and CORTEEL, 1975).* Injection of 500 IU of PMS at the time of sponge removal resulted in estrus in all goats. The administration of 500 IU PMS and HCG for each large goats insured ovulation and increased the ovulation rate

in the large goats *(SMITH, 1986)*. *CORTEEL (1977)* have used a 21-day progestogen treatment followed by 400 IU PMS in the breeding season with conception rates ranging from 55 to 70% following artificial insemination at the induced estrus. Low percentages of conception and kidding rates were obtained by *STAGNARO et al. (1978)*. They inserted the sponges for 19 days, followed by 500 IU PMS injection on time of sponge withdrawal.

Outside the breeding season, *SMITH (1986) and MAVROGENIS (1988)* reported that vaginal sponges implanted for 16 to 21 days could be used successfully for estrus synchronization resulting in 40 percent conception with artificial insemination. They added that administration of 400 to 600 IU of PMS 48 hours before sponge removal improves fertility, resulting in 65 percent conception rate. The fertility of goats was improved during non breeding season following treatment with vaginal sponge and human menopausal gonadotropin *(CAIROLI et al., 1987)*.

This study was conducted to investigate the followings:

1- Effectiveness of vaginal sponge for estrus synchronization in breeding and outside breeding season in Saanen goats.
2- The effect of PMS doses on the conception and kidding rates, and
3- The influence of PMS doses on the type of birth.

MATERIAL and METHODS

This study was carried out on 180 Saanen goats in a private farm close to Alexandria province.

The goats were kept in corrals during day and night all over they year. Breeding of the animals depended on natural service by fertile bucks. The scanning technique (transabdominal) was used to diagnose pregnancy at day 50 post service.

In November (breeding season) 60 Saanen goats were assigned for estrus synchronization by using vaginal sponge (Chrono-gest 45 mg Flugestone acetate - Intervet Comp.) and 30 animals were left untreated as control (group 3). The sponge was inserted into vagina and remained there for 17 days. At the time of sponge removal the goats were assigned into 2 groups according to the dose of PMS injected. Goats in group I (n = 30) received 500 IU PMS each, while in group 2 (n= 30) each goat injected with 400 IU PMS. The number of goats, came in heat, pregnant, kidding and the type of birth were recorded.

During July (outside the breeding season) a total of 90 goats were assigned into 3 groups (30 in each). In the first 2 groups (groups 4 & 5) estrus was synchronized by using vaginal sponges, while in the third group (group 6) the animals were

kept untreated as a control. All sponges were removed after 17 days. 48 hours before sponges removal the goats were treated with 700 and 600 I.U. of PMS for the first and second groups respectively. Estrus was recorded for each goat. The parameters were recorded as mentioned before.

Statistical analysis was carried out with SPSS.X program in a VAX750 computer (SPSS, INC., 1983).

RESULTS

All goats that were treated with vaginal sponges and received either 500 IU PMS (group 1) or 400 IU PMS (group 2) exhibited signs of estrus. While in control group, 70% of the does came to heat at the same period. In group 1, 22 (73.3%) out of 30 does became pregnant after the first service. Higher percentage (86.6%) of pregnant goats was found in group 2. In non-treated animals, 17 (56.6%) does became pregnant from 21 which exhibited estrus. Statistically, the difference between grops were significant ($P<0.05$) (table 1).

Of the does that received 500 IU PMS, 19(63.3%) goats kidded. Six (31.5%) of them gave single kid. Eight does (42.2%) had twin kids, The remainder (5) goats (26.3%) gave triplet kids. The average kid/doe was 1.9 (37/19) (table 2).

The does injected with 400 IU PMS have 80.0% kidding rate, while it was 63.3% and 46.6% in groups 1 and 3 respectively. Four does delivered single kids and 14 gave twin kids. The other 6 does had triplet-kids (Table 2). The number of kids obtained from 24 parturient goats were 50 kids with an average of 2.1 kid per goat. In the control group, 14 does kidded from 17 pregnant does. Six (42.8%) of them were given single kid, while 8 does (57.2%) gave twin-kids. The total number of kids were 22 with an average of 1.5 kid per doe. The differences between the three groups were statistically non-significant in single and twin kids and significant ($P<0.01$) in triplet kids.

The findings in table 1 showed that in non breeding season, all the treated does with sponge and injected with 700 IU PMS (group 4) exhibited estrus signs and 15 of them became pregnant. While the does in group 5, 100% exhibited cyclicity and 18 (60%) became pregnant. The difference between the two groups was statistically significant ($P<0.05$). There were no cyclical changes detected in the non-treated does (group 6).

Results in table 2 showed that 11 goats (36.6%) in group 4, kidded. Two (18.2%) of them had single kid, while 6 (54.5%) had twin-kids and 3(27.3%) does gave triplet-kids. The total number of kids were 23 with an average 2 kid per goat, while

in group 5, 14 (46.6%) does kidded, of which 2 (14.3%), 7(57.2%) and 4(28.5%) had single, twin and triplet kids respectively. The does gave 30 kids, with an average 2.2 kid per doe. The differences between groups (4 and 5) were highly significant (P<0.01) when compared with the control group.

The results presented in table 3 indicated that the estrus signs occurred in all treated does with vaginal sponges during breeding or non breeding season. The percentage of the pregnant and kidding does (80 & 71.6%) during breeding season were higher than non-breading season (55 & 41.6%). There was a significant increase (P<0.05) in the number of pregnant and kidding does in breeding season than the non-breeding one.

DISCUSSION

In Egypt, does like ewes are seasonal polyestrous and they start cycling when the daylinght length shorten *(EL-BARBARI & abd el-latif, 1984 and KANDIL, 1988).* They added that heat signs are predominant from May to August and also from November until January in the Baladi goats.

The estrus was synchronized using vaginal sponge. The results revealed that all treated goats (100%) which received 500 or 400 IU PMS exhibited normal cyclicity. Similar results were reported by *DHINDSA et al. (1971), FUENMAYER et al. (1973) and STAGNARO et al. (1978). GONZALES (1977)* reported low percentage (90%) of the treated animals came to estrus.

The percentage of pregnant does following the estrus synchronization with vaginal sponge during the breeding season was 73.3% and 86.6% for the does in group 1 and 2 respectively. *GONZALES (1977)* reported that 76% does conceived during the first cycle and 81.5% conceived dring the second cycle.

The present results indicated that the goats, which received lower doses of PMS (400 IU) gave a higher percentages of conception and kidding rates than the goats reeived high doses of PMS (500 IU). The same conclusion was obtained by *(DHINDSA et al., 1971; ROBERTS, 1971 and BONO et al., 1984).* They reported that in large goats the increase in the dose of PMS leading to increase in the number of the follicles, some of which failed to ovulate. Van *RENSBURG (1964)* reported that injection of HCG into small and large goats, increased ovulation rate (P<0.01). Similarly injection of HCG at the first sign of heat after removal of vaginal sponge, will improve the successful ovulations consequently improve the percentage of fertility from 55% to 90% *(DHINDSA et al., 1971). NISHIKAWA et al. (1983); DHINDSA et al. (1971) and SMITH (1986)* found that the ovulation rate depend on the dose of HCG administered. It can be explained that the high doses of PMS (500 IU) gave low conception and kidding rates rather than low

dose (400 IU) because the present dose of LH was insufficient to induce the ovulation in the large follicles.

The incidence of the twins was higher in the does injected with 400 IU PMS than the does injected with 500 IU PMS. *HULET and FOOTE (1969)* reported higher incidence (75%) of twins after the treatment with PMS during estrus synchronization. However, *ROBERTS (1971)* found that high incidence of embryonic deaths when the does received a high doses of PMS. *LYNGEST (1968)* reported a higher rate of embryonic losses in goats when two ova were shed from the same ovary than when one ovum shed from each ovary. He observed higher rate of embryonic mortality when more than two ova were shed at the same time. *NAIR and RAJA (1973)* cited that the goat is usually a biparous animal, it is only natural that the ovum/emryo loss is higher when more than two ova are shed at a time. The low number of kids accompanied with the high doses of PMS in the present work may be referred to insufficient level of LH, high embryonic losses, and the breed differences.

During non breeding season, all does treated with vaginal sponge and injected with 700 or 600 IU. PMS exhibited normal cyclicity. Similar results were reported by *BRUNNER* et al. *(1964); BONO* et al. *(1984) and SMITH (1986).* They foundd that all the treated goats showed the normal signs of estrus following vaginal sponge removal.

The does received low dose of PMS (600 IU) gave a high conception (60%) and kidding (46.6%) rate compared with the goats injected with 700 IU PMS, where the conception and the kidding rates were 50% and 36.6% respectively. *DUTT (1953) and BRUNNER* et al. *(1964)* found that the fertilization rate was 50-60% when the estrus induced in all anestrus does treated with vaginal sponge. *MOORE and HOLST (1966)* reported that about 65 percent of eggs recovered from mated does were fertile and 50 percent of the does were kidding. *ROBERTS (1971)* reported that the embryonic mortality was high in the does receiveing high dose of PMS. While *DZUIK* et al. *(1968) and CAIROLI* et al. *(1987)* cited that in the middle of the anestrous season 67% does were kidding after estrus synchronization by using vaginal sponge and injection of PMS + 250 IU HCG. *BONO* et al. *(1984)* cited that the LH level dropped although some follicles still unovulated. It could be suggested that the high doses of PMS (700 IU) gave low conception rate and kidding rate, it may be to insufficient doses of LH to cause ovulation of the large follicles andd/or embryonic losses. Contrary, *WENTZEL and MULLER (1979)* recorded that the induced oestrus by hormonal treatments [methyle acetoxyprogesterone (MAP) intravaginal

sponges + PMS + LHRH] in Angora goats in the middle of the non-breeding season, none of the does conceived in spite they were mated twice daily during estrus.

Generally, low doses of PMS during breeding season (400 IU) or non-breeding season (600 IU) gave a high percentage of conception and kidding rates. It may be attributed to insufficient LH amount which is essential for ovulation of the large follicles that are formed due to superovulation (using PMS). It could be suggested that 400 and 600 IU PMS doses during the breeding and non-breeding season are suitable for estrus synchronization in Saanen goats.

Low doses of PMS (600 IU) gave a high percentage of twins and triplets. *ROBINSON* et al. *(1967)* reported that low dose of PMS gave good results of estrus synchronization and a high incidence of twins and triplets. High incidence of twin kid in both groups in the present work is referred to that the goat is biparous animal. *NAIR and RAJA (1973)* cited that the goat is usually biparous animal and embryonic losses are higher when more than two ova are shed at the same time for each ovary.

Goats treated with vaginal sponge during breeding season gave a higher significant conception and kidding rates than those treated outside the season ($P<0.05$). *Henderson (1985)* reported that the HCG must be injected for synchronized does outside the breeding season because the gonadotropin hormone is insufficient, to stimulate estrus in does during non-breeding season, HCG injected in a rate of 600 IU, 500 IU and 300 IU in July, August and September respectively. From October onwards HCG is not required. *BONO* et al. *(1984)* cited that there is a low LH level in the synchronized estrus during non-breeding season which lead to low ovulation rate. In ewes *GHERARDI and LINDSAY (1980)* reported that the response in ovulation rate of ewes treated with PMS varied significantly through the year.

It could be suggested that the use of vaginal sponge was helpful in estrus synchronization during breeding and outside the breeding season. It was not necessary to use the high doses of PMS to obtain a high pregnancy and kidding rates.

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Table 1. Occurrence of estrus, pregnancy and kidding rates after treatment with vaginal sponge in Saanen goats.

Season	Group	Treatment	Estrus does		Pregnant does		Kidding does	
			No.	%	No.	%	No.	%
Breeding season	G1(n=30)	Sp.+500IU PMS	30	100	22*	73.3	19	63.3
	G2(n=30)	Sp.+400IU PMS	30	100	26	86.6	24	80.0
	G3(n=30)	Untreated	21	70.0	17	56.6	14	46.6
Non- Breeding Season								
	G4(n=30)	Sp.+700IU PMS	30	100	15	50.0	11*	36.6
	G5(n=30)	Sp.+600IU PMS	30	100	18**	60.0	14	46.6
	G6(n=30)	Untreated	00	000	00	00.0	00	00.0

Sp.= Sponge
* significant (P<0.05).
**highly significant (P<0.01).

Table 2. Effect of PMS doses on type of birth and number of kids.

Groups	Treatment	Kidding does	Type of birth						Total Kids	Average kid\doe
			S.		T.		Tr.			
			No.	%	No.	%	No.	%		
Breeding season:										
g1(n=30)	Sp.+500IU PMS	19	6	31.5	08	42.2	5	26.3	37	1.9
g2(n=30)	Sp.+400IU PMS	24	4	16.6	14	58.4	6**	25.0	50	2.1
g3(n=30)	Untreated	14	6	42.8	08	57.2	0	00.0	22	1.5
Non breeding season:										
g4(n=30)	Sp.+700IU PMS	11	2	18.2	06**	54.5	3**	27.3	23	2.0
g5(n=30)	Sp.+600IU PMS	14	2	14.3	08	57.2	4**	28.5	30	2.1
g6(n=30)	Untreated	00	0	00.0	00	00.0	0	00.0	00	0.0

Sp.= Sponge S.= Single T.= Twin Tr. Triple g= group.
**highly significant (P<0.01).

Table 3. Effect of season on occurrence of estrus, pregnancy and kidding rates in Saanen goats treated with vaginal sponge.

Season	Estrus does		Pregnant does		Kidding does	
	No.	%	No.	%	No.	% (n=60)
Breeding	60	100	48*	80	43*	71.6
Non-breeding	60	100	33	55	25	41.6

* significant (P<0.05).