

USE OF FLUOROGESTONE ACETATE TO SYNCHRONIZE ESTRUS EITHER DURING BREEDING OR OUT BREEDING SEASON IN DAMASCUS GOATS

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ABSTRACT

One hundred clinically healthy non-lactating Damascus goats (2.5 - 6 years old) were used in this study; 52 treated (T) and 48 control (C). In group T, does were treated with intra vaginal sponges inserted for 17 days. At sponges withdrawal, the does were treated with 400 IU PMSG inter muscular (im) followed by 0.7 ml PGF₂α during the breeding season or 700 IU PMSG 48 h before sponge withdrawal (Day 15) and 0.7 ml PGF₂α on the day of sponge withdrawal (Day 17) during out breeding season according to the manufacturer procedure. All treated does were artificially inseminated with fresh or frozen semen at 52 h after sponge withdrawal. Expressed estrus %, time at onset of estrus and kidding rate were recorded.

Does in group C were allowed for natural mating or were exposed to fertile bucks for a period of 35 days (2 estrus cycles) during the breeding or out breeding seasons contemporary to that of treated does.

Expressed estrous came to 70% in May 2005 and 60% in May 2006 (out breeding seasons), while was 86.4% in September 2004 and was 90% in September 2005 (in the breeding season). Time post-treatment to onset of estrus was earlier during out of season treatments compared with during season treatments Kidding percentage of the treated does in the breeding seasons was 81.8% in September 2004 and 70.0 in September 2005 while being 40% in out breeding seasons. Does of group C conceived only in the breeding seasons.

Use of Fluorogestone Acetate was effective to synchronize estrus either during breeding or out breeding season with acceptable kidding rate in Damascus goats.

Keywords: *Damascus Goats, Fluorogestone Acetate, estrus synchronization, breeding season, out breeding season.*

INTRODUCTION

Damascus goats proved well adaptation to the Egyptian prevailing conditions, more acceptable by the Egyptian farmers and local market, either for the pure breed or its crossbred with Barki or Baladi goats (Saifelnasr, *et al.*, 2003). The mating season of Damascus goats occurs late in August until early November and does normally kid once per year in Syria (Zarkawi *et al.*, 1999), in Cyprus (Constantinou, 1981) and in Egypt

(Shalaby *et al.*, 1998). High demand for goat milk with good prices, especially for manufacturing to goat cheese, needs the availability for goat milk all round the year.

Understanding the seasonality of reproduction in female goat and its sequence under the local conditions is important for planning breeding programs and allowing maximum utilization of these animals throughout their productive life. It is also important for the planning kidding season to fit availability of feed resources and demands to milk and meat (Aboul-Ela and Chemineau, 1988 and Chemineau *et al.*, 1992).

Induction of estrus has been widely studied and used worldwide (Patil *et al.*, 2000; Motlomelo *et al.*, 2002 and Fonseca *et al.*, 2005). Under sup-tropical conditions, however, such as in Egypt, further studies are necessary.

The objective of the present study was to evaluate the efficiency of hormonal synchronization/induction of estrus during or out the breeding seasons in Damascus goats.

MATERIALS AND METHODS

1. Location

The present study was carried out at Sakha Animal Production Experimental Research Station, belonging to the Animal Production Research Institute, Ministry of Agriculture, Egypt. (latitude 22° 42' N, longitude 30° 45'). The local average altitude was 692.73 m, annual average temperature of 20.9 °C and annual rainfall of 1203 mm³.

2. Experimental animals.

One hundred clinically health non-lactating Damascus does (2.5 - 6 years old) was selected randomly to be used in this study. The experimental does were kept in semi-open sheds. The does were fed concentrate feed mixture (14% CP and 70% TDN) and roughages (Egyptian clover during winter or clover hay during summer) according to NRC (1984) for production of 1-2 kg milk/head/day. Animals were allowed free access to water, salt and mineral blocks.

Exp.	Season	No. of does		Type of semen
		Treatment	Control	
1	Breeding (September 2004)	22	21	Fresh semen
	Out breeding (May 2005)	10	10	Frozen semen
2	Breeding (September 2005)	10	10	Frozen semen
	Non-breeding (May 2006)	10	7	Frozen semen
Total		52	48	

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The present work consisted of two experiments carried out during two successive years throughout the period from 2004 to 2006 as follows:

Does in each experiment were divided into two groups considering age, body weight and body condition. In the 1st group (T), does were treated with intra vaginal sponges containing 45 mg Flugestone acetate (FGA), inserted for 17 days period. At sponge withdrawal, the does were treated with 400 IU PMSG im (Folligon, Intervet International B.V. Boxmeer-Holland) followed by 0.7 ml PGF2 α . Each ml of Estrumate contained 263 mg Cloprostenol Sodium equivalent to 250 mg Cloprostenol. (Estrumate, Coopers Animal Health LTD, Berkhamsted-England) during the breeding season or 700 IU PMSG 48 h before sponge withdrawal (Day 15th) and 0.7 ml PGF2 α on the day of sponge withdrawal (Day 17th) during the non-breeding season according to the manufacturer procedure.

After sponge removal two mature aproned bucks were introduced to does for detection of estrus onset. Estrus detection was performed at 4 h interval till 36 hours after sponge removal. Does which were seen to be receptive (standing for mounting by the teaser) were considered in heat.

Does in the control groups (C) were exposed to fertile bucks for a period of 35 days (2 estrus cycles) during the breeding and out of the breeding seasons contemporary to that of treated does, Hand mating was applied for those came in estrus.

2.3. Insemination.

In the breeding season of September, fresh diluted semen was used. Collected semen were frozen during the breeding season and stored in liquid nitrogen for use during the out breeding season and following breeding seasons. Tris-yolk extender was used for the extension of both fresh and frozen semen. Frozen semen was prepared according to **Evans and Maxwell (1987)** and **Maxwell *et al.* (1995)**. In the breeding season (September 2004), does were inseminated with fresh semen, while treated does in other seasons were inseminated with frozen semen.

2.4. Statistical analysis.

Data were analyzed using **SAS (1999)**, and Chi-square. Duncan Multiple Range test (**Duncan, 1955**) was used to get the means separation among the effects of seasons, treatments and type of semen for the studied traits.

RESULTS AND DISCUSSION

1. Estrus response.

1.1. Expressed estrus percentage.

Expressed estrous percentage (the percentage of does that expressed estrous behavior of those treated) in the two experiments are shown in Table (1). Expressed estrous was 70% in May 2005 and 60% in May 2006 out breeding season. While in the breeding seasons it was 90% in September 2004 and 86.4 in September 2005.

Expressed estrous % in the breeding seasons (September, 2004 and September, 2005) was 86.4% and 90%, respectively. These results are slightly low compared with 100% reported with Amrawi *et al.* (1993) and Chemineau (1985). Amrawi *et al.* (1993) found that expressed estrus % was 100% during the breeding season with Saanen goats treated by FGA-sponge for 17 days followed by 400 or 500 IU PMSG at sponge withdrawal. They found that 100% of treated goats showed estrus behavior. Also Chemineau (1985) found 100% estrus in Creole goats with FGA-treatment.

Table 1. Expressed estrus % in Damascus goats treated by vaginal sponge for estrus synchronization/induction in the breeding or out breeding seasons.

Experiment	Season	NT	NE	Expressed estrus %
1	September 2004 (in)	22	19	82.3
	May 2005 (out)	10	7	70
2	September 2005 (in)	10	9	90
	May 2006 (out)	10	6	60

NT= Number of treated does; NE= number of does expressed estrus
in = breeding season; out = out breeding season.

1.2. Time post treatment to onset of estrus.

The time post-treatment to onset of estrus was earlier during out of season treatments (May 2005 & May 2006) compared with that of during season treatments (September 2004 & September 2005) as shown in table (2). These results are in agreement with the results of Boer goats that exhibited estrus 29.4 h after the end of treatment with FGA-sponge + PMSG + PGF2 α for 14 days out of the breeding season (Holtz and Sohnrey, 1992). In addition, out of the breeding season, Baril *et al.* (1993) reported that estrus occurred 24-72 h after taking off sponges in Saanen and Alpine goats following 11 days treatment with progesterone analogue, PMSG and PGF2 α . In Damascus goats, estrus occurred in the breeding season after 24 - 48 h following 16 day progesterone analogue+PMSG treatment (Mavrogenis, 1988) and was induced out of the breeding season at 21-68 h post 18 days MAP-sponge and PMSG treatment (Zarkawi *et al.*, 1999).

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Table 2. Time post treatment to onset of estrus (h) (Occurrence and distribution (%) in Damascus goats treated by vaginal sponge for estrus induction/synchronization.

Exp.	Season	NT	NE	Time post treatment to onset of estrus				
				Occurrence time (h)	Distribution (%)			
					24 h	28 h	32 h	36 h
1	Sept. 2004(in)	22	19	30.3±0.7 ^a	5.3	42.1	42.1	10.5
	May 2005(out)	10	7	27.4±1.0 ^b	28.5	57.1	14.2	-
2	Sept. 2005(in)	10	9	28.4±1.0 ^{ab}	22.2	44.4	33.3	-
	May 2006 (out)	10	6	28.7±1.2 ^{ab}	16.7	50.0	33.3	-

NT = Number of treated does; NE= number of does expressed estrus
in = breeding season; out= out breeding season.

Means bearing different small letters within each column differ significantly (P<0.05).

2. Kidding percentage and litter size:

Data in Table 3 show that kidding rate of treated does in the breeding season (September, 2004) was higher (81.8%, P>0.05) than that of the control (47.6%). Out of the breeding season, the control does did not conceive, but values of kidding % for treated does was 40 % in both May 2005 and 2006. While, fertility rate obtained in September 2005 was 70%.

Result of kidding % in September 2004 in treated does (81.8%) is much higher than fertility resulted in European dairy goats (55.8-58.8%) when treated in the season with FGA-sponge + PMSG (Corteel, 1975). However, in that work, treatment did not involve PGF2a which had been given at sponge withdrawal in the present study. Level of 58.5% kidding during the transition from non breeding to breeding season in different breeds of goats studied by East and Rowe (1989) was obtained following the same protocol used in the present study. Those levels lie within the range of 40-70% resulted in this study in early and late August.

Concerning litter size, the highest value was recorded in September 2004 and 2005 (2.16 and 1.71, respectively) compared to litter size of does in the control group (1.5 and 1.42) in September 2004 and 2005, respectively (Table 3). Differences in litter size may be related to gonadotrophin dose. It is of interest to remind that doses of PMSG used in the present work were 400 IU at sponge removal in September breeding season and 700 IU 48 h before sponge withdrawal in May out of the breeding season.

Table 3. Kidding percentage and litter size in Damascus goats treated by vaginal sponge for estrus induction/synchronization.

Experimental	Group	Total	Does kidded		No. kids born	Litter size (M±SE)
			N	%		
September 2004 ^f	T	22	18	81.8 ^a	39	2.16±0.23 ^a
	C	21	10	47.6 ^b	15	1.50±0.15 ^b
May 2005 ^z	T	10	4	40.0	8	2.00±0.71
	C	10	0	0.0	0	0.0
September 2005 ^z	T	10	7	70.0	12	1.71±0.28 ^a
	C	10	7	70.0	10	1.42±0.20 ^b
May 2006 ^z	T	10	4	40.0	7	1.75±0.16
	C	7	0	0.0	0	0.0

^f = insemination with fresh semen.

^z = insemination with frozen semen.

Group means bearing different letters differ significantly (P<0.05).

4. Effect of type of semen (fresh vs. frozen):

Comparison had been made between the use of fresh semen in September 2004 and the use of frozen semen in the other seasons on fertility rate (Table 3). Kidding rate was significantly (P>0.05) higher for does inseminated with fresh than that with frozen semen (81.8 vs. 70% in the breeding season).

Karatzas et al. (1997) reported fertility rates of 65.5 and 53.4% following insemination with fresh and frozen semen, respectively.

CONCLUSION

From the obtained results it could be concluded that:

- Estrus can be synchronized or induced by using vaginal sponges impregnated with fluorogestone acetate (FGA) in the breeding or out of the breeding season.
- The percentage of does expressed estrus within the first 36 h after sponge removal is an important factor that should be observed in AI programs.
- In case of natural breeding, the number of females being synchronized or induced must be in a manner considering the number of bucks in the herd, to prevent over use of bucks and corresponding decreased fertility.

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إستخدام مادة الفلوروجيستون أسيتات لإستحداث التزامن الشبقي داخل أو خارج موسم التناسل في الماعز
الدمشقي.

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1. قسم بحوث الأغنام و الماعز- معهد بحوث الانتاج الحيواني

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أستخدم في هذه الدراسة 100 معزة دمشقي جافة خالية من الأمراض (عمر 2.5-5 سنوات) . قسمت الحيوانات إلى مجموعتين الأولى مجموعة المعاملة (52 معزة) والثانية مجموعة المقارنة (48 معزة). في مجموعة المعاملة تم وضع الأسفنجات المهبلية المشبعة بمادة الفلوروجيستون أسيتات ثم نزعت في اليوم الـ 17 . بعد نزع الإسفنجات مباشرة تم حقن الماعز ب 400 وحدة دولية من هرمون الفرس الحامل ثم 0,7 مل من الإستروميت خلال موسم التناسل بينما تم حقن الماعز 700 وحدة دولية من هرمون الفرس الحامل قبل نزع الأسفنجات بمدة 48 ساعة و 0,7 مل من الإستروميت بعد نزع الأسفنجة مباشرة حسب مواصفات المنتج. الماعز المعاملة تم تلقيحها أصطناعيا بسائل مبرد أو مجمد عند مرور 52 ساعة من نزع السفنجة. تم تسجيل النسبة المنوية لظهور الشياح والوقت عند بداية ظهور الشياح ومعدل الولادة.

الماعز في مجموعة المقارنة تم تعريضها لطلائق مخصبة لمدة 35 يوم (2 دورة شبقي) للتلقيح خلال موسم التناسل أو خارج موسم التناسل في الوقت المقابل للمعاملة.

كانت النسبة المنوية لظهور علامات الشبق علي الماعز المعاملة 70% في موسم مايو 2005 وكانت 60% في موسم مايو 2006 خارج موسم التناسل بينما كانت 86,4% في سبتمبر 2004 وكانت 90% في سبتمبر 2005 خلال موسم التناسل. كانت المدة اللازمة لظهور الشياح بعد نزع الإسفنجات مبكرة خارج موسم التناسل مقارنة بداخل موسم التناسل. معدل الولادات داخل موسم التناسل كان 81,8% في سبتمبر 2004 وكان 90% في سبتمبر 2005 بينما كان 40% خارج موسم التناسل في كلتا السنتين. لم تحدث حالات ولادة في مجموعة المقارنة خارج موسم التناسل وكانت الولادات في موسم التناسل فقط. ونستطيع ان نقول ان استخدام مادة الفلوروجيستون أسيتات لإستحداث تزامن الشبق داخل أو خارج موسم التناسل في الماعز الدمشقي كان فعالا مع تحقيق معدل ولادات مقبول.