

## DURATION OF ESTROUS CYCLE AND DURATION OF ESTRUS IN LOCAL GOATS IN THE REGION OF KABYLIA (ALGERIA) "BEHAVIORAL STUDY"

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**Abstract.** *The study was conducted in 16 local goats in the region of Kabylia (Algeria) for a period of 13 months. The goats were kept non-pregnant and permanent presence of an intact buck with a deck preventing mating. Detection twice daily (morning and evening) of heat for 30 minutes was carried out by direct observation. During the 13 months of the study 149 estrus and 135 estrus cycles were detected. It was found that these goats are three types of cycles of different durations. Cycles lasting 15 to 25 days considered normal with a percentage of 49% and an average of 19.23 days. Cycles of short duration, from 3 to 14 days with a percentage of 45% above that observed for the resumption of sexual activity and seem characteristic of goats. As these cycles there are also long-term cycles from 26 to 35 days, but with small numbers with a percentage of 6%. The duration of estrus recorded ranged from 12 hours to 72 hours, with an average of 34.3 hours. We found that the duration of estrous is especially longer in autumn, with an average of 36.75 hours.*

**Keywords:** Algeria, local goat, cycle duration, estrus.

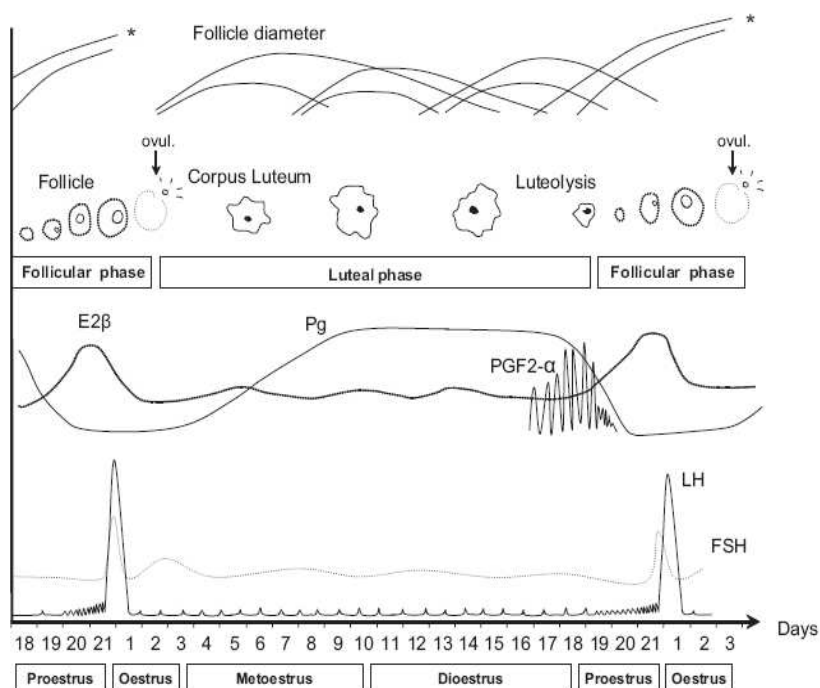
### INTRODUCTION

The non-pregnant female has a cyclic sexual activity from puberty; that sexual activity leads to a succession of specific events occurring at constant intervals, at a pace suitable for each species, this is the sexual cycle. In some species under certain conditions, for example related to changes in day length (photoperiod), the cyclic activity may be suspended temporarily in most females. During the breeding season, females may show several successive estrous cycles and the number of successive cycles depends on the length of the breeding season and breed of goat.

A sexual cycle is a repetition of estrus accompanied by ovulation at regular time intervals, varying according to species.

The sexual cycles are reflected in the appearance of heat (estrus) in the estrous cycle or ovulation during the ovarian cycle (Figure 1). The estrus cycle duration is relatively characteristic of the species, but has, however, significant individual variations (Good et al, 1988). This duration is determined by the time interval between two (02) consecutive heats. It is about 21 days on average in the goat (Figure. 1), with variations among individuals 16 to 23 days (Camp et al, 1983) and (Buggin, 1990). In addition to these normal cycles, short cycles and long cycles

can be observed. The behavior of estrus also varies in duration, according to different authors. It can range from 22 to 60 hours (Greyling, 2000).



**Fig. 1. Schematic representation of the different physiological events occurring during estrous cycle in goat: pattern of follicle development, ovarian cycle and endocrine regulations. \*Ovulatory follicle(s). Adapted from (Baril et al. 1993 a) and (Evans. 2003)**

Our present work aims to determine the duration of estrus cycle and the duration of estrus in local goats in the region of Kabylie (Algeria).

For this, we undertook a study based on clinical assessment of changes in the behavior of estrus during a period of 13 consecutive months.

## MATERIAL AND METHOD

The experiment was conducted in a goat breeding in the wilaya of Tizi-Ouzou (Kabylia region) located about 100 km east of the capital Algiers (latitude 36 ° 20 'N and 36 ° 50' N and longitudes 3 ° 40 'E and 4 ° 35' E). The wilaya of Tizi-Ouzou has a climate characterized by rainy winters and mild, and hot dry summers. This kind of climate regime, known as the Mediterranean climate, (meteorology center of Algiers, 2010). The annual average temperature varies between 15 and 18 ° C, minimum temperatures in the range of 3 to 8 ° C are recorded in January and maximum temperatures in the range of 28-35 ° C are reached in August,

Sixteen (16) local breed goats were randomly selected, and which age is of 05 months to 05 goats and two years or more for the other 11 goats. The average live

weight was 11.5 kg and 28kg respectively for (small) goats and adult goats. These females have undergone no manipulation of sexual activity and are preserved including any fecundation.

In addition to the 16 goats we used a buck for heat detection; it is aged about 03 and half years with a body weight of 42kg. The whole of herd received the same diet throughout the period of the experiment. The animals received a daily ration consisting of; clover hay, a concentrate (ground barley) and bran is distributed at a rate of 500 g / day / animal. On top of that, the input acquired by the open grazing (rangeland). Water is distributed at will.

To determine the duration of estrous cycles and duration of estrus to be registered, the 16 goats were left for 13 consecutive months in constant contact with the intact buck with a deck preventing mating that is used to detect of heat. Estrous activity was assessed by a careful detection of heat by direct observation twice daily (morning and evening) for half an hour. A female was seen in heat when she became receptive to the buck, stopped and accepted the overlap. The cycle duration is the time interval between two consecutive estrus, and duration of heat (estrus) is the period during which the goat leaves overlap.

## RESULTS AND DISCUSSION

We have retained just 14 of the 16 goats, two goats (No. 02 and No. 09) were pregnant after overlapping by the buck (by mistake) and were excluded from the study.

**Estrous cycle Duration:** The number and duration of cycles (short, normal, long) recorded during the period of the study are reported in Table 1.

**Table 1**

**Number of cycles recorded in relation to their durations for each goat**

<b>Total</b>	11	17	9	20	20	15	11	3	8	1	7	1	6	6	<b>135</b>
Goats Number	<b>01</b>	<b>03</b>	<b>04</b>	<b>05</b>	<b>06</b>	<b>07</b>	<b>08</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>Total</b>
<b>3 to 14 days (short)</b>	2	10	2	13	14	2	5	0	4	0	2	1	2	4	<b>61</b>
<b>15 to 25 days (normal)</b>	7	4	7	7	6	13	6	2	3	1	4	0	4	2	<b>66</b>
<b>26 to 35 days (long)</b>	2	3	0	0	0	0	0	1	1	0	1	0	0	0	<b>8</b>

Number of cycle

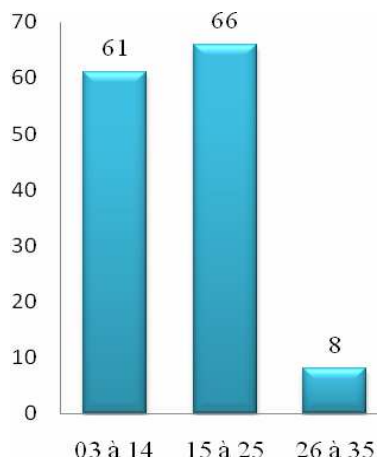


Fig. 2. Number of recorded cycle in relation to their durations

Cycle duration(days)

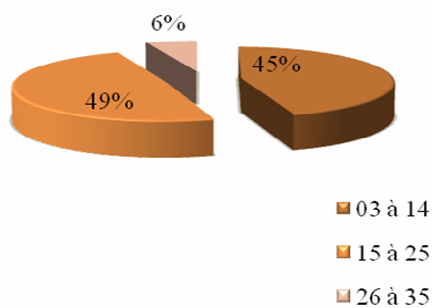


Fig. 3. Percentage of duration of cycles recorded (short, normal, long) in days

The percentages of different cycles durations encountered during the entire study are shown in Figure 4.

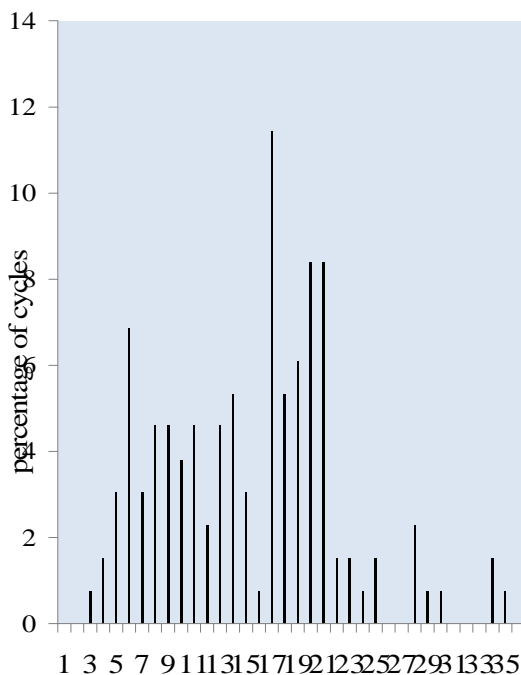


Fig. 4. Percentages of different cycle durations recorded

The results of the estrous cycle duration show that the local goat in the region of Kabylia in addition to the normal cycles (15-25 days), present a great percentage of short cycles ranging from 3 to 14 days which are mainly found in the onset intensity of sexual activity in the end of July. At these cycles is added a small percentage (6%) of long cycle (25-35 days).

Our results are consistent with those of Charallah (2000), confirming that the normal estrous cycle duration is 20 days in the goat Bedouin, and existence near of these cycles, short cycles and long cycles.

Derquaoui and El Khaldi (1994), indicate that the average duration of the estrous cycle in goats D'man is  $10.5 \pm 3.45$  days for short cycles and  $20.96 \pm 2.84$  days for normal cycles. The periods found are comparable to values reported for a certain number of tropical alpine breeds.

In local Moor goats in Tunisia, the average duration of normal cycles was  $21.1 \pm 1.5$  days (Lassoued and Rekik, 2005).

Corteel (1975), notes that the goat exteriorizes every year only than 6-8 estrous cycles. Frequent duration is 21 days. However, the cycles longer or shorter than are observed by several authors (Lahirigoyen, 1973). The average durations of short cycles are 6 days and those of long cycles between 30 and 44 days.

According Baril et al (1993) b, the average duration of short cycles is 7.9 days, those normal cycles 20.7 days, and those long cycles 39 days.

In fact 86%, 32% and 11% of cycles are short, respectively, in the Nubian goat (Camp et al, 1983), Creole (Chemineau and Thimonier, 1986), and in the local goat of Venezuela (Gonzalez and Madrid-Burry, 1982).

Greyling (2000), report that the duration of the estrous cycle was recorded as Being  $20.7 \pm 0.7$  days.

The normal cycle duration of  $19.7 \pm 1.5$  is described in the Matou goat in China (Moaeen-ud-Din et al, 2008).

It would seem that the relatively high incidence of short cycles is a characteristic of the goat species (Baril et al, 1993 b) (Derquaoui and El Khaldi, 1994).

The origin and etiology of short cycles in small ruminants are not fully elucidated, but it seems that the corpus luteum of short cycles should be of bad quality and that their secretory life is limited (Chemineau and Thimonier, 1986) and strongly influenced by food level (Oldman and Martin, 1979).

### Duration of estrous :

Durations of estrous registered during the entire study and among the different goats vary from 12 hours to 72 hours, with an average of 34,3 hours.

Table 2

Average durations of estrus observed per goat (hours)

Goats Number	01	03	04	05	06	07	08	10	11	12	13	14	15	16
Means	34,1	33,6	34,8	37,6	31,3	36,7	40	28,8	26,7	36	30	36	36	38
General Mean	34,3													

Table 3 shows the averages of the durations of estrous for each season (Summer, Autumn, Winter and Spring).

Table 3

Average duration of estrous for each season

Season	Summer	Autumn	Winter	Spring
Mean duration of estrous (hours)	32.14	36.75	32.17	26.67

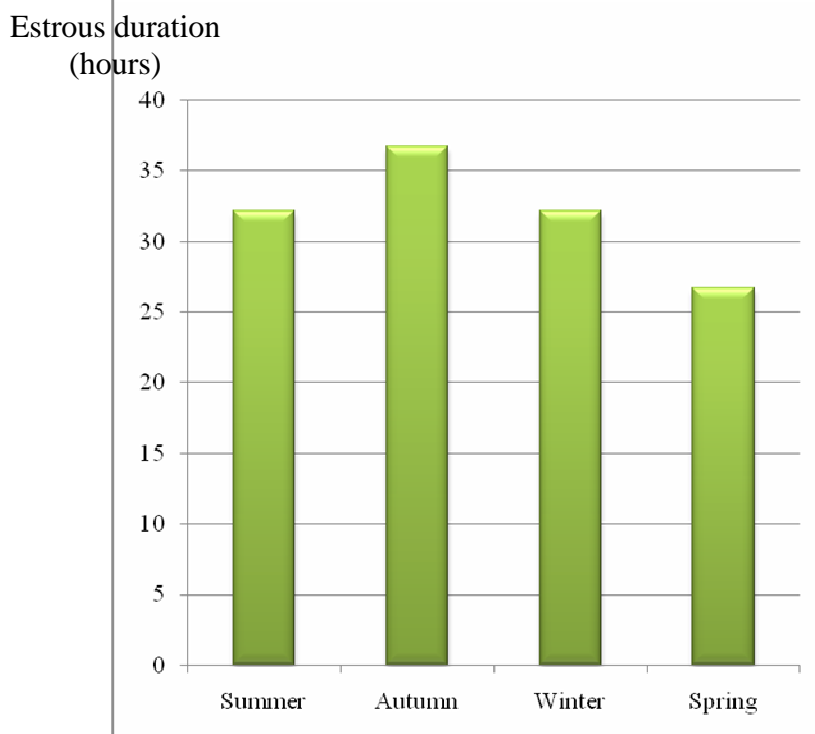


Fig. 5. Mean duration of estrous per season

In our study, we found an average duration of estrous of 34.3 hours with a high intensity of long-term estrous in autumn. This observation corresponds to the results of Henderson et al (1988), who noticed that estrus lasts an average of 36 hours with extremes of 22 to 48 hours.

Also the duration of estrus depends on the breed, it is 31 hours in French Alpine goats and 27 hours in Creole goat meat (Baril et al, 1993 b).

Greyling (2000), rapport that the mean duration of the estrous period being  $37.4 \pm 8.6$  hours. with a variation of 24–56 hours between individuals.

The duration of the estrous period of the Boer goat appears to be variable in length, but in line with the common duration of estrous reported in goats of

36 hours, with a variation of between 22 and 60 hours (Riera, 1982). Cited by Greyling (2000).

The estrus duration averaged 58.6+/-15.9 hours in Matou goat in central china (Moaeen-ud-Din et al, 2008).

Marais (1968) found that the estrous period of the Angora doe to be shorter at the onset and end of the breeding season, compared to the months of peak sexual activity (autumn), cited by Greyling, (2000).

Deriveaux and Ectors (1980), indicate that estrous is generally shorter at the beginning and end of the breeding season, such as when the male is constantly maintained within the herd.

## CONCLUSIONS

This study allows us to highlight the existence of variations on the duration of estrous cycles observed throughout the experiment, which leaves us to conclude that the local goat in the region of Kabylia presents cycles of length 15 to 25 days considered normal with an average of 19.23 days. At addition to these natural cycles we found cycles of short duration ranging from 03 to 14 days, which occur mainly to the resumption of sexual activity and who seem a characteristic of the goat species. As they exist also long duration cycles of more than 25 days but in low numbers.

The duration of estrus found in these goats are on average 34.3 hours with variations between 12 to 72 hours. It was also noted that the duration of oestrus is mostly longer in autumn, season of intensive breeding throughout the year at the local goat species in the region.

Besides the fundamental scientific interest, this study aims to better control the caprine breeding, integrate with other species particularly sheep, and that in order to improve its productive performance, especially since this species is not demanding and resistant to different rearing conditions where other species can not survive.

## REFERENCES

1. Baril, G, P. Brebion et P. Chesne, (1993) a. Manuel de formation pratique pour la transplantation embryonnaire chez la brebis et la chèvre. Étude FAO: Production et santé animales. FAO Ed., No. 115.
2. Baril. G, P. Chemineau et Y. Cognie (1993) b. Manuel de formation pour l'insémination artificielle chez les Ovins et les Caprins.
3. Bonnes. G, J. Desclaude, C. Drogoul, R. Gadoud, R. Jussiau, A. Le Loc'h, L. Montmeas et J. Robin, (1988). Reproduction des mammifères d'élevage. Les éditions FOUCHER Collection INRAP.
4. Buggin. M, (1990). Le développement embryonnaire caprin in vitro : étude des conditions de culture et application au choix d'un protecteur. Thèse. Médecine. Vétérinaire. Nantes, vol 23.
5. Camp. JC, DE. Wildt, PK. Hourard, LD. Stuart and PK. Chadraborty, (1983) Ovarian activity during Mooreland abnormal length oestrus cycles in the goats. Biol. Reprod, vol 28, 673 – 681.

6. Carlos Gonzalez. S and M. Madrid-Burru, (1982). Sexual season and oestrous cycle of native goats in a tropical zone of Venezuela ». Third Int. Conf. on goat prod. and Disease. Tuscon, Arizona, USA. (10-15 janvier 1982).
7. Centre de météorologie d'Alger, (2010). [www.meteo.dz](http://www.meteo.dz)
8. Charallah. S, F. Khammar, Z. Amirat et Y. Lakhdari, (2000). Evaluation de l'activité sexuelle mâle et femelle : caractérisation zootechnique et nutritionnelle chez la chèvre bédouine. in : actes conférence internationale sur les caprins, tours, france, 15-21 mai 1990, tome i, p. 460.
9. Chemineau. P and J. Thimonier, (1986). Methods for evaluation of reproduction and growth rate performance in sheep and goat ». World Review of animal production, vol 22, 28-32.
10. Corteel. JP, (1975). Le contrôle du cycle sexuel de la chèvre. 1ere journée de la recherche ovine et caprine. INRA- ITOVIC. Tome 1, 28-47.
11. Deriveaux. J et I. Ectors, (1980). Physiopathologie de la gestation et obstétrique vétérinaire. Edition le point vétérinaire. Maisson Alfort. 273p.
12. Derquaoui. L et O. El Khaledi, (1994). Evaluation de l'activité sexuelle pendant la saison de baisse de fertilité chez la chèvre de race D'man. In : 2e conférence African Small Ruminant Research Network, Arusha, Tanzania, 7-11 déc. 1992. Addis-Abeba, Ethiopie, Cipea, p. 49-51.
13. Evans, A.C.O., (2003). Characteristics of ovarian follicle development in domestic animals. Reproduction of Domestic Animals 38, 240–246.
14. Greyling . J. P. C, (2000). Reproduction traits in the Boer goat doe. Small Ruminant Research. Volume 36, Issue 2, Pages 171-177.
15. Henderson. KM, RL. Savage. Ellen, K. Ball and KP. Mac Natty, (1988). Consequences of increasing or decreasing plasma FSH concentration during the preovulatory period in Romneyemes . J. Reprod. and Fert, vol 84, 187-196.
16. Lahirigoyen. M, (1973). Contribution à la définition d'un plan de testage des caprins. Edition : INRA – Paris.
17. Lassoued. N et M. Rekik, (2005). Variations saisonnières de l'œstrus et de l'ovulation chez la chèvre locale Maure en Tunisie. Revue Élevage. Médecine. vétérinaire. Pays tropicaux. 58 (1-2) : 69-73.
18. Moaeen-ud-Din M, LG. Yand, SL. Chen, ZR. Zhang, JZ. Xiao, QY. Wen and M. Dai (2008). Reproductive performance of Matou goat under sub-tropical monsoonal climate of Central China. Trop Anim Health Prod. 40(1):17-23.
19. Oldham. CM and GB. Martin, (1979). Stimulation of seasonally anovular Merino ewes by rams. II. Premature regression of ram induced corpora lutea ». Animal Reproduction Science 1: 291-295.