

# FREQUENCY AND DURATION OF ESTROUS CYCLE AND PERIOD IN GENETICALLY NON-DESCRIPT (SRD) TYPE OF GOATS IN THE TROPICAL NORTHEAST OF BRAZIL<sup>1</sup>

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**ABSTRACT** - In a one-year study conducted in the tropical, semi-arid region of Northeast of Brazil, 30 genetically non-descript (SRD) does, 1.5 - 2.0 year old, were grazed on native range (2.3 ha/head/year) with *ad libitum* water, salt and bone meal. Fourteen goats were supplemented with green chopped elephant grass (*P. purpureum* Schum.) at the proportion of 2% dry matter in relation to the mean body weight of goats, during the most critical part of the dry season (November 2 to February 26). The remaining 16 goats served as controls. The 480 estrous cycles and 511 estrous period lengths were compared for the wet season (February 27 to July 10) and dry season (July 11 to February 26) as well as for level of feed. The incidence of estrus classified by month was evenly distributed throughout the year with a mean of 8.3% and 7% to 9.8% range ( $P > 0.05$ ) monthly variation. The average lengths of estrous periods were 55.8 vs 57.4 hours ( $P > 0.05$ ) and the estrous cycles 20.9 vs 21.5 days ( $P > 0.05$ ) for non-supplemented and supplemented groups, respectively. The same traits between wet and dry seasons were 62.0 vs 51.2 hours ( $P < 0.05$ ) and 20.6 vs 21.8 days ( $P < 0.06$ ), respectively.

**Index terms:** reproduction, season, native pasture, feed supplementation.

## FREQUÊNCIA E DURAÇÃO DO CICLO ESTRAL E DO ESTRO EM CAPRINOS SEM RAÇA DEFINIDA (SRD) NO NORDESTE TROPICAL DO BRASIL

**RESUMO** - Este trabalho foi conduzido no CNPC, Sobral, Ceará, Brasil. Trinta cabras do tipo SRD, numa faixa etária de 18 a 24 meses, foram mantidas em pastagem nativa numa lotação de 2,3 ha/animal/ano. Água e uma mistura de cloreto de sódio e farinha de ossos, em partes iguais, foram oferecidas *ad libitum*. Quatorze cabras receberam, além disso, capim-elefante (*P. purpureum*, Schum.) verde, expresso em matéria seca, na proporção de 2% em relação ao peso corporal, durante o período mais crítico da estação seca (2/11 a 26/02). As outras 16 fêmeas serviram como testemunha. Quatrocentos e oitenta ciclos estrais e 511 estros foram registrados e analisados em relação ao regime nutricional, durante as estações, chuvosa (27/02 a 10/07) e seca (11/07 a 26/02), respectivamente. A incidência de estro, classificada por mês, foi uniformemente distribuída durante o ano, com uma média mensal de 8,3% e uma variação de 7,0% a 9,8% ( $P > 0,05$ ). A duração média do estro foi de 55,8 e 57,4 horas ( $P > 0,05$ ), e a do ciclo estral foi de 20,9 e 21,5 dias ( $P > 0,05$ ) para as cabras não suplementadas e suplementadas, respectivamente. A duração do estro foi de 62,0 e 51,2 horas ( $P < 0,05$ ) e do ciclo estral de 20,6 e 21,8 dias ( $P < 0,06$ ) para as estações chuvosa e seca, respectivamente.

**Termos para indexação:** reprodução, estação, pastagem nativa, suplementação alimentar.

### INTRODUCTION

The goat is usually referred as a short-day breeder. In tropical and sub-tropical areas, the reproductive cycles are much less influenced by photoperiod, resulting in extended periods of

breeding including continuous year round sexual activity (Mishra & Biswas 1966, Sahni & Roy 1967, Vohradsky & Sada 1973, Haumesser 1975).

The duration of the estrous cycle and the estrous period in goats is variable between and within breeds in a particular season and geographical location (Rensburg 1964, Carrera & Butterworth 1969, Prasad & Bhattacharyya 1979b, Jarosz et al. 1971, Bhattacharyya et al. 1981).

In the present study, an attempt has been made to quantify the influence of season and level of supplementation on incidence and duration of estrous period and estrous cycle.

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## MATERIAL AND METHODS

This research was conducted at EMBRAPA/Centro Nacional de Pesquisa de Caprinos (CNPQ) at Sobral, CE, Brazil, at 3.42° South latitude and 40.21° West longitude.

Thirty randomly chosen does of 1.5 to 2.0 years of age and two vasectomized bucks, all of the nondescript native (SRD) type, were used in this study. The does were maintained on native range at a stocking rate of 2.3 ha/head/year for one year. The daily grazing period was nine hours beginning at seven in the morning. Water and a mixture of equal parts of sterilized bone meal and common salt were made available *ad libitum* in the holding corrals at night but were not available in the pasture. All animals were treated for internal parasites and vaccinated against foot and mouth disease according to "Sistemas..." (1980).

The dry season was arbitrarily established as the period from July 11 to February 26 and the wet season from February 27 to July 10.

Fourteen does were supplemented with chopped green elephant grass (*Pennisetum purpureum*, Schum.) when the native range vegetation was sparse (November 2 to February 26). The amount of supplementation was calculated in terms of dry matter at the rate of two percent of average live body weight. The remaining 16 does received no supplementation.

Detection of estrus was made using painted teaser bucks placed continuously with the does, in the mornings (6 - 7 a.m.), in the evenings (4 - 6 p.m.) as well as in the field during the grazing hours of the day. The teaser bucks used for estrus detection were changed every 20 days and the color of marking ink every 14 days.

Least square analysis of variance was performed to determine the statistical probability of difference between the main effects (season and level of feed) on estrous cycle and period duration.

## RESULTS AND DISCUSSION

The incidence of estrous per day, month and season and the proportion of short estrous cycles are shown in Table 1. The proportion of recorded estrous periods was evenly distributed among different months, showing no evidence of variation associated with seasons or with calendar months. These observations are in agreement with several other reports of data obtained from tropical areas (Mishra & Biswas 1966, Vohradsky & Sada 1973, Haumesser 1975). However, some workers have reported that the kiddings are concentrated around certain periods of the year (Amble et al. 1964, Gill & Dev 1972, Singh & Singh 1974, Wani et al. 1980). An overall mean of about 4.6%, 1.42% and 17.03% of estrus per day, month and year, respectively.

This information demonstrates that the type of goats used in this study behave as continuous, year-round breeders.

Results of the analysis of variance and the least square means for the duration of estrous period and cycle are presented in Tables 2 and 3. The overall mean duration of the estrous period was 56.8 (12 - 192) hours. It appears to be on the higher side of the majority of the reports indicating around 36 hours of estrous period duration (Phillips et al. 1943, Mishra & Biswas 1966, Prasad & Bhattacharyya 1979a,b, Bliss 1980). Jarosz et al. (1971), in Toggenburg and African Pygmy goats found a mean of estrous period of 96 hours. The mean estrous period obtained in this study corresponds more closely to Nubian goats observed by Camp et al. (1983).

The estrous period was significantly ( $P < 0.01$ ) longer during wet season (62.0 hr) compared to dry season (51.2 hr). Prasad & Bhattacharyya (1979b), in India have reported longer estrous periods during cool-dry months than in hot-humid months. Thus indirectly the cooler period may have some effect on the estrous duration. However, in the present study, the environmental temperature was high throughout the year and the rainfall months have had some effect in increasing the duration of estrous period contrasting to those findings of Prasad & Bhattacharyya (1979b).

The overall mean estrous cycle length was 21.1 days. Individual lengths varied from 5 to 69 days which is similar as to the Angora (Shelton 1961), Granada (Carrera & Butterworth 1969), Toggenburg and African Pygmy (Jarosz et al. 1971), Pashmina (Bhattacharyya et al. 1981), Barbari (Sahni & Roy 1967) and Black Bengal (Ali et al. 1973). There was some indication that the estrous cycle tends to be significantly ( $P = 0.06$ ) shorter during the wet season (21.8 vs. 20.6 days).

A significant proportion (11.0%) of the total estrous cycles are of short duration (5 - 9 days) which seems to be characteristic of goats in several regions (Mishra & Biswas 1966, Prasad & Bhattacharyya 1979a,b, Gonzales & Madrid 1982, Camp et al. 1983). Finally, the most striking feature of this study was the large variation in the mean concentration in both estrous periods and estrous cycles.

Supplementation of does during the dry season, when the quantity and quality of range fodder was lowest had no influence on either estrous period or estrous cycle duration.

The frequency of estrous periods and estrous cycles length classified into class intervals as well as the mean within each interval, are shown in Table 4. Nearly 50 percent of the estrous periods were over 60 hours duration, close to 28 percent, between 45 to 59 hours and the remaining 22 percent between 15 to 44 hours. The information shows some concentration around 60 to 70 hours of estrous period length.

Figure 1 (A and B) depicts the frequency distribution of estrous period and estrous cycles by season, level of supplementation and overall data. Season of year influenced the mean duration of estrous period as shown in Table 3. But, it is interesting to note that during the wet season the highest frequency of estrous cycle length was

60 hours compared to 48 hours during the dry season. Feed supplementation during the dry season did not appear to extend or shorten the estrous periods. The frequency distribution of the estrous cycle did not differ significantly due to the two main effects (season and level of feed). This is in full agreement with relevant information on this type of work available (Carrera & Butterworth 1969, Sands & McDowell 1978, Prasad & Bhattacharyya 1979b).

It is not clear to what extent the estrous period and estrous cycle duration presented in this study represent a genetic or climatic effect. The above information obviously indicates that in the Northeast of Brazil, goats show a longer estrous period in response to the weather or genotype or both, compared with other published results (Mishra & Biswas 1966, Prasad & Bhattacharyya 1979, Bliss 1980).

TABLE 1. Incidence of estrous periods according to seasons and months.

Season/month	n	Estrous %	Mean n <sup>o</sup> of estrous periods /doe/month	Does in estrus /day (%)	Short estrous cycles (%)
<b>Dry (215 days)</b>					
July	44	8.61	1.43	4.73	5.88
August	50	9.78	1.67	5.38	1.96
September	36	7.04	1.20	4.00	7.84
October	41	8.02	1.37	4.41	15.69
November	42	8.22	1.40	4.67	5.88
December	43	8.42	1.43	4.62	3.92
January	42	8.22	1.40	4.52	11.77
Mean		8.33	1.42	4.62	7.56
Sub total	298	58.32			52.94
<b>Wet (151 days)</b>					
February	44	8.61	1.47	5.06	11.77
March	39	7.63	1.30	4.19	7.84
April	44	8.61	1.47	4.89	13.73
May	43	8.42	1.43	4.62	7.84
June	43	8.42	1.43	4.78	5.88
Mean		8.34	1.42	4.70	9.41
Sub total	213	41.68			47.06
<b>Total</b>	<b>511</b>	<b>100.00</b>	<b>1.42</b>	<b>4.65</b>	<b>100.00</b>

TABLE 2. Least square analysis of variance of estrous cycle and period duration.

Source of variation	Estrous period (hours)		Estrous cycle (days)	
	df	M.S.	df	M.S.
Season	1	14,871.15**	1	171.74 <sup>a</sup>
Level of supplementation	1	310.26 N.S.	1	37.68 N.S.
Season x Level of supplementation	1	4.52 N.S.	1	21.77 N.S.
Error	507	262.54	476	48.42

\*\* P &lt; 0.01

<sup>a</sup>P = 0.06

TABLE 3. Estrous cycle and period lengths by season and level of supplementation.

Variables	Estrous period (hours)		Estrous cycle (days)	
	n	Mean (SE) <sup>1</sup>	n	Mean (SE) <sup>1</sup>
Overall mean	511	56.8 (0.75)	480	21.2 (0.32)
Season				
Dry	243	51.2 (1.04) <sup>a</sup>	242	21.8 (0.45) <sup>ax</sup>
Wet	268	62.0 (1.00) <sup>b</sup>	238	20.6 (0.45) <sup>bx</sup>
Level of supplementation				
Native pasture	277	55.8 (0.98) <sup>a</sup>	260	20.9 (0.43) <sup>a</sup>
Native pasture + grass supplement	234	77.4 (1.06) <sup>a</sup>	220	21.5 (0.47) <sup>a</sup>

<sup>1</sup> Mean comparisons are between seasons and level of supplementation.

P &lt; 0.01 for means having different superscript letters (a and b).

P = 0.06 for means having ax and bx superscripts.

TABLE 4. Frequency and mean (SE) estrous cycle and period duration.

Class interval	n	Frequency (%)	Mean (SE)
		Estrous cycle (days)	
17	53	11.0	8.3 (0.35)
17 to 24	367	76.5	21.0 (0.07)
24	60	12.5	33.6 (1.08)
Total	480	100.0	21.2 (0.32)
		Estrous period (hours)	
15	1	0.2	12.0 (0.00)
15 to 29	6	1.2	21.7 (1.20)
30 to 44	108	21.1	36.8 (0.48)
45 to 59	141	27.6	50.1 (0.25)
60	255	49.9	69.7 (0.82)
Total	511	100.0	56.8 (0.75)

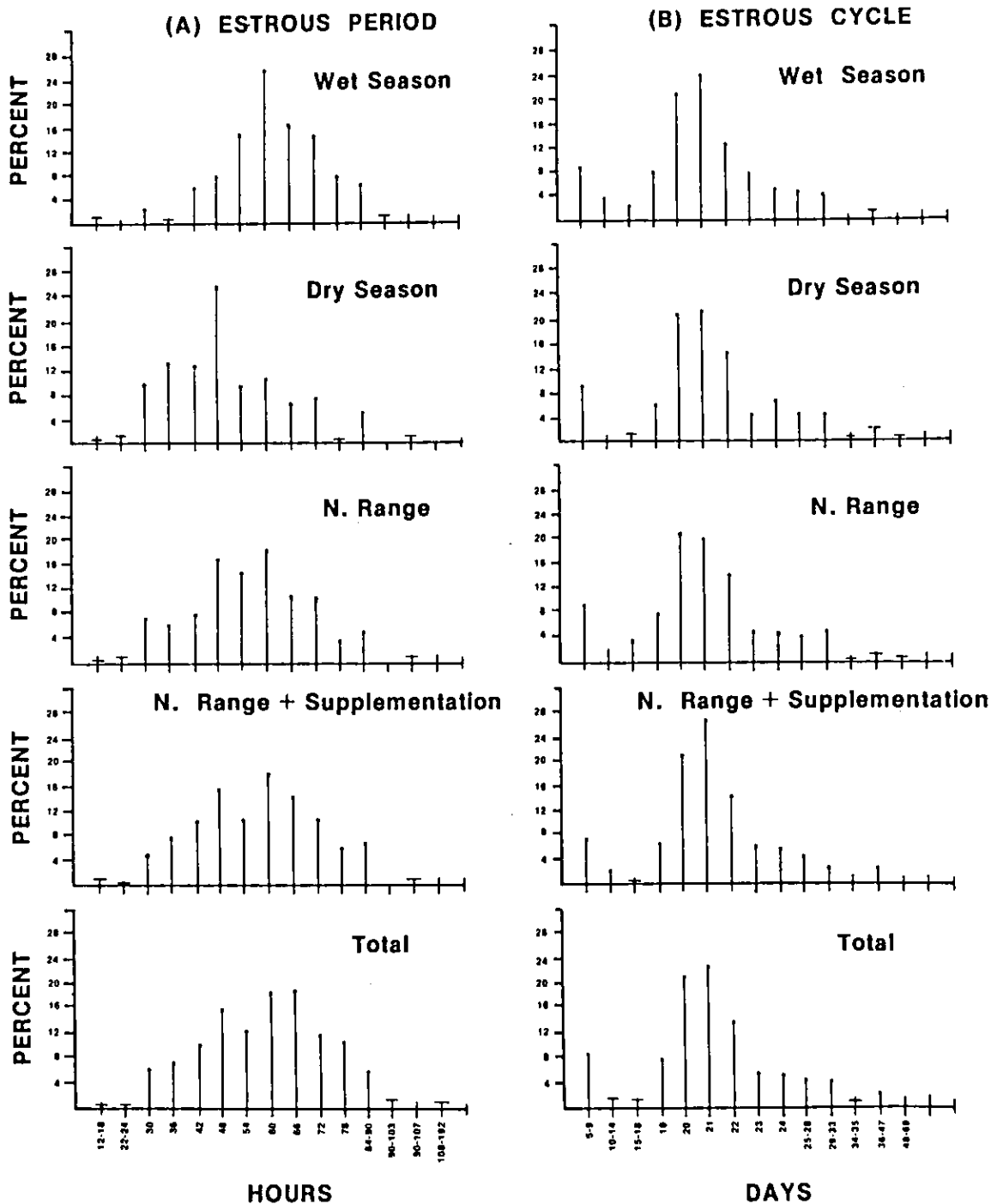


FIG. 1. Frequency distribution of (A) estrous period (hours), and (B) estrous cycle (days) duration by season, level of supplementation and total.

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