

POST-PARTUM CYCLING ACTIVITY OF CHIOS, OSSIMI SHEEP AND THEIR CROSSES

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SUMMARY

Post-partum first and second oestrus and factors affecting them were studied during the lactations of 23 Ossimi (OO), 24 Chios (CC) and 22 of their crosses (Chios 50%- Ossimi 50%, CO) which lambed during May-Jun., 1991 and Jan. - Feb., 1992.

The post-partum interval to first oestrus was slightly shorter in (CC) than in (OO) and (CO); 41.50 ± 13.15 , 43.39 ± 14.47 and 44.36 ± 13.02 days, resp. On the other hand, the (CO) had shorter interval for second oestrus than the (CC) and (OO); 19.95 ± 29 , 62 ± 16.54 and 20.30 ± 5.95 resp. None of the factors (age, season, type of birth, sex and breed) influenced post-partum oestrus significantly. While, type of birth and breed had significant effect ($p < 0.01$) on the second oestrus interval.

Plasma progesterone concentration ranged from 0.17 ± 0.15 ng/ml on the day of oestrus to 4.17 ± 1.56 ng/ml at mid cycle. The peak progesterone values did not differ among ewes from different genotypes. Silent ovulations were 36%, 18% and 10% for Chios, Ossimi and Crosses, resp. Positive correlations between age and length of second oestrous cycle (0.286) and between sex and interval to first oestrus (0.240) were obtained in this study. While, a negative correlations were observed between type of birth and both first and second heat; (-0.235) and (-0.307), resp., other correlation values came in between. The observations of post-partum oestrus early in some ewes are interesting and the selection

within breed may be useful for improving this trait.

Keywords: Sheep, Chios and Ossimi, post-partum cyclicity

INTRODUCTION

Lambing interval is affected, chiefly, by the lambing to conception interval, which is influenced in its turn by several factors (e.g. season of lambing, resumption of ovarian activity & efficiency of oestrous detection. Early resumption of ovarian activity has direct bearing on the success of accelerated lambing system.

Assaying blood plasma progesterone concentrations is a precise indicator of ovarian function and has been used to post-partum ovarian activity monitor regularity of oestrus cycles, and pregnancy. Precise records of oestrous activity will help in detecting ewes with irregular cyclicity which need close observation from herdsman.

The current study was planned to investigate the post partum ovarian and oestrous, activity in imported Chios, Comparing to local Ossimi sheep and their crosses (Chios x Ossimi) in relation to season of lambing.

MATERIAL AND METHODS

Animals

This work was carried out at Mallawi Experimental Farm, belonging to Animal Production Research Institute, Ministry of Agriculture.

Twenty three purebred Ossimi (OO), 24 purebred Chios (CC) and 22 crossbred Co (1/2 CC 1/2 OO) ewes were used, as chosen randomly from the farm flocks. Ewes ranged from 3-6 yr (average 4.5) of age the beginning of experimental work and the three genotypes did not differ in the mean age. All ewes have given at least two successive lambing. Post-partum oestrus was studied in two different lambing seasons (May - June, 1991 and Jan., 1992).

Oestrus detection was performed twice daily at early morning and at evening using vasectomized/aproned rams which were placed with the ewes for one hour each check. The rams were interchanged between the groups. The ewe which stood for mounting by the ram were considered as being in oestrus. Time and date of 1st and 2nd oestrus

were recorded. length of oestrous cycle was classified as short (<14 d) medium (from 14-19 d) and long (>19 d) Ewes that had not come into the 2nd oestrus for a period of 30 days after the 1st oestrus were considered in anoestrus. from December to may, green fodder (berseem) (*Trifolium alexandrinum*) plus 0.5 kg of concentrate mixture were given daily for each live. during the second part of the year, ewes were fed on plette concentrate (0.5 kg/h/d) plus green drawa (maize). In addition concentrate mixture 250 g/animal/day supplemental feed was provided during advanced pregnancy and lactation. water was provided ad libitum. The animals were housed in semi-open shed and allowed to exercise daily. They were subjected to vaccination programme against infectious diseases.

Hormone determination (HD)

Ovarian activity was assessed from the concentration of plasma progesterone in blood samples collected from jugular vein every 4 days from the 15th day after lambing to the 4th day after second oestrous. Blood samples were centrifuged and plasma was stored at -20°C until assays were performed. All samples were assayed for the content of progesterone by Radioimmunoassay (Beal et al., 1986)

Statistical Analysis

Data were examined by statistical analysis (SAS, 1989) and the General Linear Model (GLM) was used. The main factors affecting oestrous cycles were studied which included breed, season, age of ewe, type of birth and sex of lamb.

The data were investigated by the model:

$$Y_{ijklmn} = U + B_i + S_j + A_k + T_i + X_m + e_{ijklmn}$$

Where:

Y_{ijklmn} = $ijkl$ th observation on estrous cycles;

U = is the population mean;

B_i = fixed effect of i th breed, (1=Ossimi, 2=Chios and 3=Cross); S_j = fixed effect of J th season, 1= June, 1991 and 2=Feb. 1992;

A_k = fixed effect of k th age (reg. coefficient of estrous cycle on age);

T_i = fixed effect of I^{th} type of birth, 1=single and 2=twins;
 X_m = fixed effect of m^{th} sex, 1=male, 2=female and 3=both of the male and female.
 e_{ijklm} = random effect of $ijklm^{th}$ with mean=0 and variance σ^2_e .

Duncan's multiple-range (DMR) test was utilized to detect differences among means. Least-squares means were estimated and used in (DMR) test. Correlations coefficient were calculated between factors affecting oestrus and various measure of it.

RESULTS

Numbers and percentages of ewes observed in oestrus are shown in Tables (1 and 2).

Table 1. Frequency-distribution of post-partum oestrus occurrence by genotype

Period (days)	Ossimi No. (%)	Chios No. (%)	Cross No. (%)	Total No. (%)
< 20	4(14.4)	3(12.5)	2(9.0)	9(13.1)
21-30	6(26.1)	9(37.5)	8(36.4)	23(33.3)
31-40	3(13.0)	8(33.3)	6(27.3)	17(24.6)
> 40	10(43.5)	4(16.7)	6(27.3)	20(29.0)

Table 2. Length of oestrous Cycle; Short, medium and long by genotype

Length (days)	Ossimi No. (%)	Chios No. (%)	Cross No. (%)	Total No. (%)
< 14	1(4.3)	1(4.2)	3(13.6)	5(7.20)
14-19	12(52.2)	11(45.8)	14(63.6)	37(53.60)
> 20	10(43.5)	12(50.0)	5(22.8)	27(39.20)

Within < 20-40 days after lambing about 83.30% of (CC) ewes came in oestrus in comparison with 72.7% and 56.50% for (CO) and (OO) ewes resp., the rest of ewes came in oestrus after this period. In regard to, second oestrus about 50% of (CC) ewes had the longest oestrous cycles

while, the corresponding values were 43.50% and 22.8% for (OO) and (CO) ewes.

Duration of estrous in the three genotypes (OO), (CC) and (CO) are shown in Table (3). The post-partum oestrus of one day (24 hrs) duration were 53%, 52% and 45.5% for (CC), (OO) and their crosses (CO) resp. For 36 hr the values were 16.7%, 13% and 4.5% for (CC), (OO) and (CO) resp. On the other hand, heat of second estrous for 36 hr were about 66.77%, 50% and 39.1% in (CC), (CO) and (OO) resp. The longest duration of heat (average of 48 hr) occurred only in the second estrous with the highest frequency for (CO) (45.5%) and the lowest one for (CC) (16.7%).

Table 3. Duration of post-partum in first and second oestrus in Ossimi, Chios and their crosses

Duration (hr)	Ossimi		Chios		Cross	
	H1	H2	H1	H2	H1	H2
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
12	8(34.8)	-	6(25.0)	-	11(50.0)	-
24	12(52.2)	4(17.4)	14(53.3)	4(16.7)	10(45.5)	1(4.5)
36	3(13.0)	9(39.1)	4(16.7)	16(66.7)	1(4.5)	11(50.0)
>48	-	10(43.5)	-	4(16.7)	-	10(45.5)

H1 : Heat of first oestrus.

H2 : Heat of second oestrus.

Least squares means \pm S.E and tests of significance of factors affecting oestrous cycles of (OO), (CC) and (CO) are presented in Table (4). Except the significant effect ($p < 0.01$) of type of birth and breed for second estrous., non of the other factors affected estrous cycles significantly. Plasma progesterone concentration ranged from 0.17 ± 0.15 ng/ml on the day of oestrus to 4.17 ± 1.56 ng/ml at mid cycle. The peak progesterone values did not differ among ewes from different genotypes. Progesterone concentration and ram detection showed that 36% of oestrus was as silent ovulation (ovulation oestrus) for chios ewes while lower values 18% and 10% were found for Ossimi and crossbred ewes respectively.

Positive correlation between age and second oestrous

cycle length (0.24) was obtained in this study, while, negative correlations were observed between type of birth and both of duration of first and second heat, (-0.24) and (-0.31) resp. Other correlation values came in between (Table 5)

Table 4. Least squares means \pm S.E and tests of singnificance of factors affecting post-partum second oestrus

Item	<u>Oestrus interval</u>		<u>First Cycle length</u>	
	Means \pm S.E		Means \pm S.E	
Genotype:	NS			
(OO)	47.72	± 3.72	20.94	$\pm 3.12a$
(CC)	43.96	± 3.48	31.13	$\pm 2.92b$
(CO)	47.36	± 3.34	21.68	$\pm 2.81ac$
Type of birth:	NS			
Single	44.33	± 3.21	28.60	$\pm 2.69a$
Twins	48.36	± 3.27	20.56	$\pm 2.75b$
Season :	NS			
(May-June)	48.65	± 3.14	23.99	± 2.63
(Jan-Feb.)	44.04	± 3.00	25.17	± 2.52
Sex :	NS			
Male (σ)	41.75	± 2.43	20.85	± 2.04
Female (ϕ)	45.63	± 2.73	21.54	± 2.29
(σ, ϕ)	51.65	± 7.20	31.36	± 6.04

a, b and c, LS - means within main effect with unlike superscripts differ ($P < 0.05$).

Table 5. Correlation coefficients between factors affecting oestrus with cycle length and heat duration

Varaiables	Length of		Duration of	
	<u>1st</u> Cycle	<u>2nd</u> Cycle	<u>1st</u> heat	<u>2nd</u> heat
Age	- 0.02	0.29	0.01	-0.22
Sex	0.24	0.06	0.02	-0.17
Season	- 0.14	0.06	0.02	-0.20
Breed	0.09	-0.01	-0.15	-0.03
Type of birth	- 0.14	0.10	-0.24	-0.31

DISCUSSION

In the present study Chios ewes had slightly shorter interval from lambing to oestrus (41.5 d.) than Ossimi and their cross (43.29 and 44.36 days resp.). This value is lower than (77.3d) of Chios ewes observed by Michailidis et al. (1990) but, higher than 20 days reported by Devendra and Mcleroy (1988). However, Several works reported that the ovarian activity in most of sub-tropical breeds is resumed at 45 days after lambing (Khaldi, 1984; Kholouk, 1987 and Aboul-Naga et al., 1991). These results are in agreement with the findings of the present study.

Cycle lengths vary for any one ewe and some ewes consistently tend to have longer cycle lengths than others. The length of heat period is also variable and is to some extent related to the age of ewe. Depending on breed and individual, heat lasts for an average of 30-36hrs. in mature ewes. It is at least 10 hours shorter in immature ewes (Blocky and Cumming, 1970). Thus, the differences between breeds and animals within breed in estrous cycle are expected. Second heat duration was longer than that of 1st oestrus. During the study, it was observed that mean of oestrous cycle in Chios was found to be 29.36 days which is longer than 20 days for both the Ossimi and cross. In 5 breeds (Rambouillet, Criollo, Romney Marsh, Corriedale and Suffolk) of sheep studied by Lucas et al. (1988) the length of cycle and duration of oestrous ranged between (16.6-17.5 d) and (26.5-32.0 hrs.) resp. in winter and the differences between breeds were not significant.

Concerning pattern of progesterone in the present study the mean progesterone concentration did not differ significantly between genotypes. Basal values occurred from day 2 before oestrus (follicular phase) until day 4 after estrus (early luteal phase).

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النشاط التناسلى والمبضى بعد الولادة لاغنام الكيوس الاوسيمى وخلانظهم

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تم دراسة الشبق الاول والثانى بعد الوضع والعوامل المؤثرة عليهما بعد
الولادة فى ٢٣ نعجة اوسيمى و ٢٤ نعجة كيوس و ٢٢ نعجة خليط بمحطة
بحوث الانتاج الحيوانى بملوى وكذلك خلال مواسم ولادة مايو -
يونيو ١٩٩١ ويناير - فبراير ١٩٩٢.

ودلت الدراسة على ان الشياح الاول لنعاج الكيوس كان مبكرا الى حد ما
عن نعاج الاوسيمى وذلك الخلطان وكان المتوسط $13,15 \pm 41,5$ ، $13,39$ ، $14,47$ ، $13,02 \pm 44,36$ يوم على الترتيب ومن ناحية اخرى كانت دورة
الشبق الثانية قصيرة فى النعاج الخليطة عن الانواع النقية.

ولم يؤثر كل من عمر النعاج والموسم وعدد مواليد البطن وكذلك الجنس
والنوع على اول شبق بعد الوضع. بينما كان هناك تأثير عالى المعنوية لكل
من عدد المواليد والنوع على الشبق الثانى للوضع.

تركيز هرمون البروجستيرون كان يتراوح ما بين $0,15 \pm 0,17$ نانوجرام/مل عند بداية الشبق الى $4,17 \pm 1,06$ نانوجرام/مل فى منتصف
دورة الشبق. قسم ذروة البروجستيرون لم تختلف اختلاف الانواع. وكان
التبويض الصامت 36% ، 18% ، 10% فى الكيوس والاوسيمى والنعاج
الخليطة على الترتيب. وكما وجدت علاقة موجه بين العمر والشياح الثانى
ما بعد الوضع ($0,286$) وبين الجنس والشياح الاول ($0,240$) وكان هناك
علاقة سلبية ما بين عدد الولادات فى البطن الواحدة وكان الشياح الاول
والثانى. التباين الواسع داخل النوع فى فترات الشبق الاول والثانى يعنى
امكانية الانتخاب لهذه الصفة داخل كل نوع. كما ان ذروة الشبق الاول فى
كل الانواع فى حدود ٢٤ يوم بعد الوضع فنوصى باقلال الفترة ما بين
الولادتين باستخدام بعض نظم الولادات السريعة الاخرى.