Effect of Ram Sexual Rest on Non Return Ratio of Ewes and Ram Testosterone Levels

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Abstract: Effect of sexual rest on non-return ratio and rams testosterone levels were studied in this experiment. A group of female sheep was divided into four groups according to period of ram sexual rest, in which there were period of 1, 3, 5 or 7 days of sexual rest provided to rams prior to mating time. Results showed that the optimal sexual rest for rams was 3 days before mating and this period was correlated with testosterone level of used rams. Where testosterone levels for three used rams were 2.7, 2.48 and 2.25 ng / ml and correlated conception rate % were 60, 38.5 and zero for the used rams.

Keywords: sheep, ewe, ram, sexual rest, breeding, mating, testosterone and lambing.

INTRODUCTION

Sexual rest is very important for both male and female sheep. Most sheep husbandry systems used different and restricted periods for sexual rest during breeding season. Sexual evaluation depending on mating capacity tests are related to breeding performance of rams under certain breeding environments. When breeding intensity is greater, above-average rams impregnate more ewes and sire more lambs than below-average rams. When only a small number of ewes are in estrus daily, below-average rams for serving capacity scores perform as well as above-average rams in multiple-sire and single-sire breeding environments (Stellflug et al., 2008). They also reported that above-average rams should be used to reduce number of rams required when breeding intensity is greater. Many authors called these periods as intervals between different ejaculates (Foote, 1978). Most of popular sheep breeds are short day breeders, where reproductive activity is started during autumn to activate hypothalamus secretion to initiate hypothalamo-hypophysial axes (Rosa & Bryant, 2003).Breeding period in sheep is placed in late summer and early autumn, and its duration is variable from 80 to 150 days (Salamon, 1987). Estrous activity could be affected during spring in Egyptian local sheep breeds (Ossimi, Rahmani and Barki) (Abdel-Hafez, 2002).

As for many farm animals, spermatogenesis process is affected primarly by testosterone level. Sexual rest can affect directly testosterone level and indirectly male sex drive. The effect of month of the year was studied by Daader et al., (1985) and they found that the highest sperm-cell concentration values were recorded in March, then February and April (spring) and the lowest was observed during July-August (summer), in Rahmani x Finn sheep. Semen quality and quantity can be improved by providing good management system for male sheep. In most cases good reproductive rams used and management can pay off in the field of sheep production (Gimenez & Rodning, 2007) The objective of this study was to find out the effect of sexual rest for male sheep on fertility percent of females and total testosterone levels of used rams as a guide for sexual drive.

MATERIALS AND METHODS

A group of male (3) and female sheep (14) of local Egyptian sheep breeds (crosses of Rahmani and Ossimi breeds) was used in this experiment. Animals were reared and maintained in Animal Production Station of Improved Agricultural Systems Project in Suez Canal East (Sinai), Ismailia, Egypt. Ewes were isolated from rams and mated according to a suggested schedule. Rams were allowed to mate ewes after a sexual rest period of 1, 3, 5 or 7 days. For all sexual rest periods ewes were allowed to mate with rams for 12-24 hours to assure mating occurrence. Times of ewe drying (separation of lambs from ewes during winter for next breeding season) and times of first, second and third estrous were recorded. Average weight of ewes used in this experiment was 40 ±S.E 2.5kg while, average of rams weight was 50 ±S.E 3.2 kg. Also, average age was 4 and 5 years for both ewes and used rams, respectively. Both ewes and rams were housed in open shaded barns. A concentrate feed mixture (1.25kg per ewe or ram) and a chopped alfalfa (2kg per ewe or ram) was used for animal nutrition in this experiment. Blood samples were collected from jugular vein from rams at the day of mating in the morning. Blood samples were allowed to coagulate overnight at 4^0 C. Centrifugation was carried out at 3500 rpm/20 min. to separate blood serum. Serum samples were stored at -20^0 C. for subsequent total testosterone determination using ELISA technique. Data were statistically analyzed using (Statistical Package for the Social Sciences) SPSS 16 program for windows to study the effect of sexual rest of ram on non-return ratio and lambing rate.

The mathematical model used in this experiment was the following:

$$Y_{ij} = \mu + h_I + e_{ij}$$

Where:

Y_{ij} = The observation on the j^{th} individual from the i^{th} SR (sexual rest period)

μ = The overall mean.

H_i = The fixed effect of the i^{th} SR period.

E_{ij} = The random error associated with the individual ij.

RESULTS AND DISCUSSION

Data in Table 1 showed time of estrous incidence percent and non-return ratio and time of ewe drying (separation of lambs from ewes). In which, incidence of estrous percent was 100, 50 and 28.57% for first, second and third estrous, respectively. Also non return ratio was 0, 50 and 71.43% for 1st, 2nd and 3rd estrous, respectively. Both incidence of estrous percent and non-return ratio differed significantly (P≤0.05) for 1st, 2nd and 3rd estrous as shown in Table 1. Data in Table 2 showed the effect of sexual rest period on conception rate, lambs born / ewe mated %, lambs born / ewe lambed %, gestation period (days), sex ratio and twining rate. In which 3 days sexual rest achieved 100 % conception rate. While 1, 5 and 7 days sexual rest, the conception rate was 75, 60 and zero percent, respectively. Also criteria of lambs born / ewe mated and lambs born / ewe lambed was affected by sexual rest period as shown in Table 2. Both criteria were higher in 3 and 5 days sexual rest group and they differed significantly from other groups. They reached 21.43 and 37.5% for both criteria for both groups of sexual rest period, respectively. While they were 14.29, 25& 0, 0 % for 1 and 7 days sexual rest period with regard to lambs born / ewe mated and lambs born / ewe lambed. Gestation period, did not differ significantly among different groups. But it was higher in the first group (1 day sexual rest) and it reached 162.5 days. It could be correlated to sex ratio which was 100 % male births for this group. Also it was noticed that there were no twining births in this experiment as shown in Table 2. Data in Table 3 are comparing of rams, conception rate of ewes and levels of total testosterone in rams. It was found that there were no significant differences among the three used rams in body weight and total testosterone level. But there was significant difference in their effect on conception rate of ewes in which the first ram achieved 60% conception rate as shown in Table 3. These results of conception rate were correlated with levels of total testosterone levels as presented in Table 3. Where mean testosterone levels were 2.7, 2.48 and 2.25 for first, second and third rams, respectively and testosterone levels did not differ significantly between three rams. Rams fertility is affected by many factors. One of these factors is sexual desire (Hafez, 1987). Sexual rest can affect ram sexual activity in many ways. Which, sexual rest is highly correlated to sexual drive and hormonal balance especially, testosterone hormone level (Ali & Taha, 2012).

Rams can be used in a breeding season for one month in many sheep farms. Most of sheep breeders can use different rams for breeding groups to obtain high fertility rate. Fertility rate can be changed from first estrous to the second estrous and to third estrous as shown in Table 1. Where, non-return ratio reached 50 % for all breeding groups for the second estrous. Whereas it reached 71.4 % for the third estrous regardless of the sexual rest period as shown in Table 1. Ram sheep reproductive activity can affect to a great extent fertility rate in most sheep flocks (Price, 1987). It is very desirable to test rams fertilizing ability by many measurements. Some of these measures are fertility rate of tested rams from their fertility records to achieve high fertility rate in sheep farms. Rams body weight is very important in this concept. High or low body weight can adversely affect fertility rate in many ways. Over weight rams can correlate negatively to sexual drive as pointed out by many researches (Hammond, et al., 1984). Also low body weight rams should not be allowed to serve ewes during breeding season. In this study, it is noticed that one of the rams couldn't achieve any fertility rate although its weight was 52 kg and had 7 days sexual rest. Sexual rest can also affect ram sexual desire in a direct way. Therefore, it could be concluded that ram's body weight and sexual rest before breeding season are very important determinant in achieving high fertility rate. This study suggest that 3 days sexual rest period and 48 kg body weight in rams of local Egyptian sheep breeds is necessary to achieve high fertility rate.

Table (1): Data of estrous incidence percent and non-return ratio of ewes.

Time of ewe Drying	Time of 1st Estrous [a*]	Time of 2nd Estrous [b]	Time of 3rd Estrous [c]
17-11-2011	1-12-011		
17-11-2011	15-12-011	2-1-012	
17-11-2011	11-12-011		
17-11-2011	4-12-011	23-12-011	8-1-012
17-11-2011	1-12-011		
17-11-2011	28-11-011	15-12-011	3-1-012
17-11-2011	3-12-011		
17-11-2011	15-12-011	1-1-012	
17-11-2011	4-12-011	23-12-011	
17-11-2011	18-12-011		
17-11-2011	8-12-011		
17-11-2011	4-12-011	8-1-012	
17-11-2011	13-12-011		
17-11-2011	17-11-011	8-12-012	
Estrous occurrence%	100 [a]	50 [b]	28.57 [c]
Ewes No	14	7	2
Non-Return Ratio	0 [a]	50 [b]	71.43 [c]
Ewes No	0	7	9

*Columns with superscripts differed significantly among different groups at P≤ 0.05.

Table (2): Effect of sexual rest period of used rams on conception rate & birth rate of mated ewes.

Sexual Rest Period (Days)	Conception Rate %*	Lambs Born/ewe Mated %	Lambs born/ewe Lambed%	Gestation Period (days)	Sex Ratio		Twining Rate
					M	F	
1	75 [b]	14.29 [b]	25 [b]	162.5 [a] Ewe No 4	100 [a] No 4	0 [b] No 0	0
3	100 [a]	21.43 [a]	37.5 [a]	149 [a] Ewe No 6	66.7 [b] No 4	33.3 [a] No 2	0
5	60 [c]	21.43 [a]	37.5 [a]	155 [a] Ewe No 6	66.7 [b] No 4	33.3 [a] No 2	0
7	0 [d]	0 [c]	0 [c]	0 [b]	0 [c]	0 [b]	0

*Figures in the same column with different superscripts differed significantly (P≤ 0.05).

Table (3): Body weight of rams, testosterone level and effects on conception rate of ewes.

Ram	Body Weight (Kg)	Conception Rate %*	Total Testosterone Ng/ml
1	49	60 [a]	2.7
2	48	38.5 [b]	2.48
3	52	0 [c]	2.25

*Figures in the same column with different superscripts differed significantly (P≤ 0.05).

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تـأثير فترة الراحة الجنسية للكباش على نسبة النعاج التى لا تعود للشياع وعلى مستوى تركيز هرمون التستستيرون لذكور الأغنام

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قسم الإنتاج الحيوانى والثروة السمكية- كلية الزراعة- جامعة قناة السويس- ٤١٥٢٢ الإسماعيلية- مصر

تم دراسة تأثير فترة الراحة الجنسية لذكور الاغنام على كل من نسبة النعاج التى لا تعود للشياع وكذلك التأثير على مستوى تركيز هرمون التستستيرون للكباش. حيث تم تقسيم النعاج الى أربعة مجموعات تبعا لفترة الراحة الجنسية للكباش وهذة الفترات كانت ١،٣،٥، ٧ أيام راحة قبل البدء فى التلقيح. حيث قد أوضحت الدراسة ان أنسب فترة راحة كانت ٣ أيام وذلك قبل البدء فى مجاميع التلقيح حيث أرتبطت هذة المجموعة باعلى تركيز لهرمون التستستيرون. كذلك فقد وصل تركيز هرمون التستستيرون الكلى الى ٢,٧ ، ٢,٤٨ ، ٢,٢٥ نانو جرام / ا ملى سيرم دم وذلك للكباش المستخدمة بينما كانت نسبة النعاج العشار ٦٠ ، ٣٨,٥ ، صفر % لنفس الذكور المستخدمة.