RESEARCH REGARDING THE FECUNDITY OF WHITE TURCANA SHEEP

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Abstract

Fecundity is an index by which the reproductive activity may be assessed to all species. In this research was analysed the dynamic of the sheep entering into heat during the breeding season (August 15 - October 25) and was calculated the fecundity in relation to the rearing period, the sheep age, the rams age. The research was done on 1200 White Turcana sheep breed raised in the pedoclimatic conditions of Neamţ county in two different farms with 800 and 400 sheep, respectively.

The sheep entering in heat was noticed in a larger percentage after two weeks since the rams were introduced into the flock so, the biostimulatory effect of the males being obvious. This percentage overlapped with a decreasing of the average daily temperature with 2ºC. The best fertility was obtained to the ewes which were mounted in the first month of the breeding season (91.62%). For both farms, the periods with the most mounts, also represented the periods with good fertility. Depending on the ram used for mounting, the fecundity ranged from 80.0% to 100%, and depending on their age, between 87.2% (for 5 year old rams) and 91.6% (for 3 and 4 year old rams). The fecundity of adult ewes was equal to that of the young ones.

Key words: sheep, fecundity

INTRODUCTION

Sheep breeds grown in temperate area, and therefore the Romanian ones are characterized by seasonal breeding activity [13,14,16]. This is closely related to photoperiodicity [15]. The level of melatonin, secreted by the epiphysis, fluctuates according to the calendar period of the breeding season [9]. The functional link between the epiphysis (pineal gland) and the hypothalamus determines the appearance of the breeding season to sheep [3,4]. Photoperiodicity may interact with the feeding in starting and progressing the breeding season [8]. The dynamics of sheep entering into heat during the breeding season, the ovulation [2,4], the oestrus manifestation are hormonal coordinated processes; the length of daylight being an essential factor [1,15]. Other factors, such as nutrition, temperature, altitude, humidity, social factor, breeding age, etc. are very important in expressing the manifestations of sex life to sheep. For the native sheep breeds there are studies that refer largely to those factors [6,7,10,11,12].

The knowledge of the peculiarities of sheep breeding is necessary in programming the activity in order to increase the performance in this sector.

The profitability of raising sheep may also be influenced by their fecundity, since that index influences the number of lambs obtained in a year from a certain number of sheep [13]. Knowing the factors that may influence the fertility of any species is of great biological and economic importance.

In this research were analyzed the fecundity dynamics to the Turcana sheep breed according to calendar period in which the rearing was performed, on sheep age, the rams used for reproduction and rams age.

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MATERIAL AND METHOD

The research was done on 900 adult ewes, 300 young ewes and 36 rams from White Turcana breed with ages that ranged between 2 and 5 years. Farm I was formed from 800 ewes and 24 rams and it organised the breeding season during 15 August – 12 October. Farm II was formed from 400 ewes and 12 rams and the breeding season was between 30 August – 25 October. The detection of the in heat sheep was done with trying rams provided with apron. The ewes in oestrus were separated from the flock and assigned for mounting with the nominated ram. There was practised only one mount on the sexual cycle. The fecundity after first mount was calculated as the ratio between the number of sheep that did not repeat the oestrus and the number of mounted sheep. Temperature was calculated as an average of 24 registrations from the meteo station. The data were interpreted depending the analysed period, ewes and rams age.

RESULTS AND DISCUSSIONS

The ewes entry into heat in both farms was gradually, with a maximum after 2 weeks from the beginning of the breeding season (51.4% in farm I and 48.3% in farm II) due to the ram effect in biostimulating the ewes; a fact which is presented largely on research studies [7,11,14,16]. In the first and last two weeks before/ after the maximum period the percentage was below 25 (table 1).

Table 1 The dynamic of sheep entering in heat

Farm/ Sheep no.	Sheep in heat	Period/average temperature				
		15.08 – 29.08 19.2 ºC	30.08 – 13.09 17.2 ºC	14.09 – 28.09 14.5 ºC	29.09 – 12.10 8.7 ºC	13.10 – 25.10 11.6 ºC
Farm I/800	No.	197	411	140	52	-
	%	24.6	51.4	17.5	6.5	-
Farm II/400	No.	-	90	193	87	30
	%	-	22.5	48.3	21.7	7.5

Analysing the daily dynamic of in heat entering with the daily temperature, it was noticed that high temperature were associated with a low number of ewes in heat, presented often in studies (6,11,12). This situation is obvious in the middle of the breeding season in each farm (figure 1 and figure 2)

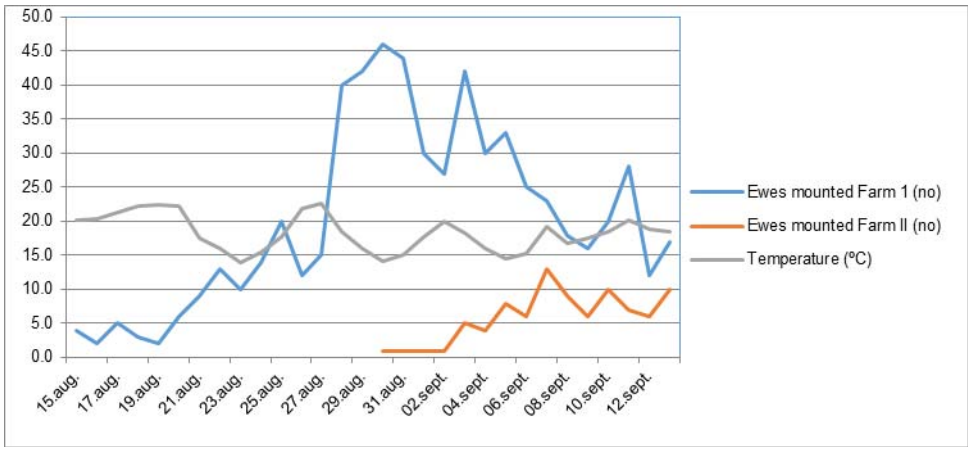

Fig. 1 The daily dynamic of sheep's intake in the heat (15 august-13 September)

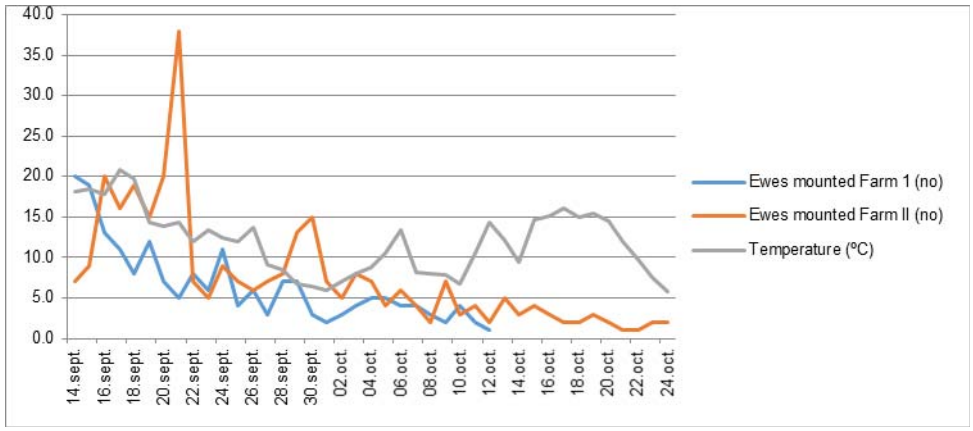

Fig. 2 The daily dynamic of sheep's intake in the heat (14 september-25 October)

But if there are analysed the number of ewes entering in heat during days with a certain thermic regime, there may be noticed different situations depending on the moment of breeding season beginning (table 2).

Table 2 The dynamics of oestrus appearance in sheep depending on atmospheric temperature

Temperature	Sheep in oestrus – total (no./%)	Period/average temperature				
		15.08–29.08 19.2 ºC	30.08–13.09 17.2 ºC	14.09–28.09 14.5 ºC	29.09–12.10 8.7 ºC	13.10–25.10 11.6 ºC
		Sheep in oestrus in each period (no.)/(%)				
FARM I						
< 10 ºC	47(5.8)	-	-	10(7.1)	37(71.1)	-
10-15 ºC	207(25.8)	10 (5.0)	123(29.9)	59(42.1)	15(28.9)	-
15–20 ºC	458(57.2)	138 (70.0)	260(63.2)	60(42.8)	-	-
>20 ºC	88(11.2)	49(25.0)	28(6.9)	11(8.0)	-	-
Total farm I	**800(100)**	**197 (100)**	**411(100)**	**140(100)**	**52(100)**	**-**
FARM II						
< 10 ºC	98(24.5)	-	-	13(6.7)	77(88.5)	8(26.7)
10–15 ºC	159(39.7)	-	7(7.7)	128(66.3)	10(11.5)	14(46.6)
15–20 ºC	117(29.2)	-	77(85.5)	32(16.5)	-	8(26.7)
>20 ºC	26(6.6)	-	6(6.8)	20(10.5)	-	-
Total farm II	**400(100)**	**-**	**90(100)**	**193**	**87(100)**	**30(100)**
FARM I + FARM II						
< 10 ºC	**145 (12.1)**	**-**	**-**	**23(6.9)**	**114(82.0)**	**8(26.7)**
10–15 ºC	**366(30.5)**	**10 (5.0)**	**130(25.9)**	**187(56.1)**	**25(18.0)**	**14(46.6)**
15– 20 ºC	**575(47.9)**	**138 (70.0)**	**337(67.2)**	**92(27.6)**	**-**	**8(26.7)**
< 10 ºC	**114(9.5)**	**49(25.0)**	**34(6.7)**	**31(9.4)**	**-**	**-**
Total	**1200(100)**	**197 (100)**	**501(100)**	**333(100)**	**139(100)**	**30(100)**

The number of sheep entering in heat during a certain period has been greatly influenced by the time of rearing season beginning and less by the atmospheric temperature. The aspect is obvious if we analyse, the whole mounting season, the sheep percentage in oestrus for different temperature ranges. Thus, in the days with the average temperature below 10 ºC, 12.1% of the total flock entered in heat, a different percentage depending on farm (24.5% for farm II and 5.8% for farm I) (tab 2 and fig 3).

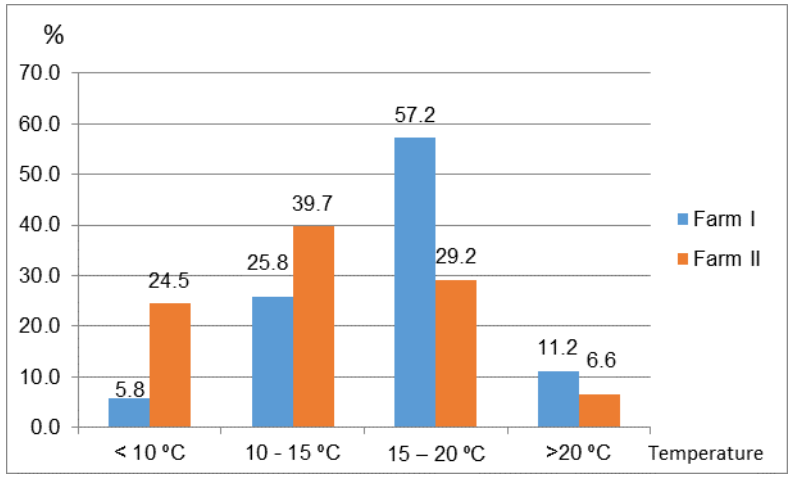

Fig. 3 The percentage of sheep in oestrus depending on the temperature level

The early beginning of the breeding season to White Turcana sheep breed determined their entering into oestrus in a large percentage on the days with an average temperature between 15 and 20ºC, which shows that the ovarian function is not blocked by this temperature. The melatonin stimulatory action as a result of the daylight decreasing had reduced the possible negative effect of the high temperatures [3,9].

During the first two weeks of the breeding season, approximately a quarter of the flock from farm I was mounted. Although the average temperature in this period was quite high (19ºC), the fertility was very good (95.5%). The same situation was registered for farm II, where fertility was 93.34%. The result was due to the correct sheep and rams preparation before the breeding season. In the next two weeks, the fertility was still high on farm I and decreased by 4% on farm II, possibly due to the large number of mounts done during this period. Fecundity gradually decreased in the following periods. In the last two weeks of the breeding season corresponding to each farm, there were mounted sheep that had difficulties in entering in heat; to those was noticed the lowest fecundity (82.7% in farm I and 86.67% in farm II) (tab. 3).

Table 3 The sheep's fecundity depending on the mount period

Period	Farm	Mounted sheep	Sheep returning in heat		Fecundity (%)
			No.	%	
15.08 – 29.08	Farm I	197	8	4.50	95.50
	Farm *II*	-	-	-	-
	Total	**197**	**8**	**4.50**	**95.50**
30.08 – 13.09	Farm I	411	36	8.76	91.24
	Farm *II*	*90*	*6*	*6.66*	*93.34*
	Total	**501**	**42**	**8.38**	**91.62**
14.09 – 28.08	Farm I	140	18	12.86	87.14
	Farm *II*	*193*	*12*	*6.22*	*93.78*
	Total	**333**	**30**	**9.00**	**91.00**
29.09 – 12.10	Farm I	52	9	17.30	82.70
	Farm *II*	*87*	*15*	*17.24*	*82.76*
	Total	**139**	**24**	**17.26**	**82.74**
13.10 – 25.10	Farm I	-	-	-	-
	Farm *II*	*30*	*4*	*13.33*	*87.67*
	Total	**30**	**4**	**13.33**	**87.67**

The fecundity was analysis in young and adult ewes. Although the literature states that in females with many offspring the fecundity is lower [16], to ewes there are fewer reproductive tract disorders caused by gestation and calving [5]. Consequently, in the studied flock, the fecundity was equal to the both age categories (tab. 4).

Table 4 The fecundity to lamb and adult ewes

Mounted sheep (no.)		Sheep returning in heat				Fecundity (%)	
Lamb ewes	Adult ewes	Lamb ewes		Adult ewes		Lamb ewes	Adult ewes
		No.	%	No.	%		
300	900	27	9.0	81	9.0	91.0%	91.0%

Among the many factors that influence sheep fertility is also the ram's age [10]. For the studied herd, the best values were obtained from rams of 3 and 4 years old, when the seminiferous epithelium and the adjacent glands are at maximum potential, and lower values were obtained from younger rams and the ones of 5 year old (tab. 5).

Table 5 The sheep's fecundity depending on the ram's age

Age (years)	Rams (no.)	Mounted ewes (no.)	Ewes returning in heat (no.)	Fecundity (%)
5	4	117	15	87.2
4	12	450	38	91.5
3	16	549	46	91.6
2	4	84	9	89.3

Also, fecundity depends on the individual genetic peculiarities. For the 36 rams analysed in this study, the fecundity ranged between 80% to 100% (fig. 4).

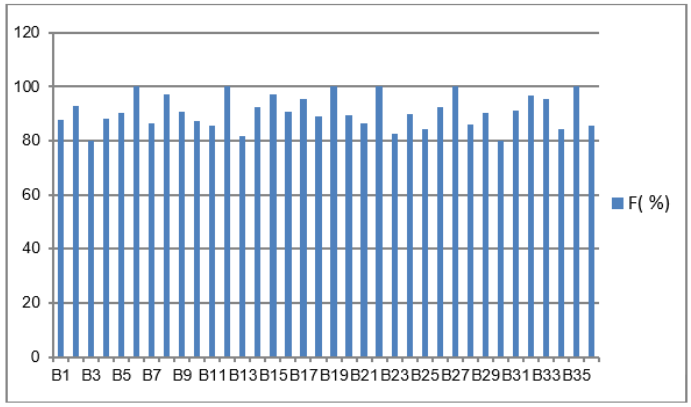

Fig. 4 The individual fecundity on the rams

CONCLUSIONS

Analysing the data in this study, the conclusion is that the dynamics of the sheep entering into heat in the two farms was similar. The maximum percentage of sheep in oestrus was registered between 2- 4 weeks after the rams were introduced into the herd, although to the farm I, the mounting season started 2 weeks earlier than in the farm II.

The fecundity of the White Turcana sheep was higher at the beginning of the mounting season and lower in the last two weeks.

The fecundity of adult ewes was equal to that of the lamb ones.

In rams, the individual values of fertility ranged from 80% to 100%, and the best results in mounting were obtained to rams aged 3 and 4 years.

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