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THE INFLUENCE OF BODY CONDITION SCORE ON RESPONSE OF EWES TO THE "RAM EFFECT"

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Abstract

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The effect of body condition score (BCS) of ewes on their fecundity is well documented. However, data for the influence of BCS on the response of ewes to the so called "ram effect" which synchronizing effect appeared from the 16th to 26th days after introduction of rams into flock are equivocal, and not enough. The aim of this study is to estimate the effect of body condition score on reaction of ewes to the 'ram effect". For this purpose there were carried out 6 experiments with five different Bulgarian breeds, and the total number of 1407 sheep. Body condition score of ewes varied from 1.9 to 4.6 in different sheep and it was estimated using a scoring system based on a five-point scale. Rams were introduced into sheep flock at the end of anoestrous season, in the second part of July and the first part of August. The response in all 6 experiments and in all 5 breeds was similar with the typical two peaks of oestrus activity. Ewes responded with oestrus behaviour between 16th and 26th days after ram introduction into flocks were 30.2% of the total number of animals with BCS < 2.4; 44.4% with BCS 2.4–2.9; 64.3% with BCS 3 – 3.5; 65.4% with BCS 3.6–4.0 and 52.7% with BCS > 4.0. The differences were significant between sheep with BCS > 3.0 and < 3.0, between sheep with BCS < 2.4 and BCS 2.4–2.9. In conclusion, for maximal "ram effect" it is necessary for ewes to have BCS between 3 and 4. The good body condition is connected with better sexual functions in general. Synchronisation of oestrus of ewes by proper applying of the "ram effect" is effective, easy, cheap, clean and ethic method, which merit application in sheep farming.

Key words: sheep, body condition, ram effect, response rate, oestrus synchronisation

Introduction

There are enough evidences that sudden introduction of ram into the ewes flock, after a certain period of separation, leads to spontaneous "silent" oestrus. In some females after 5–6 days appears a second silent oestrus followed by a normal luteal phase and oestrus behavior 16–17 days later, while other part of the ewes have only one "silent" oestrus followed by a regular one (Martin, 1984; Pearce and Oldham, 1984; Signoret et al., 1984; Korjonen, 1997; Ungerfeld, 2003). It is not clear enough the effect of feeding level and especially the influence of body condition score (BCS) of ewes on their response to the "ram effect. Some authors reported that ewes in a good body condition responded better (Lassoued and Khaldi, 1990; Mellado et al., 1994; Thimonier et al., 2000; Veliz et al., 2006), while other found that there is not influence of body condition of ewes on their reaction to the "ram effect" (Pearse et al.,1994; Lassoued et al., 1998; Folch et al., 2000). There is no data based on exact evaluation of body condition using BCS system with enough number of sheep for definitely solution of this problem.

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The aim of this paper is to study the effect of body condition score (BCS) of ewes at the time of sudden introduction of rams into the flocks on percent of responded ewes and the level of oestrus synchronization.

Material and Methods

The study was carried out in six sheep farms raising five different breeds (Table 1). The animals in farms 1, 2, 3 and 4 were reared in one flock, while in farm 5 and 6 they were kept in two separate flocks, but under the same grazing, feeding and farming conditions. The average body condition score in different farms varied from 2.67 to 3.35 according to the 5 score system described in details by Todorov et al. (1996). However, significant individual variations in BCS in the range from 1.9 to 4.6 were observed in some ewes included in the experiments.

All sheep included in the study were reared on natural pasture with relatively dry and coarse grass. Pasture grass contains 92–95% grass and 5–8% legumes, during months of July and August, when the experiments were conducted. Apart the daily grazing, all studied sheep were supplemented with a daily amount of only 150–350 g concentrate feeds 15 to 18 days prior to the introduction of rams in the flocks and continued 45–52 days in different experimental farms. All the ewes in the farm received same supplements to pasture. Therefore, differences in BCS were not a result of the different supplementations.

All rams were separated from ewes and reared separately for 5–6 months before the reintroduction. Ram- teasers were equipped with aprons, (cloth covering the abdomen tied at the withers and the croup) to prevent breeding. After the introduction of teaser rams all the ewes which came in oestrus were mated naturally by assigned ram in farm 1 and 2 or artificially inseminated in farm 3 to 6.

The introduction of rams into sheep flocks coincided with the end of anestrous season of experimental sheep, during second part of July – first part of August.

Body condition score of ewes was evaluated 1 to 5 days before introduction of rams into the flocks by two experts and average BCS was used in analyses. Only these ewes which came in oestrus for the first time after contact with rams are taken into account. 79% of ewes used in this experiment were aged 3 to 7 years and 21% were gimmers, inseminated for the first time at 16 – 18 month age.

The statistical significance of the differences between percent of ewes responded to "ram effect" at the groups with different body condition was determined by chi square test ($\chi 2$) for alternative traits (Agresti, 2007) following description of Plohinski (1980).

Results and Discussion

The data for different experimental farms, sheep breeds, start time of the trials, and average body condition score (BCS) are given in Table 1. The average distribution of ewes in oestrus after ram introduction is shown in Figure 1. The response of sheep is typical for the "ram effect" found by other authors (Ungerfeld et al., 2004; Chemineau et al., 2006; Nedelkov, 2013).

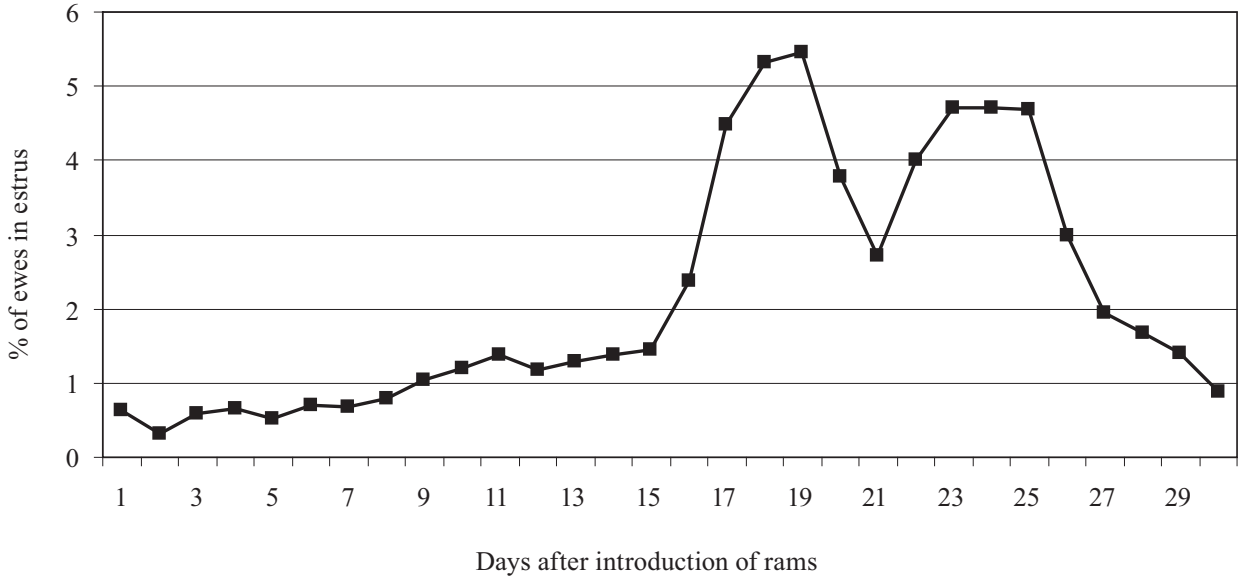

Fig. 1. Percent of ewes in oestrus after introduction of rams in the flocks

Table 1
Data for experimental farms, date of rams introduction in the flocks, and average body condition score (BCS) of ewes

Farm number	Number of ewes	Breed of sheep	Feed supplementation per one ewe per day	Date of ram introduction	Average BCS
1	213	Central Staraplanina Sheep	Not applied	13.07.2009	2.67
2	161	Bulgarian Dairy Synthetic Population Sheep	150 g barley +300 g brewery grain	15.07.2011	2.73
3	267	Tsigai	200 g wheat bran	06.08.2011	3.27
4	109	Karakachan sheep	200 g wheat bran	06.08.2011	3.19
5	313	Bulgarian Dairy Synthetic Population Sheep	300 g compound feed, 18% crude protein	15.08.2011	2.71
6	344	Pleven Blackhead Sheep	300 g barley	22.07.2011	3.35

Lack of proper flushing of ewes with concentrate supplementation in the farm no. 1 (Table 1) is main reason for the lowest BCS and the lowest rate of response (34.3% of total sheep) to the "ram effect" at this farm (Table 2). Khaldi and Lassoued (1991) also found a very low (21%) response to sudden introduction of rams at continuously undernourished and weak ewes.

A reaction of ewes to the sudden introduction of teaser rams was similar in all experimental farms (Table 2). Percentage of ewes which came in oestrus between the 16th and the 26th day after placing teaser rams in the flocks at different farms increased with the improvement of BCS up to 4 (slightly above average body condition) (Table 2 and Figure 2). It was observed the highest response to the "ram effect" of ewes with BCS between 3.6 and 4. This result is in agreement with opinion of Lassoued and Khaldi (1990), Mellado et al. (1994), Thimonier et al. (2000) and Veliz et al. (2006) that better body condition has advantage in response to "ram effect".

It is difficult to explain why Pearse et al. (1994), Lassoued et al. (1998) and Folch et al. (2000) did not found BCS as a factor which could influence the response of ewes from Barbarine breed in Tunisia to the introduction of rams into the flocks.

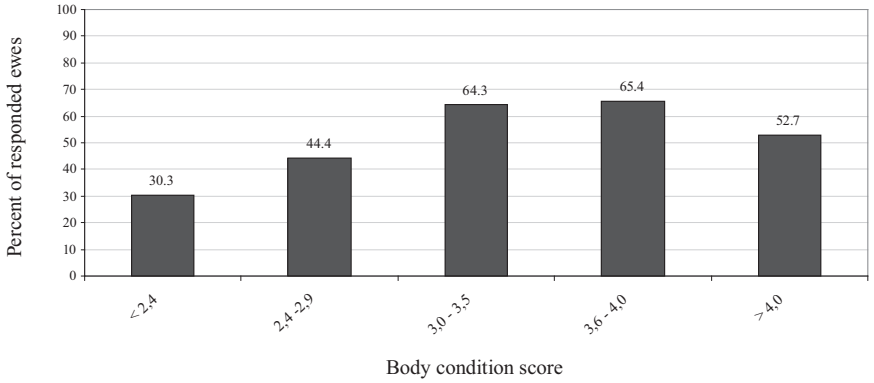

Fig. 2. Influence of body condition score on response of ewes to "ram effect"

Table 2
Data for total number of ewes with certain body condition score (T) and of ewes in oestrus (E) in framework of two peaks of the "ram effect"

Body condition score	Farm number														
	1		2		3		4		5		6		Total for 6 farms		
	T	E	T	E	T	E	T	E	T	E	T	E	T	E	% E
< 2,4	41	8	35	9	9	2	4	1	48	21	5	2	142	43	30.3a*
2.4 – 2.9	119	34	80	32	84	35	39	16	179	84	78	56	579	257	44.4b
3.0 – 3.5	48	29	33	20	79	49	43	22	76	43	158	118	437	281	64.3c
3.6 – 4.0	9	4	69	37	16	8	8	7	4	2	50	44	156	102	65.4c
>4.0	4	1	26	10	7	2	2	1	1	0	53	35	93	49	52.7bc
Total	213	73	161	66	267	133	109	49	313	156	344	255	1407	732	52.2

** Percentages of ewes with different BCS without common letter are significant at P < 0.05*

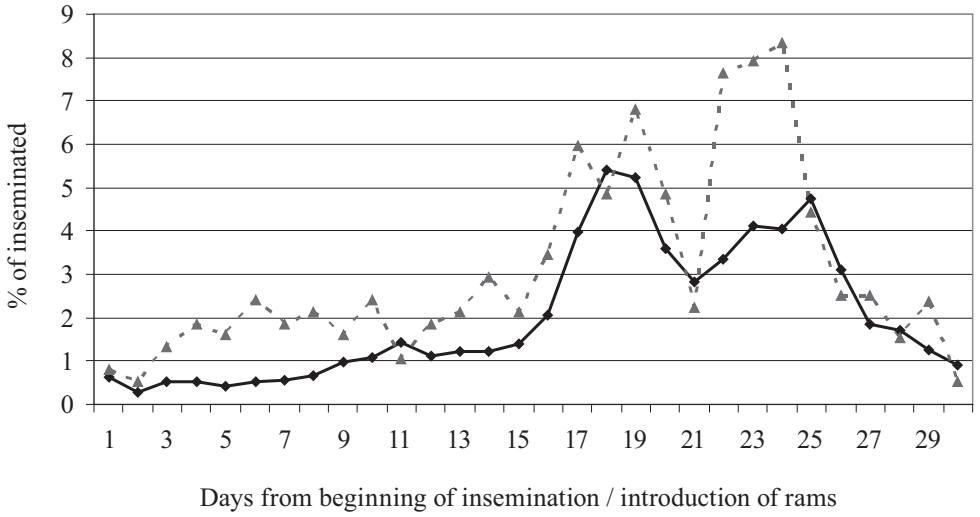

Fig. 3. Dynamic of changes the percent of ewes in oestrus of total number with BCS below 3 (solid line) and above 3 (broken line)

There was a tendency about a poor response to the "ram effect" in obese ewes with BCS over 4 (Table 2 and Figure 2).

There was a trend for a large number of ewes in oestrus with good body condition (BCS above 3) not only during the two peaks of reaction typical for the "ram effect, but also during the first 15 days after ram's introduction (Figure 3). Therefore, ewes in a good body condition are generally more active sexually.

It is well known an advantage of BCS in range of 3 to 4 in respect of ewes' fecundity (Nottle et al. 1990; Vinoles, 2003; Martin & Kadokawa, 2006; Scaramuzzi et al., 2006; Vologirov et al., 2009). However there isn't certain data in the literature for the influence of BCS on response of ewes to introduction of rams into the flock. This study with a large number of ewes from five different breeds shows clearly, that a higher percentage of ewes came in oestrus between 16th to 26th days after sudden introduction of rams, which were previously isolated for a certain period from the ewes.

Conclusions

On the basis of extensive study included 1407 ewes with body condition score varying from 1.9 to 4.6 (according to 5 scores system) it was found that the improvement of body condition score (BCS) of ewes up to 4.0 increased significantly the percentage of ewe's response to the "ram effect". It is possible to maximize synchronization of oestrus of sheep by sudden introduction of the rams with adjusting body condition score of sheep at 3 to 4. Synchronisation of oestrus of ewes by properly applying of the "ram effect" is effective, easy, cheap, clean, and ethic method, which merit application to the management of sheep in commercial farm.

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