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Sexual Perfomance of White Karaman and Kivircik Rams Exposed to Fat-Tailed Ewes

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Abstract: This study was conducted to evaluate the sexual performance of White Karaman and Kivircik rams of different breed groups. About 16 ram each of White Karaman and Kivircik breed were subjected to sexual performance tests by being exposed to oestrous White Karaman ewes for 30 min period. Anogenital sniffing Flehmen response, nudging and following ewes features of rams were assement at breed groups. Results of the present study indicate that White Karaman are more capable of mating with fat-tailed ewes than the Kivircik rams.

Key words: Ram, sexual behaviour, fat-tailed ewe, White Karaman, Kivircik, Turkey

INTRODUCTION

Animal agriculture is depend upon animal reproduction and reproduction is depend upon willingness and ability of animals to engage in sexual behaviour even where artificial insemination is employed. To meet particular management needs, humans take advantage of knowledge of sexual behaviour by facilitating or preventing its occurrence. Additional reasons for studying in farm animals arises from an interest in understanding evolutionary and ecological influences on expression of behaviour (Bearden and Fuquay, 1997).

White Karaman is a fat-tailed and white coloured sheep species with rough-mixed wool which produces 60 kg day^{-1} milk in 140-160 days of lactation period and has 20-30% twin rate. Red Karaman is a fat-tailed and brown-purple coloured sheep species with rough-mixed wool which produces 80-90 kg day^{-1} milk in 150-160 days of lactation period and has 20-30% twin rate (Akcapinar, 2000). Kivircik is a Thin-tailed and coloured sheep species with rough-mixed wool which produces 120-160 kg day^{-1} milk in 170-200 days of lactation period and has 20% twin rate. This species is bred in Turkey, Arabic countries and North Africa (Akcapinar, 2000).

This study is designed to test the sexual performances of White Karaman and Kivircik breeds rams to exposure to fat tailed ewes. And also to determined the differences of sexual behaviour between different breeds.

MATERIALS AND METHODS

Animals and treatments: The experiment was conducted during the late Summer to mid-Autumn period (early September to mid-November) at the Firat University of Veterinary Farm. Animals were kept in open-front barns with free access to water and ad libutium feeding. Water was available *ad libitum* and feed, mixture of concentrated feed in pellet form (300 g) and alfaalfa hay (400 g) was given twice per day. About 80 ewes of the White-Akaraman fat-tailed breed, 16 rams from the same breed and 16 rams of the Kivircik thin-tailed breed were the animals used. The ewes and the rams were kept isolated from the sight, smell and sound of animals of the opposite sex for about 60 days before the beginning of experiment. The experimental period was designed to cover the whole ewe estrus cycle plus 2 more days with the intention to include the maximum number of estrus ewes in the analysis since, the estrus date of each ewe was not known. The synchronization of estrus was avoided in order to minimize the effects of handling on estrus treatment and the related disturbances.

Ewes were ramdomly divided into eight groups. Rams were housed all together in a separate pen without having a visual, olfactory and auditory contact with the ewes. Concretely, the pen of rams contained 4 young and inexperienced rams of White Karaman breed, 4 mature and experienced rams of White Karaman breed, 4 young and inexperienced rams of Kivircik breed and 4 mature and experienced rams of Kivircik breed. The average live weight and height between the mature, 21 months old, White Karaman and Kivircik rams did not different significantly (81.4±1.8 kg and 79.8±2.1 cm, respectively). Young rams from each breed, 12 months old had similar weight and height too (44.2±1.4 kg and 48.7±1.8 cm, respectively).

Young rams from each breed had never come in contact with estrus ewes before the experimentation so, they were considered as inexperienced. On the other hand, mature rams were used repeatedly during the

fertilization of estrus ewes of the same breed the previous year so, they were ranked among the experienced rams. Two males from each experimental four animal subgroup were separately introduced to the housing pens (10±5 m enclosures) of ewes, one ram per ewe group between 07:30 and 10:30 h. Each group of ewes came in contact with the same group of rams during the experimental period.

Rams from each subgroup were used in daily rotation in order to avoid the negative effect of ewe and ram preferences and assure their cyclic use. The genitals of each ram of introduction were covered to prevent intromissions and undesirable pregnancies. Rams before the experimental period had the opportunity to get used to these covers so, it is considered that the elements of sexual behaviour and their libido, except from mounting efficiency and ejaculatory competence were not influenced negatively as it has been demonstrated by researchers' previous studies and other similar experiments (Price *et al*., 1994, 1996).

The eight groups of ewes were housed to adjacent pens with fences made by open metal bar construction. During the introduction periods, the ewes and rams sexual behaviour was recorded by video cameras. The ewes were considered in estrus when they were directly observed to accept a ride from a ram (standing reflex).

Data collection and statistical analysis: Data of the sexual behaviour were collected for 18 days, during the experimental hours. Observations were carried out after rams were introduced to the groups of ewes. Two video cameras mounted on observation towers were used to record continuously in detail, all movements of the rams and ewes in their immediate proximity.

The recorded tapes were later played in a video recorder-TV set and analyzed in detail. Sexual behaviour patterns, described previously in other sheep breeds (McClelland, 1991) were utilized as the basis of study.

Anogenital sniffing: Rams approach females and place their nose near the urine or perineal region ofthe ewes. The sniffing of ewes rear results in the detection of estrus and it seems to be primal and integral part of courtship.

Flehmen response: After sniffing, ram arches its head up and retracts the upper lip until it curls completely away from its upper jaw.

Nudging: This pattern consists of one alone or a combination of the foreleg kick, rubbing (the ram rubs head and shoulders along or under the ewe's flank) and low stretch or twist (the ram's neck is being held horizontal to the ground with the muzzle forward and raised while the head is turned through 908 as well).

Following: Ram follows ewe and the distance between them is <0.5 m. By this activity ram stays close to ewe and exhibits its sexual performance. These components of courtship behaviour are not exhibited on every occasion (McClelland, 1991; Odagiri *et al*., 1995). In fat-tailed sheep, ram behaviour includes ewe tail raising, a common practice that allows estrous detection and copulation. In this experiment, the duration and frequency of sniffing and nudging and the duration of flehmen response and following were recorded. Collected observations were similar to those reported in previous studies (Kridli and Said, 1999; Kridli and Al-Yacoub, 2006; Kridli *et al*., 2006) and included bouts of leg kicking, anogenital sniffing, mounts, frequency of raising the fat tail of ewes and mating (mounts with ejaculation) frequency.

Data were analysed by analyses of variance for completely randomized design. However, the actual sexual performance data are presented with means being separately based on transformed data. All analyses were conducted using the General linear model procedure of SAS (2001).

RESULTS AND DISCUSSION

Sexual performance parameters are shown in Table 1. Mature White Karaman rams sniffed more ewes per hour in relation to Kivircik and young White Karaman rams. By comparing ram ages, mature rams spend more time sniffing than the young males. On the other hand, mature Kivircik rams sniffed for more time in relation to White Karaman and young Kivircik males. Frequency of nudging was especially increased in the case of young White Karaman rams and its duration was higher in both mature and young White Karaman rams in comparison with the respective categories of Kivircik rams. Duration of Flehmen response was also higher in mature than young rams for both breeds. Following appeared not to vary significantly between the different groups.

Table 1: Interactions between ram breed and age which influence the ram sexual behavioural components (least square means±SE)

Characteristics	Kivircik yearling	Kivircik mature	White Karaman yearling	White Karaman mature
Sniffing (n h^{-1})	21.1±3.6^a	23.4±3.5^b	26.5±3.5^b	43.3±3.4^c
Sniffing (min h^{-1})	4.0±0.2^a	5.5±0.2^b	3.5±0.2^a	4.6±0.2^c
Nudging (n h^{-1})	3.0±1.1^a	5.0±1.0^a	14.0±0.9^b	5.0±0.9^a
Nudging (min h^{-1})	2.1±0.5^a	2.6±0.4^a	3.5±0.4^b	4.8±0.4^c
Flehmen response (min h^{-1})	0.6±0.1^a	1.7±0.1^b	1.0±0.1^c	1.8±0.1^b
Following (min h^{-1})	4.7±0.7	4.2±0.7	4.9±0.7	4.4±0.6

Means within arow with different letters (a-c) are significantly different ($p<0.05$)

Rams searched more ewe and spend more time sniffing them compared to the mature ewes with White Karaman rams having increased sniffing rates in relation to Kivircik rams. As it was illustrated, White Karaman rams of both ages exhibited higher rates of sexual interest in comparison to the respective Kivircik rams with the exceptions of following for all ewes and duration of sniffing and nudging for mature ewes.

The results of the experiment revealed that ram breed and ram age influenced the expression of its sexual interest (Table 1) . White Karaman mature rams which had previous experience of females in contrast with the rest of the rams, managed to sniff and deal with more ewes per hour in relation to the other rams, probably as a result of their versatility and faster ewe hormonal status perception. As it has been found, the number of investigations is associated with the sexual performance scores (Price *et al*., 1992). Rams with high sexual performance scores as mature White Karaman rams, switch females more often than rams with lower sexual performance scores. On the other hand, mature Kivircik rams which had previous experience with ewes of their own breed, dealt with fewer ewes for more time they delayed in detecting White Karaman estrus ewes but finally succeeded in it. The young inexperienced rams of both breeds without any previous mating precedent often failed even at a short distance to identify the state of ewe sexual receptivity and exhibited reduced sexual performance in response to the ewes; low rates for both frequency and duration of sniffing as it has also been observed by other researchers (Orgeur, 1991; Shackleton, 1991). Moreover, the fat tail of White Karaman ewes probably influenced negatively the transfer of pheromones; stimuli that are essential for the reproductive chemical communication and readiness (Rekwot *et al*., 2001). Mature White Karaman rams might discriminate the odour of urine of estrous ewesfaster because of their ability to smell the fat tail from a different angle. At the same time, they often raise the fat tail of females, an activity that was not observed in the case of theother rams and it is common in fat-tailed breeds (Kridli and Said, 1999). Frequency of nudging was especially increased in young White Karaman rams in contrast with its duration which was higher in the case of mature White Karaman rams. As it is stated, high rates of frequency of nudging are associated with low sexual efficiency (Dyrmundsson, 1973) and they are also expressed in the case of non-estrus ewes (Tomkins and Bryant, 1947). Young White Karaman rams strived to copulate without exhibiting the rest necessary courtship elements in a considerable way, an incident that resulted in poor mating success. According to Shackleton (1991), a female which is courted will stand while those receiving only forced copulation attempts will run away. Consequently, estrus ewes allow only males that perform complex courtship to mate with them. On the other hand, Kivircik rams might nudge less time towards White Karaman ewes than White Karaman rams, as a result of delayed perception of ewe estrus status. Duration of Flehmen response was increased in mature rams. The expression of Flehmen is an attempt to gain general olfactory information, not only the estrous state of a female (Stevens *et al*., 1982). Additionally, it may serve in self-stimulation as in goats (Price *et al*., 1993) or in inter-animal communication (Banks, 1964) Mature rams having previous experience with ewes, exhibited higher Flehmen rates, an activity that kept them in a state of behavioural and physiological readiness for mating. Flehmen response is associated with the perception of hormonal state of the female. Since both White Karaman and Kivircik mature rams detect estrus ewes, irrespective of the required time, duration of flehmen response does not differ significantly between the two ram breeds. On the other hand, young rams had reduced ability of acknowledging ewe hormonal state since, they came in close contact with ewes for the first time during this experiment and they expressed therefore, low flehmen rates. The behaviour of females also plays an important role in the meeting of sexual partners and subsequent mating (Gelez *et al*., 2003). The receptive ewe stands firmly, moves the tail and turns the head, activities that reinforce the positive response of the male. The intensity of sexual behaviour varies among ewes since, pubertal ewes during their first or second estrus show weaker responses than mature ewes and never or rarely stand firmly (Edey *et al*., 1978; Dyrmundsson, 1973).

Moreover, it may be suggested that the main factor that created these differences was the shape of the tail in White Karaman breed. The fat tail protects the vulva of ewe, prevents ram from mounting (George, 1982) and affects negatively the transfer of pheromones, elements which are necessary for the expression of sexual behaviour (Rekwot *et al*., 2001) as it has already been mentioned before. Low sexual interest rates which are observed during the interaction of thin-tailed rams and fat-tailed ewes can be tackled with tail docking, a cheap and effective way of eliminating the fat tail's negative implications. The expression of mating behaviour elements was significantly shorter in the group of young rams and mature ewes than in other groups. This could be consequence of ewes preference and young rams inexperience. Ewes prefer older, larger, more sexually active rams which tend to be more reproductively successful than younger and smaller rams (Estep *et al*., 1989).

Sexual experience also influences the activities of ram; younger rams often fail to identify the status of ewe sexual receptivity and they exhibit reduced rates of sexual interest when they first come in contact with the ewes. Therefore, the majority of mating management practices throughout the world recognizes the need for particular care in management of young and virgin animals (Lindsay, 1996), due to the fact that virgin yearling rams which are first exposed to estrous females, exhibit reduced sexual interest towards the ewes (Katz *et al*., 1988).

Other researches (Tomkins and Bryant, 1947; Price *et al*., 1991, 1994) have demonstrated that offering heterosexual experience to ram lambs at 6-9 months of age reduces the proportion of rams that are initially disinterested in estrus ewes a year later and improves their sexual performance. The exposure of rams to estrous ewes substantially improves their level of sexual activity.

CONCLUSION

The results of this study indicate that White Karaman rams managed to raise the fat tail of females more frequently suggests a greater advantage in natural mating over Kivircik rams and also pointed out that thin tailed rams exhibit reduced sexual interest rates towards fat-tailed ewes in comparison with fat-tailed rams. At the same time, ram age play an important role in the expression of courtship behaviour.

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