

STIMULATION OF SEXUAL REFLEXES OF ABORIGINAL RAM BREEDS DURIN THE NON – MATING SEASON

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ABSTRACT

The aim of the present study is to induce the sexual activity and to attain ejaculation during non-mating season in aboriginal ram breeds bred in Bulgaria. The possibility is discussed to use these rams with regard to the selection activity in effective sexual way.

KEY WORD: Aborigine rams breeds, sexual activity and reflexes, semen

РЕЗЮМЕ

Целта на настоящото изследване е при аборигенни породи кочове, отглеждани в България да се предизвика полова активност и получаване на еякулати в извънслучен сезон. Дискутира се възможността за ефективно полово използване на тези кочове като спермодарители във връзка със селекционната дейност.

ПОДРОБНО РЕЗЮМЕ

Проведени са опити за индуциране на полови рефлексии в извънслучен сезон при аборигенни породи кочове, отглеждани в България, с оглед ефективното им използване като спермодарители. За индуцирането на полови рефлексии през неразмножителния сезон, кочовете бяха третирани с андрогени (Omnadren – Polfa) в доза 50 мг. на животно. На животните, които не проявиха *libido sexualis* беше приложено допълнително третиране с витаминен препарат Vialiton (Peshtera – Bulgaria) в доза 8 см³ и Morphinum Hydrochloricum 2% (Bulgaria) в доза 0.5 см³.

Установено е, че при изпитания режим на хранене, гледане и медикаментозно третиране на кочове от аборигенните породи Каракачанска, Медночервена Шуменска, Местна Карнобатска и Реплянска е възможно предизвикване на нормална полова активност и проява на безусловните полови рефлексии в извънслучен сезон (м. Юни – м. Юли). При извършените рефлексологични изследвания е установено, че времетраенето за протичане на звената на сложния размножителен рефлекс е средно 65.3 ± 7.2 , като стойностите за рефлексите на приближаване, ерекция и обхващане са 61.1 ± 6.5 , а тези за съвкупление и еякулация – 4.2 ± 0.3 секунди. Запазването на ценни породи аборигенни овце, отглеждани у нас е възможно да се постигне и чрез ефективно полово използване на кочовете като спермодарители в извънразмножителния сезон с оглед подобряване на селекционната дейност.

INTRODUCTION

Since ancient times Bulgaria was been a sheep-breeding country, the occupation being implemented in the nation's lifestyle and having significant importance for the country's economy. The complex of natural ecological factors in the country stands in the optimal limits for dwelling of domestic representatives of the *Ovis* species thus favored the cultivation of local aboriginal breeds and the preservation of any positive features from the genetic fund of these animals.

In some regions of the country in accordance with the specific soil, climate, relief, economy and other conditions several local sheep breed are bred. They have developed to a great extent genetically confirmed unity with the dwelling environment. In Bulgaria there a unique genetic fund existed in the past; only the aboriginal breeds and ramifications of sheep breeds were more than 15. Due to different reasons their number has been significantly reduced at present. In the different regions within comparatively small herds there are sheep from

the breeds Karakachan, Copper-red, Shumen, Middle-Balkan, Karnobat local, Replian and Dabene. The Karakachan breed is the oldest on Balkan Peninsula and represents a typical Balkan breed (Fig.1). In the region of Northeastern Bulgaria the Copper-red Shumen breed is widely distributed. It is considered that the Copper-red Shumen breed is a typical "Tzakel" (Fig.2). In the northern lower parts of Middle Balkan mountain the Middle-Balkan mountain sheep are bred. They are from the Karakachan type but are comparatively bigger and with higher productivity (Fig.3).



Figure 1. Karakachan breed



Figure 2. Copper-red Shumen breed



Figure 3. Middle-Balkan mountain breed

The animals from the breed Karnobat local are one of the oldest breeds in Bulgaria, formed centuries ago by the people's selection. The sheep are robust and well-accustomed to the conditions in Southeastern Bulgaria (Fig.4). The Replian breed is distributed in Northwestern Bulgaria, the animals being well-adapted to the terrains and the ecological conditions of the mountain (Fig.5). The Dabene sheep are bred in the region of the Karlovo and Kazanlak plains. The animals are averagely big, grounded, with a compact body (Fig.6).



Figure 4. Karnobat local breed



Figure 5. Replian breed

Comparatively the biggest fertility is obtained with the sheep from Copper-red Shoumen – up to 135% and from Replian breeds – 120-130%.

The animals from aboriginal breeds are bred in small farms in different regions of the country, which does not allow the application of the biotechnology for artificial insemination, mainly the natural mounting of sheep being used. All this hinders the selection process, respectively the preservation of the population from the aboriginal sheep breeds. That is why it is indispensable to collect rams from these aboriginal breeds at one place in order to induce sexual reflexes, to train them to donate sperm in order to create genetic banks for extended conservation of masculine gametes.



Figure 6. The Dabene breed

The manifestation in the course of time of the sexual cycles in aboriginal sheep has determined a manifestation of the sexual reflexes in the brood animals during the respective mating season (August - September). This season is short for the sheep and even with maximum utilization of the rams their abilities to inseminate bigger population of sheep are limited. This problem may be solved through organization of a normal sexual regime of the brood animals during the non-mating season also. To reach this effect it is necessary to make a stimulation of libido sexualis with the rams by studying the manifestation and the running of the unconditional sexual reflexes. In our country reflexologic tests have been conducted with rams from milk- and thin-fleece breeds (2, 3, 4, 5, 6)

There are no published data on the possibilities for inducing sexual reflexes in rams from aboriginal breeds bred in our country during the non-mating season.

The aim of the present study is to test the ability to induce libido sexualis, to investigate the manifestation and the intensity of the sexual reflexes in aboriginal ram breeds during non-mating season with respect of their effective sexual use as sperm donors.

MATERIAL AND METHODS

The experiments are carried out with 18 clinically healthy and sexually mature rams from the breeds Karakachan – 8, Copper-red Shumen – 2, Middle-Balkan mountain – 2, Karnobat local – 3, Replian – 2 and Dabene – 1. The rams were with normally developed genitals and were used to naturally inseminate of sheep during the preceding mating campaign in 2004. The animals had been collected from different regions of the country. The experiments were carried out at the Station for Artificial insemination – Sofia during the spring season – end of April and beginning of May. During a period of 45-day adaptation the animals were subjected to uniform breeding regimes. The feeding ration included concentrated forage – 1.3 kg, hay – 2 kg,

Table 1. The sexual reflexes of rams

Breed	The obtained ejaculates (n)	Complex of reproductive reflex $\bar{x} \pm Sx$	Time of running of sexual reflexes (sec)	
			First step (reflexes of approaching, erection, covering) $\bar{x} \pm Sx$	Second step (reflexes of copulation and ejaculation) $\bar{x} \pm Sx$
Karakachan breed	32	59.70±1.03	57.30±0.92	2.20±0.17
Copper-red Shumen breed	14	68.90±0.76	66.40±0.73	2.50±0.29
Karnobat local breed	12	69.10±0.86	66.90±0.83	2.20±0.21
Replian breed	13	61.40±1.50	58.90±1.28	2.46±0.27
Total	71	63.40±0.75	61.10±0.74	2.30±0.11

carrots – 0.5 kg, milk powder – 0.1 kg, 2 eggs, ensuring them with 2.3 food units and 0.24 kg digestible protein. The animals were taken every day to pasture.

To induce their sexual reflexes during the non-mating season the rams were treated i.m. once with androgens (Omnadren – Polfa) at a dose of 50 mg per animal. The animals that did not manifeste libido sexualis an additional parenteral treating was made with vitamin preparation Vialiton (Peshtera – Bulgaria) at a dose of 8 cm³ per animal and Morphinum Hydrochloricum 2% (Bulgaria) at a dose of 0.5 cm³. The rams were additionally stimulated by using the natural pheromones of the vaginal secretion of sheep put onto a mounting frame. In order to provoke estrus, 3 thin-fleeced sheep were used. The sheep were treated with PMSG (Intervet) with a dose of 500 UI three times every 16 days. The appearance and the duration of the different sexual reflexes forming the complex reproductive reflex were determined 3 times a week under Bratanov's method (1), modified by Nikolov and Nestorova (2).

The investigation of sexual reflexes was performed in two steps. The reflexologic tests in the first step comprised the unconditional sexual reflexes of approach, erection and mounting (sec). The second step connected the investigation of copulation and ejaculation (sec).

After obtaining of the semen the biological parameters of spermatozoa were studied. The semen volume, sperm concentration, motility and morphology were investigated to determine the biological indicators with regard to sperm suitability for practical use.

The data from the tests were processed under the Student's variation-statistical method.

RESULTS AND DISCUSSION

During the adaptation period non of the investigated animals did not manifested libido sexualis. After the hormonal treatment 5 rams (28.8%) from the breeds: Replian – 1, Copper-red Shumen – 1, Karakachan – 2 and Karnobat local – manifested libido sexualis sings. No earlier than on the 8th day sexual reflexes were found in one more ram from the Karakachan breed. Of all 18 rams only 6 (33.3%) of them manifested sexual reflexes after hormonal treatment. The brood animals from the breed Middle-Balkan mountains and Dabene did not manifested any sexual reflexes.

After the additional treatment of the rest 12 animals with Vialiton (Peshtera, Bulgaria) and Morphinum hydrochloricum – 2%), only 3 of them (25%) showed reflexes of approach, erection and mating (first step). The same rams did not manifest any reflexes of copulation and ejaculation until the end of the experiments.

The results from the reflexologic tests indicated that Karakachan, Replian, Copper-red Shumen and Karnobat local breed is possible to provoke sexual activity in a non-mating season. It is known that this is not typical for the aboriginal sheep breeds. The changes of the time and the seasons for obtaining of the sperm from these breeds of brood animals is physiologically entirely possible. In this way may be obtained a rational usage of aborigines rams as sperm donors during the non-mating season.

The unconditional reflexes manifested in the non-reproductive season (June and beginning of July) are shown to run in the normal limits typical for this breed. Some authors report similar data for another rams breeds (3, 5). The duration of the flow of the two steps of the complex reproductive reflex is on the average 63.40±0.75. The values of the sexual reflexes rendered on account of

seconds during the first step were 61.10 ± 0.74 sec and for the second one – 2.30 ± 0.11 sec.

From the beginning of June to the beginning of July the libido sexualis reflexes of the brood animals increased step by step. This was manifested by the gradual reduction of the duration of running of the reflexes.

A certain distinction was observed regarding the speed of their running of the different rams from the different breeds. The libido sexualis reflexes from the Karakachan (59.70 ± 1.03) showed the biggest intensity, while the animals from the Replian breeds (61.40 ± 1.50) manifested a lower reflex intensity. The results are statistically insignificant.

The increasing of libido sexualis activity coincide with the changes of the climate conditions (temperature, air humidity, duration of the day). The climate characteristics of the mating season of the aboriginal sheep breeds, are close those to this for the reproducing season of the animals during August - September. This is probably related to the adaptation of the rams nervous system to the signals coming from the environment and reflected the endocrine system. Treatment with androgens leads to a higher reactivity of the nervous system and this is manifested in a normal sexual activity. The role of the type nervous activity is essential. The ejaculated rams were classified on folow the follow basis of the types of nervous activity (Bratanov 1): calm type – 2 animals, lively type – 1 animal and excited type – 3 animals. The remaining 3 brood animals with unconditional sexual reflexes included in the first step of the complex reproductive process were with weak type of a higher nervous activity, with prevailing inhibition processes. As a result of this in those rams the reflexes of the first step were weakly manifested. This fact hindered the development of the reflexes of copulation and ejaculation.

From the investigated 71 ejaculate samples due to worse biological parameters (volume of the ejaculation sample < 0.5 ml; concentration of the spermatozoa < 1.5 mln/cm³; mobility of the spermatozoa $< 70\%$ and with violated cell configuration of the cells $> 20\%$) 21 ejaculation samples (29.6%) were rejected. The evaluation of the biological parameters of the rejected semen samples and the time for running of the sexual reflexes indicated that 19 from them (90.5%) were obtained by brood animals. In these animals the speed of manifestation of the reflexes from the first step was a longer duration. Probably the speed of running of the sexual reflexes, expressed in prolongation of the time for their manifestation caused a certain unfavorable effect on the biological qualities of the obtained semen samples. The data from the conducted tests indicate that at the stimulation of the sexual activity of rams from aboriginal breeds in non-reproductive

season, bred in our country, it is possible to obtain a satisfactory high percentage (70.4%) normozoospermic ejaculation samples.

The hormonal treatment with androgens accompanied by an improved feeding (foods from animal origin included in the daily ration – eggs, milk powder) and pasture has a positive effect on the reproductive functions of rams from aboriginal breeds in a non-reproductive season (June – July). The results from the tests give grounds to assume that the preservation of valuable breeds of aboriginal sheep bred in our country is possible through an effective sexual usage of rams as sperm donors also in the non-reproductive period with regards to improving the selection activity.

CONCLUSION

During the tested feeding regime, breeding and medical treatment of rams from aboriginal breeds Karakachan, Copper-red, Shoumen, Karnobat local and Replian it is possible to provoke normal sexual activity and manifestation of unconditional sexual reflexes in the non-mating season. (June-July).

The duration of the steps of the complex reproduction reflex is on the average 63.40 ± 0.75 , the values for the reflexes of approach, erection and mounting is 61.10 ± 0.74 and the average length of duration for copulation and ejaculation – is 2.30 ± 0.11 seconds.

The preservation of valuable breeds aboriginal sheep bred in our country is achievable also through an effective sexual use of rams as sperm donors in the non-reproductive season with regard to the improvement of the selection activity.

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