

New Method Of Mating Of Kalmyk Cattle

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Abstract

The Kalmyk breed cattle is the most common breed of cattle in the Russian Federation, due to its high adaptive capacity. More than half of the population is concentrated in the Kalmyk Republic. Breeding plants, which ranch Kalmyk cattle are concentrated mainly in the Republic of Kalmykia. One of them is JSC PZ "Agribusiness", majoring in the young stock sale not only in Russia but also abroad. In "Agrobusiness" JSC all the methods of mating and artificial insemination were conducted on the cattle of Kalmyk breed. When free mating one bull had 20-25, when pasture mating - 30-35, with artificial insemination 150 cows. Not more than 92% of calves in the first two variants were received and 72% with artificial insemination.

With the new way of mating in three herds one bull with a rate elite-record was kept for 45 days, for the rest 45 days 2-3 bulls were kept in the same herds.

It was found out that libido of the bulls was high, the quality of the seed was excellent, which allowed to receive 60-98 offsprings from one bull. 100 cows had no less than 98 calves. A high calf crop can be explained by full disclosure of the potential sires in the absence of competition.

The cows with higher body weight, short service period and a high milking ability were the first to get in season.

A new way of mating allowed to get from one bull 60-98 superior calves with a live weight more than average in the herd and more than data with other ways of mating and artificial insemination.

Key words: the Kalmyk cattle, ways of mating, a new method of mating.

INTRODUCTION

Beef cattle in Russia since 2008 has been developing satisfactorily and the number of beef and crossbred cattle in 2014 amounted to more than 2 million heads. More than 12% of the gross output of beef was received from beef cattle [1]. Kalmyk cattle in the Russian Federation ranks first among the beef breeds.

The Kalmyk breed of cattle is the only domestic breed in the Russian Federation. This is the oldest breed on the territory of Russia, it appeared together with the tribes of the Kalmyks, came from the Western part of China to the lower reaches of the Volga.

Biological quality of the Kalmyk cattle was formed in the harsh conditions of year-round nomadic grazing that contributed to its high endurance and strong body type.

The Kalmyk breed has valuable technology features: easy calving, low mortality of calves in the suckling period and high fertility. Moreover, in the grazing period, it can accumulate subcutaneous fat which has such protective function, as none of the breeds in the world has.

A long history of Kalmyk cattle breeding has shown that its biological characteristics in different periods of livestock development was always in demand, especially in pasture breeding, as only Kalmyk cattle could in preserve its genetic potential a changing environmental and economic conditions.

Despite the fact that the number of cattle of Kalmyk breed is not alarming, the problem of preserving of

the genetic potential should be paid attention to, like that it's done around the world. [2; 3; 4].

The most important in breeding technology of Kalmyk cattle is the production system "cow-calf", which is the most important work on feeding, housing, herd reproduction and productivity of animals. [5]

The Kalmyk cows in the breeding farms of the Republic of Kalmykia have the crop of 85-92 calves per 100 cows, while the average in Russia in beef herds 72-77 calves, 78-85% of the United States, Canada, European countries, 70-72% in Australia and 65% in Argentina. This means that Kalmyk cattle exceeds the world records in calf crop for weaning. [6; 7].

In beef cattle free-style, hand-mating and artificial insemination less frequently are used. In the last 100 years there haven't been significant changes in the methods of mating. Thus, according to G. P. Legoshina [1] in countries with developed beef breeding 10-12% of the population is inseminated artificially, while in Russia, 1,5-2 %. In Kalmykia, where only beef cattle is bred, the proportion of cows and heifers, inseminated artificially, does not exceed 1%.

MATERIALS AND METHODS

The studies were conducted in open joint-stock company breed farm "Agribusiness" of the Republic of Kalmykia of the Russian Federation, where breeding records are held and breeding work is conducted at a high level.

In the farm freestyle, pasture mating and artificial insemination are used. While free mating in the herd 6-8 bulls were used, the load on one bull was 20-25 cows. Artificial insemination was used in the previous year. 150 cows were seeded with freshly sperm of a bull Lotus 82040. While pasture mating the herd was divided into 5 groups around 30-35 cows, to which for the whole breeding period one breeding bull was allocated. A new way of mating was to use one bull in the herd for 45 days and then 2-3 bulls cover the cows, which are not covered. Our proposed method received a patent for the invention.

The outstanding bulls class elite-record Monolith 43016, Lotus 82040, Kazak 42586 were introduced into three herd of 160 cows calving 3 and older in 2011-2013. Rate of bulls was estimated according to the instructions on the evaluation of cattle of meat breeds, adopted in the Russian Federation.

Sperm quality was determined by indicators such as the volume of the ejaculate, motility, concentration and percentage of abnormal sperm on the automatic analyzer Sperm Quality Analyzer(SQA) V, made in Israel.

Feeding and management of bulls did not differ from the traditional, accepted in a free mating in the pasture period. But grass from natural pastures bulls received daily 7 kg of concentrated feed consisting of a mixture of barley and oats (30% oat and 70% barley), also in the diet eggs, carrots and vitamins were included. The total energy value of the diet was 11-12 EFU (energetic feed units) and 115-118 MJ (megajoules) of metabolizable energy. [8]

70% of the feed was given in the afternoon and 30 % after watering in the evening.

The mode of bulls usage was as follows: in a herd for 45 days 1 bull was introduced, in every 3 day the bull was taken away and allowed to rest for 1 night. After 45 days of usage these bulls were replaced with other, less valuable bulls, which carried out cover.

Immunogenetic characteristics of cattle and the determination of the evidence of origin were held for 33 antigens according to the standard technique. [9] Immunodiagnostikums were made from the blood of the own donor herd in a certified laboratory of OAO "Moscow" (Moscow)

Cows was determined by live weight and milk yield during the evaluation. In beef cattle milk yield is determined by live weight of calf aged 205 days. The live weight of the cows, their milk productivity of the offspring were processed by variation statistics. [10].

The comparative analysis of the results of free and pasture mating, artificial insemination and a new way of mating was made.

THE RESULTS OF RESEARCH.

The characteristic features of bulls used in the new method of mating are given in the table 1. The data in table 1 show that in the experiment, we used high-rate bulls. Monolith and Kazak were 7 years old, Lotus was 3 years. They had significantly different immunogenetic indicators. Lotus had more ejaculate volume was greater, he also had the highest concentration and mobility of sperm, lower the percentage of abnormal sperm.

98 calves were received from Lotus, 82 from Monolith, 60 calves from Kazak. The sons of Monolith had higher live weight at the age of 205 days – 224 kg. The sons of the Lotus and Kazak weighed 219 and 220 kg. Difference in live weight was inaccurate. The obtained results are significantly higher than those in the Kalmyk breed from other farms. [11].

From the literature and world practice it is known that productive and reproductive qualities of cows depends largely on obtaining calves. [12; 13; 14; 15]. We performed the analysis of seedstock herd, covered with bulls in the experiment and made a comparison with the average for the herd. (table.2)

Table 1. The characteristic features of bulls

Features	Names and numbers of the bulls		
	Monolith	Lotus	Kazak
Age	7	3	7
Blood type	a/A2B2O4E'3I'X2F/FZ	a/A2B2O4B'I'O'WL'F/WH'Z	a/aD'E'3'F'G'O'C2X2F/Vz/z
Live weight, kg	900	860	870
Rate	Elite-record	Elite-record	Elite-record
Volume of the ejaculate, ml	4,0-4,5	4,5-5,5	4,0-4,5
Quality of sperm, including concentration, millions/ml	1,4	1,7	1,5
Motility, points	9	10	9
Abnormal sperm, %	8	7	8
Calves	82	98	60
Live weight of male calves aged 205 days, kg	224 ±3,8	219 ±3,7	220 ±3,9

Table 2. Characteristic features of cows

Inseminated by	Inseminated, cows	Calved		Live weight of cows, kg	Milk yield, Kg	Service-period, days
		cows	%			
Monolith 43016	84	82	98	508±3,7	224±3,8***	24-45
Lotus 82040	98	98	100	514±4,1*	219±3,7**	23-45
Kazak 42586	62	60	98	507±3,8	220±3,9**	23-45
On the average in 3 herds	160	147	92	498±7,4	192±7,6	23-95

Table 3. Effectiveness of different ways of reproduction

Way of mating	Load on one bull	Amount of used bulls	Calves received from 100 cows	Live weight of bull calves aged 205 days, kg
Free	20-25	6	87-92	192±6,3 **
Pasture	30-35	5	90-92	193±3,1 **
Artificial insemination	150	1	72	205±5,8 *
New method	60-98	1	98-100	221±4,2

The average live weight of cows in 3 herds amounted to 492 kg. Live weight of cows, covered with bull, Lotus, was significantly higher ($P < 0.05$). Cows, covered with Monolith and Kazak also had a higher live weight.

Dairy cows that gave the offspring of the bull, the Monolith, was higher than in average herds ($P < 0.001$) were also higher in the milk from the cows covered by the bulls, the Lotus and the Kazak ($P < 0.01$).

Service period of cows in 3 herds made up 23-95 days, cows have covered 3 bulls used in the experiment was not more than 45 days.

Of the bull, Lotus 82040 received 100 calves from 100 cows, calf crop on groups of cows covered by the bulls Monolith 43016 and Kazak 42586, was also high and exceeded the average calf crop for the herd of cattle.

As JSC PZ "Agribusiness" in 2009-2013 was tested all the ways of mating, we made a comparative analysis of the effectiveness of different ways of reproduction (table. 3.).

A comparative analysis of different method of reproduction shows that in the free mating calf crop is 87-92 calves per 100, whereas in the pasture mating this figure is slightly higher. With artificial insemination, the calf crop does not exceed 72%. Live weight of calves received with the new way of mating is higher than in free and pasture mating ($P < 0.01$) and artificial insemination ($P < 0.05$).

It should be noted that the bull Lotus had 108 calves with an average live weight of 205 kg with the artificial insemination, with the new way 98 calves with live weight of 219 kg.

DISCUSSION

Reproduction has a key role in beef cattle. In the breeding of Kalmyk cattle free mating is used among almost all cows. An advantage is the simplicity and minimal number of staff [16]. Disadvantage is the fact that it is required to keep and use a large number of bulls, sometimes not of satisfactory quality.

Due to the fact that there is a demand to receive as many calves as possible from the outstanding bulls and artificial insemination can not be used because of labor coefficient, we have proposed a new way of mating.

In the experiment three elite-record bulls with proven quality of sperm were used.

It was found that the efficiency of bulls and their libido was high. Contrary to the view that one bull can not cover more than 50 cows at free mating, in our study we received 98 calves from the Lotus 82040. We should note, however, that at the free mating with the load of 20-25 cows per 1 bull 5-6 bulls were used in the herd.

The explanation of a large number of effective mounts lies in the psychological condition of bull that realizes their potential. If you use one bull in the herd, the absence of competition creates the dominant sexual behaviour allows a bull to cover a larger number of cows without stress. When the competing behavioral environment dominates that is inherent in a free mating, the animal is in stress, which does not allow to realize the full genetic potential as this time the animal has to spend more time and energy to get females and fight with competitors. On the contrary, the bull that is the only one in the herd, realizes its reproductive quality to the full. Thus there were the optimum conditions of feeding, housing and regime of bull usage.

In the period from May 15 to May 30 the number of mounts was the highest. In this case, after relaxation, their quantity increased the entire period of use.

Kalmyk breed cows always has a good reproductive capacity and in 2-3 months come in season on a massive scale. [13; 16; 17] According to our research, cows with a strong body type and a greater live weight came in season in the first cycle.

The proposed method of mating allows to receive much larger number of calves. All offspring from test bulls were tested for blood groups, as only this method allows to establish the true origin. [18; 19].

Our research showed that cows with a strong body type, referred to the upper classes, had better productive and reproductive qualities and came early in season, they had shorter service period and a higher yield.

Thus, it is possible to obtain the best calves in an amount significantly higher than the average in the herd from outstanding bulls and productive cows.

Not more than 72% of the calves from 100 cows can be obtained from an outstanding bull in the artificial insemination. In the pasture mating at least 90 calves from 100 females are received, however, there is need in 4 more staff. Our proposed method allows to receive 98-100 calves with greater live weight at weaning. It is necessary to note that natural selection is important. Physiologically strong cows with great live weight of cows were covered by outstanding bulls that the principle of "best with best gives the best" was used.

CONCLUSION

New method of using outstanding bulls in the breeding company is the most effective. Thus, we propose to improve the method of reproduction when at free mating one bull should be put in a herd in the first 45 days, and then the rest of cows are covered.

REFERENCES

- [1] Legoshin G.P. (2014): Top targets of innovative development of beef breeding. Materials of research and practical conference "Competitive growth of cattle breeding and actual problems of its scientific support". Stavropol, Russia, pp. 233-236.
- [2] FAO/UNEP (1987): Joint expert panel on animal genetics resources conservation and management. Animal genetic resources: Strategies for improved use and conservation. Rome, pp. 301-303.
- [3] Hodjes J. (1990): Conservation of animal genetic resources in developing countries. Genetic conservation of domestic livestock Ed. Leningrad: CAB, pp. 128- 145.
- [4] Maijala K. Cherekaev A.V. and Devillard J.M. et al. (1984): Conservation of animal genetic resources in Europe. Final Rep. EAAP, 11, 3-22.
- [5] Henderson D. and Milt Yang Da (2005): Conference review: Bovine genomics from academia to industry. *Funct. Genom.*, 6, 174-180.
- [6] Kayumov F.G., Barinov V.E. and Mandjiev N.V. (2015): Kalmyk cattle and ways of its improvement. OOO Agency "Press", Orenburg-Elista, pp. 158.
- [7] Cherekaev A.V. (2010): Beef cattle breeding: methods, technologies, herd management. Moscow, Russia, pp. 205.
- [8] Mandjiev N.V., Kayumov F.G., Barinov V.E. et al (2014): Methods of increasing the genetic potential of Kalmyk cattle JSC PZ "Agribusiness" Tseliny Region of Kalmyk Republic. *Herald of beef cattle breeding*, 1(84), 24-28.
- [9] Gendjieva O.B., Adjaev, L.G. and Moiseikina, L.G. (2012): Genetic aspects of Kalmyk Cattle selection. Elista: Kalmyk University Edition, pp. 178.
- [10] Moiseikina L.G. and Turdumatov B.M. (2006): Methods for assessing quantitative traits in cattle breeding. Kalmyk University publishing, Elista, Russia.
- [11] Strekozov N.I. G.P. Legoshin, L.M. Polovinko et al (2009): Stable production system for beef production based on Russian beef cattle breeds, Elista, Russia, pp. 172.
- [12] Snapp R (1952): Beef cattle New York John Willey and Sons, JNS., London Chapman and Hall, LTD, pp. 699.
- [13] Polovinko L.M., Burka V.S. and Lapin U.V. (2004): Effective system of reproduction of the herd in beef cattle breeding. Collection of research papers "The role and importance of the method of artificial insemination of farm animals", Dubrovitsy, Russia, pp. 203-205
- [14] Johnson, S.K. et al (2013): Protocols for synchronization of estrus and ovulation Proc. Applied Reproductive Strategies in Beef Cattle Symposium, pp. 76-86.
- [15] Smith, K. (2014): MaternalPlus® reports. *Angus Journal*, 35(7), 170-171.
- [16] Eremenko V.K. (2005): Kalmyk Cattle and methods of its improvement. Moscow: Herald of RAA, pp. 185.
- [17] Strekosov N.I. and Tchinarov J.J. (1995): Situation and main development of animal production in Russia. Self-Help Organisation FAO, Rome, pp. 155-160.
- [18] Selionova M.I., Chizhova L.N. and Dubovskaya M.P. (2015): Blood types in beef cattle breeding. *Herald of beef cattle breeding*, 1(89) 14-17.
- [19] Alves B.C. (2005): Use of RAPD markers loc M и tifying Nelore bulls with early reproductive maturation onset. *Anim. ttopmi I H.*, 85: 183-191.