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Processes of Selection and Breeding Holstein Bulls in the Republican Center of Livestock Breeding Jsc "Asyl Tulik"

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Abstract

National and international experience shows that in dairy cattle breeding the main factor in improving the genetic quality of the bred stock is bulls-producers. Therefore, in modern agricultural programs, lots of attention is paid to the cultivation of young animal's genealogical use of producers. In this technological group of animals, an individual assessment of individuals is carried out more accurately than in others, and selection of breeding qualities is intensively conducted. Potential impact of bulls and cows on The improvement of the breed characteristics depend on different herds. For example, one cow in it's life-time can get 7-12 descendants, and bull can get 40-50 thousand heads and more by using artificial insemination. The genetic potential of the population is provided for about 60-80% by the use of bull-leaders. Therefore, cultivation, evaluation and selection of bulls for breeding is essential for the country. But acquisition of bull in some countries is not always advisable.

Keywords: Breeding; Bull; Selection; Sexual reflexes; Sperm

Introduction

Bulls grow up on farms and breeding factories. Technology of cultivation of breeding bulls on the specialized farms in standardized conditions provides the receipt of animals, which are more consistent with the requirements of breeding, than growing by traditional technologies [1]. This is due to the fact that is considered the number and quality of sperm, disposition and behavior, duration of using breed bulls. These indications depend on both individual characteristics and conditions of feeding, keeping, caring and growing animals at an early age [2]. Besides that, the effectiveness of the use of producers is determined not only by their breed qualities, but by the quantity and quality of the sperm. Using bulls-leaders promotes the highest rates of further growth of genetic potential, ensuring high productivity of offspring. Therefore, the evaluation and selection of bull producers on reproductive ability, contributes to the improvement of their reproductive qualities and considering as an important moment in the technological process of breeding, as it affects the population of cattle [3-7]. The aim of the work was to improve the methods of selection of animals and the technological processes of breeding bulls-producers on the basis of using new premixes, mixed fodders and the structure of rations.

Materials and Methods

To achieve this goal, a series of scientific and economic experiments were conducted on bulls during the growing period from 1 to 6 months, from 6 to 16 months. The experiments were carried out at Republican Center of livestock breeding JSC "ASYL TULIK" Akmola Region, Kazakhstan. Scientific and economic experiments were carried out by the method of groups and pairs of analogues for 51 heads in each group in accordance with methodological recommendations. The duration of the experiments was 60-120 days. The subject of the study were bulls at the age from 1 to 16 months, and bulls that were waiting for the time of breeding. When developing new premix recipes, the content of macro and microelements, vitamins in feeds, and the needs of animals in these nutrients were considered. Instead of imported raw materials, there were introduced composition of mixed fodders from local feeds of

protein components (peas, lupins, flax seeds and rapeseed cake). The structure of diets is based on the needs of animals in energy, nutrients and biologically active substances, as well as matching diets breed and live weight of animals [8,9]. Intake accounting for feed was based on the results of the control feeding (1 time per 10 days). The chemical composition of feeds was determined by sampling and analysis. Live weight was accounted by monthly weighting. At the same time, measures were developed to timely identify various developmental abnormalities, subclinical and clinical manifestations of diseases, including male genital organs, as well as preventive treatment and treatment based on the improvement of the feeding system, including the development of premixes, mixed fodders and the structure of diets [6]. Animals were on a common diet and received feed depending on the age: hay - 30-80%, silage - 8-10%, mixed feed - 20-50%. The animals of the experimental group had the same diet, but had an individual adjustment, which was carried out monthly, based on the results obtained in the analysis of the biochemical composition of the blood. Optimization of nutrients provided the inclusion of certain amount of feed premix's. The composition of the premix: Vitamin A-2000 IU, D-200 IU, E-1000 mg, sulfur-1.2 g, magnesium-1.5 g, zinc-5.9 mg, cobalt-0.2 mg, selenium-0.05 mg, molybdenum-0.22 mg. During the process of work, changes in the number of cortisol in the blood and the qualitative composition of the sperm were taken in account, also possible changes or remaining the same, depended on the composition of the consumed feeds. For bulls with increased sexual activity and body weight, the number of feed was adjusted individually in accordance with zoo technical requirements [6]. If necessary, in the case of a change in the quality of sperm, the appropriating protein-vitamin-mineral supplements were entered into the diet.

The degree of manifestation of sexual reflexes (Table 1)

№	The level of raising cortisol in the blood (multiplicity), times		
	every 6 months	every 6 months	every 6 months
10	7 (from 7% to 49 mcg)	6 (5% to 30 mcg)	6.5
16	12 (6% to 72 mcg)	14 (from 4 to 56 ug%)	13.0
18	11 (from 7% to 77 mcg)	12 (from 7% to 84 mcg)	11.5
21	10 (8% to 80 mcg)	14 (from 6% to 84 mcg)	12.0
23	17 (5% to 85 mcg)	18 (from 4 to 72 ug%)	17.5
36	19 (5% to 95 mcg)	17 (5% to 85 mcg)	18.0
28	9 (9 to 81 ug%)	8 (10% to 80 mcg)	7.0
29	10 (9 to 90 ug%)	12 (from 7% to 84 mcg)	11.0
32	8 (10% to 80 mcg)	8 (with 8% to 64 mcg)	8.0
36	18 (5% to 90 mcg)	20 (from 4 to 80 ug%)	19.0
37	15 (6% to 90 mcg)	16 (5% to 80 mcg)	15.5
53	15 (5% to 75 mcg)	17 (from 4 to 68 ug%)	16.0
67	6 (10% to 60 mcg)	8 (with 8% to 64 mcg)	7.5
71	9 (from 11% to 99 mcg)	11 (from 9% to 99 mcg)	10.0
93	5 (8% to 40 mcg)	8 (4% to 32 mcg)	6.5

Evaluation scale breeding productivity points (Table 2)

Reproductive qualities of bulls	Animals groups			
	1	2	3	4
Sexual reflex	Good	Good	Satisfied	Unsatisfied
Assessment scores	20	19	15	10
Ejaculate volume, ml	above 5	5-4	3-2	less than 2
Assessment scores	20	18	16	11
Number ofspermatozoa%	more than 80	80-71	70-50	less than 50
Assessment scores	20	19	18	15
Active sperm ball.	above 8	8-7	6-4	less than 4
Assessment scores	20	17	15	10
Fertility of cows %	above 70	70-51	50-40	less than 40
Assessment scores	20	15	10	5
Comprehensive evaluation of bulls, scores above	90	90-81	80-60	less than 60

Age of sires during the evaluation (Table 3)

Evidence	Age bulls, months
Growing up to 15 months of age	15
Statement on the test at the age of 18 months	18
Insemination controlled cows and heifers (3 months).	21
Pregnancy controlled cows and heifers (9 months).	30
Growing bull daughters (18 months).	48
Insemination bull daughters (3 months).	51
Pregnancy bull daughters (9 mo.)	60
The duration of lactation (11 mo.)	71
Evaluation for 305 days in milk (1 mo.)	72

Results

Development of questions of selection and control of a state of health of breeding animals (medical examination) is based on one of necessary conditions of the problems solution of infertility prophylactic and intensification of reproduction of cattle, in particular bulls-producers. To carry out such a large and very important work it is necessary to have optimal provision for animals with all the necessary nutritional and biologically active substances, which will make it possible to exclude the influence of all feeding factors in the technological process of breeding animals. In addition, the whole technological process of breeding stock and using bulls-producers is proposed to be carried out in three stages.

The first stage of growth and development of bull-calves (diagnostic) is the designation and evaluation of phenotypic traits, in particular, after recording the animal as a pedigree animal, it is necessary to collect anamnesis, where we know the conditions of feeding , the structure of the feeding ration, the sexual mode , quantitative and qualitative sperm counts, the fertilization of cows, the output of calves in the service area, possible disorders of sexual functions, the conditions for their expression, the violation of sexual reflexes, the previously used treatment and its effectiveness, condition for infectious and invasive diseases, veterinary treatments. After this, clinical study should be general conducted: define the constitution, fatness, temperament, secondary sexual characteristics. In addition, you should learn the animal separate system, musculoskeletal system, pay attention to the condition of the scalp, muscles, joints, hoof, horn. In the study of genital organs, it is necessary to determine the condition of the testes, their appendages, vas deferens, scrotum, prepuce and penis. In addition, and if necessary, quite often prostate and vesicular glands, and also ampoules vas deferens tested. Also in the process of work, getting sperm on an artificial vagina, you should pay attention to the demonstration of sexual reflexes. Received sperm should be research visually and microscopically, by studying microbial contamination and compliance with requirements.

Based on the results of the accomplished work, a conclusion is made about the health condition of animals, here with stand out healthy with normal sperm production and sick animals with a metabolic disorder and sperm production.

The second stage is based on optimizing the individual needs of animals in nutritional and biologically active substances. For this purpose, in feeding animals there used the process of preventive therapy in protein, carbohydrate, vitamin and mineral insufficiency. After that, if necessary, there carry out veterinary intervention, consisting in corrective and preventive therapy, also therapy carried out at serious disruptions of a metabolism. In addition, veterinary intervention or therapy is applied to clinically healthy animals, but with reduced metabolism (in the acidic state, subclinical course of disease), metabolic disorders, expressed in toxicosis, acidosis, ketonemia, hypoproteinemia, hypoglycemia, disease of ligamentous and bone tissues, also disease musculoskeletal system.

The third stage (or preventive) includes activities, directed on cultivation of highly productive young cattle and creation of optimal conditions of keeping and feeding, contributing to maintaining the desired level of sperm producing and observance of the mode of using bulls. For this, it is necessary to optimize the quality of feeding on the basis of the composition of premixes, feed and balance the ration with a gender load in a year (Ivanov 1972). Beside that, the cultivation and breeding of manufacturing bulls should be divided into three stages according to age. The first stage refers to the period of growing up of bull-calves to 6 months old and is carried out in breeding factories and special farms. During this period, it is necessary to feed calves in accordance with the scheme of cultivation which adopted by the zoo technical service of breeding factory and special farm. At the same time, animals must be exposed multiple surveys to identify and eliminate bull-calves with inborn anomalies of various origin, and the ones that were received during the growing, also pay special attention to the deformity of growth of the organs of the reproductive system. The second stage is the cultivation of 6-15-month-old bulls, which is carried out on the special farms **(Table 1)**. It is necessary to define degree of demonstrated sexual reflexes of animals, quantity and quality of the received sperm, also reveal bulls with a persistent bridle, hypoplasia, spiral curvature and a fistula of a cavernous body of the penis. Herewith previously evaluate all the phenotypic quality of the animal. The degree of sexual reflexes' evaluation should be demonstrated and determined at an early age, it will reduce the time and cost of cultivation and breeding of bulls. For this purpose, there was developed the method of early evaluation of sexual reflexes, which is based on the determination and comparison of amount of cortisol in the blood of animals. To this end, a method has been developed for an early evaluation of the demonstration of sexual reflexes, which is based on the determination and comparison of the content of cortisol in the blood of animals. The essence of this method is that it s necessary to take blood samples (10 ml each) from bull-calves at the age of 6-month and stabilize it with heparin. Then for stimulating adrenal

cortex, should be prick intramuscularly ACTH at a dose of 50 IU/100 kg of live weight. The stimulation of the adrenal cortex should be carried out at the same dose 6 months after the first. Consequently, the bull-calves will reach 12 months old. After 2.5-3.0 hours of ACTH pricking it is required to select a blood sample repeatedly. Then determine the content of cortisol in the obtained blood by radio immunological method. The functional reserves of the adrenal cortex can be considered by the difference in the multiplicity of increase in blood cortisol before injection and after 2.5-3.0 h after injection ACTH.

Discussion

Research shows that the tendency of saving level immune reactivity's in animals at the age of 6 and 12 months is stable and supported all the time. The multiplicity of increase of cortisol in blood is estimated on 100-point scale and indicates a high breeding value of the animal in the future. Five bulls had an increase in cortisol levels-in the range of 5.0 to 8.9 after the introduction of ACTH. They got up to 59 points on the 100-point scale. Total score of the other 10 bull-calves was from 60 and higher points, and the level of cortisol was much higher within of 9.0 to 19,0 times.

The third stage is the arriving and keeping of bulls-producers on the livestock breeding companies and the systematic control of their physiological status (registration with quarantine registration health act, etc.). Results that characterize individual feeding and physiological condition of bulls-producers are entered in a special card on electronic media, and then the "passport of the producer" is made. After the third stage of breeding bull's cultivation, their evaluation is carried out on the basis of accumulated research data characterizing the quantitative and qualitative composition of the sperm, and also on the basis of cow's fertilization results, they are divided into four separate production groups.

The first group consists of bulls with high reproductive ability (70% of the cows get pregnant at the first insemination). Beside that, sexual reflexes are well expressed in these animals, the volume of ejaculate is more than 5 ml, the concentration of spermatozoa in 1 ml should be more than 1 billion pieces, their activity is higher than 8 points, the number of live sperm is 80-95% **(Table 2)**. The second group includes breeding bulls with a good reproductive ability (fertilization of cows for the first insemination should be 50-70%), the volume of ejaculate-3-4 ml, the concentration of spermatozoa - 0.4-0.8 billion, activity - 70-80 points, the number of live sperm - at least 70%.

The third group is defined by bulls-producers with reduced reproductive ability. They are characterized by a high percentage of repeated inseminations of cows, frequent refusal to allocate sperm and not to respond to an artificial vagina, produce low-quality ejaculates (ejaculate volume less than 2 ml with a minimum sperm concentration of 0.2-0.5 billion and an activity below 6 points). The fourth group includes infertile animals. They release little sperm with low concentration and activity, with a large number of pathological forms of spermatozoa. Animals of the third and fourth group are discarded.

Conclusion

However, the final stage of the technological process of growing young animals and the most effective use of bulls-producers for breeding is the period of definition and quality of their offspring. This period is one of the most complex and lasting. This is due to the fact that the duration of the assessment of bulls-producers on the quality of their offspring under the optimal conditions for the cultivation of young animals and the keeping of breeding animals is 4.5 years and is completed no earlier than 6 years of age. In recent years because of different reasons, there has been a significant reduction in the duration of using bulls-producer's production. Now on some state-owned enterprises of the Republic to the beginning the period of estimation of sires on quality of progeny there are only 5% of the herds. At the age of 6 and older 95% of the bulls retires, although by their nature they have the potential for long-term breeding and productive life, as evidenced by the results of the data analysis, which belongs to Republican Center of livestock breeding JSC "ASYL TULIK" are presented in **Table 3**.

According to the information from table 3 it can be seen that for the future taking and saving of sperm (for productive use) with the existing situation on the breeding remains only 5% of test bulls, which you can use overexposure (waiting time breeding). Therefore, the main task is development of technology for housing, feeding and control mode regimes growing bulls during the period of time of their breeding to accumulate semen after a period of evaluation on the quality of posterity. At the same time, it is necessary to develop activities that promote the long-term preservation of breeding qualities of animals with normal constantly identifying bulls, which marked a decrease in the volume of ejaculate, sperm concentration and activity. There is a low survival rate and creaminess of sperms. For these reasons, up to 30% of own sperm is rejected.

Acknowledgement

Thus, sexual maturity in bulls occurs at the age of 6-9 months., and physiological maturity-in 16-18 months. Time of sexual and physiological maturity depends on the breed, climate, feeding conditions, the qualitative composition of fodder, care, maintenance, neurohumoral stimuli. Animals reach optimal sexual maturity and are considered highly valuable at the age of 6 years. However, at this time Mature and full-aged bulls-producers in the main herd are only 5%. Plans for breeding and cultivation and especially the checking bulls-producers and the quality of offspring are often violated because of their premature culling due to injuries of the pelvic limb varying degree. In addition, there are diseases of the musculoskeletal system, which reduces their sexual activity and significantly degrade the quality of sperm. In ejaculates increases the number of pathological forms of sperm cells. Also it is established that in bulls of 5-year age deformation is note joints and the emergence of a vast cavern of articular cartilage that does not allow the use of such animals as breeding.

Thus, using new methods is a lot better for breeding bull's cultivation, also the complex solution of the questions that defines their effective selection, and also realization timely testing or evaluation of bulls' offspring's quality through better feeding and conditions allows the earliest period to reliably evaluate the suitability of breeding animals, or to provide them with the necessary help, for example treatment in extreme cases, to select low-value producers from the main herd. These measures significantly reduce the period of breeding animals while reducing feed costs by 5-8%.

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