

Evaluation of Hereford bulls by the quality of their offspring over various periods of growing their offspring under farm conditions

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Abstract. The greatest success in improving the breeding and productive qualities of Hereford cattle can be achieved through the use of high-value breeding bulls. The role of producers at the modern stages of beef cattle breeding has increased dramatically, so the evaluation of bulls by the quality of offspring has become an important breeding event to improve and create highly productive herds of beef cattle. At the same time, the use of bulls that are predisposed to various diseases or the deterioration of their offspring can cause irreparable negative consequences for beef cattle breeding. In the course of research work in the conditions of the farm, studies were conducted to assess the quality of bulls-producers of the Hereford breed of cattle. Evaluation of Hereford bulls by the quality of offspring in farm conditions will increase the efficiency of herd reproduction technology in beef cattle breeding, allow rational use of bulls, get a high yield of calves (90-95%), organize the accuracy of accounting for the origin of young animals, increase the level of breeding work to improve the productive, breeding qualities of animals and create highly productive herds of Hereford cattle in a shorter time.
Keywords: beef cattle breeding, Hereford breed, breeding bulls, bull evaluation, quality of offspring, creation of highly productive herds.

1 Introduction

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At the moment the technology development and selection should be a basic requirement for the creation of such animal genotypes, which combine high production capabilities and quality with an enhanced ability to Express them in terms that do not meet adequately the physiological needs of the organism, that is, the genotype of the animals must be assigned to the whole complex of characteristics, first and foremost, the ability to develop their productive capabilities in the presence of a large number of stress factors in increasing and developing intensive technologies. An important problem of beef cattle breeding is the development of advanced management technologies, as well as breeding methods. This will allow us to improve the production of high-quality products at an accelerated pace and create new types of cattle that meet the requirements of intensive and cost-effective beef production and breeding of repair young animals. In this regard, the chosen direction of scientific research in beef cattle breeding meets the urgent requirements of beef production and rearing of repair young animals in farms of various directions and organizational structure in the Russian Federation.

The greatest success in improving the breeding and productive qualities of Hereford cattle can be achieved through the use of high-value breeding bulls. The role of producers at the modern stages of beef cattle breeding has increased dramatically, so the evaluation of bulls by the quality of offspring has become an important breeding event to improve and create highly productive herds of beef cattle. At the same time, the use of bulls that are predisposed to various diseases or the deterioration of their offspring can cause irreparable negative consequences for beef cattle breeding.

2 Materials and Methods

Experimental work was carried out in LLC "Aksayskoye Moloko" of the Aksay district, Rostov region. The research was conducted on a herd of Hereford cattle breeds. The herd was created as a result of purchasing breeding cattle of the Hereford breed from breeding farms in the Rostov region. We annually conduct bonitirovki, on the basis of which the selection of animals in the breeding core is carried out and specific measures are planned to improve the reproductive and productive qualities of Hereford cattle of the farm's herd.

3 Results

LLC "Aksayskoye Moloko" became involved in beef cattle since January 18, 2007, with the purchase of breeding 20 heifers and 5 bulls Hereford in SPK Plemzavod "Merkulovskaya" Sholokhov district of Rostov region. The quality characteristics of purchased Hereford bulls are shown in table 1, and heifers in table 2.

LLC Aksayskoye Moloko became engaged in meat cattle breeding since January 18, 2007, with purchase of breeding 20 heifers and 5 steers of Hereford breed in SEC of merkulovsky breeding plant of the sholokhovsky district of the Rostov region. The quality characteristics of purchased Hereford steers are shown in table 1, and heifers in table 2.

Table 1. Qualitative characteristics of steers purchased from SPK Plemzavod "Merkulovskaya"

№	Nickname, ind., No.	Birth date	Age, month	Live weight, kg	Exterior rating, point	Class
1	Brother 574	17.2.2006	11	390	4.5	elite
2	Pound 4605	2.2.2006	11	384	4.5	elite
3	Mirny 4625	18.1.2007	11	385	4.5	elite
4	Mirny 6201	13.2.2006	11	267	4.5	elite

5	Breeze 6207	2.2.2006	11	240	4.5	elite
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Note: the sale date is January 18, 2007.

Table 2. Quality characteristics of heifers purchased from SPK Plemzavod "Merkulovskaya"

№	Nickname, ind., No.	Birth date	Age, month	Live weight, kg	Exterior rating, point	Class
1	Mimosa 5052	23.5.2006	7	190	4.5	elite
2	Spring 5334	17.4.2006	8	222	4.5	elite
3	Mina 5336	12.5.2006	7	200	4.5	elite
4	March 6020	5.5.2006	7	220	4.5	elite
5	Metelitsa 6042	2.2.2006	7	220	4.5	elite
6	Sprig 6112	8.3.2006	9	220	4.5	elite
7	Sprig 6114	20.4.2006	8	245	4.5	elite
8	Cherry 6116	15.03.206	9	224	4.5	elite
9	Cherry 6202	15.04.206	9	200	4.5	elite
10	Lira 6210	1.04.2006	8	232	4.5	elite
11	T-shirt 6222	15.03.2006	9	260	4.5	elite
12	Lassie 6304	20.04.2006	8	239	4.5	elite
13	Lassie 6308	5.04.2006	9	248	4.5	elite
14	Mulka 6316	23.04.2006	8	229	4.5	elite
15	Milka 6318	12.04.2006	8	232	4.5	elite
16	Violeta 6320	15.04.2006	8	212	4.5	elite
17	Burenka 6330	18.04.2006	8	240	4.5	elite
18	Verbochka 6332	15.04.2006	8	238	4.5	elite
19	Murka 6354	15.04.2006	8	219	4.5	elite
20	Chub 6408	10.04.2006	8	220	4.5	elite

Note: the sale date is January 18, 2007.

The imported heifers belonged to two lines: Baron 2344-14 heifers and Label 413-6 heifers. On the line of the Baron, they were the daughters of two bulls: pirate 3841 (its live weight in 3 g. 700 kg, exterior rating was 95 points, complex class-elite-record) - 9 heifers and bull Indus. No. 3984 (2 g. - 750 kg-90-elite-record) - 5; on the Label line-6 heifers, whose father was the manufacturer Leaf 2615-3 g. – 780 kg – 90 points-elite-record).

In order to avoid the harmful influence of related mating, on March 29, 2011, specialists purchased three more purebred breeding bulls of the Hereford breed from the breeding farm "Rodina" of the Krasnogvardeysky district of the Stavropol territory. The characteristics of purchased bulls are shown in table 3.

Table 3. Characteristics of purchased bulls SPK Rodina of the Stavropol territory

№	Nickname, ind., No.	Birth date	Age, month	Live weight, kg	Exterior rating, point	Class
1	01003	7.01.2010	14	445	90	elite-record
2	01202	13.01.2010	14	475	90	elite-record
3	03213	14.03.2010	12	430	90	elite-record

Note: the sale date is March 29, 2011.

The purchased Hereford bulls were genealogically descended from the same line of FORDER 1915126. The father of two bulls-01202 and 03213 was the Favorite bull 21004 (at the age of 5, he had a live weight of 940 kg and a complex class-elite-record), in which all the ancestors on the four rows of the pedigree (on the paternal side) had a complex class-elite-record. On the maternal side, the mother of bull 01202 was rated first class on the set of characteristics, and the great-grandmother, respectively, was rated elite, and on the paternal side, elite and elite-record; accordingly, on the paternal side of the pedigree - class elite, elite and elite-record.

Bull 01003 on the paternal side of the pedigree had the ancestors of all rated class elite-record, and on the maternal side: mother and grandmother-rated class elite, and great-grandmothers-first class and elite-record. Bull 03213 had an elite mother (live weight 600 kg at the age of 7 years) and a grandmother (4 g. weight 490 kg), and the great-grandmother was evaluated by the first class, first class. On the maternal side of the pedigree, the grandfather was rated elite-record class (live weight 921 kg), and his mother had the elite-record class on the complex of signs, and his father – elite class.

This is the quality side of the first imported bulls in LLC "Aksayskoye Moloko", which were used in a herd of cows.

To exclude related breeding in the Hereford herd in LLC "Aksayskoye Moloko" May 26, 2015 it was imported eight high-class bulls: seven class elite-record and one of the elite nucleus of JSC "Belokamenskoe" Apanasenkovskogo district, Stavropol territory. The characteristics of these high-value bulls are shown in table 4.

Table 4. Characteristics of purchased bulls from JSC "Belokopanskoe"

№	Nickname, ind., No.	Birth date	Age, month	Live weight, kg	Overall score/for exterior, point	Class
1	3220	28.12.2013	17	415	84/20	elite-record
2	3223	28.12.2013	17	410	88/20	elite-record
3	3229	24.12.2013	17	430	85/20	elite-record
4	3237	6.12.2013	17	410	84/20	elite-record
5	3255	15.12.2013	17	410	76/20	elite
6	3386	6.12.2013	17	430	81/20	elite-record
7	3465	28.12.2013	17	465	94/20	elite-record
8	3703	15.12.2013	17	460	94/20	elite-record

Note: the sale date is May 26, 2015.

All steers were distinguished by good health and a beautiful exterior, characteristic of the Hereford breed. The first three bulls (3220, 3223 and 3229) were related, as they belonged to the same famous Hereford line, the famous ancestor of The FORDER factory

line 1915126. In addition, the first five steers (individual numbers: 3220, 3223, 3229, 3237 and 3255 half-brothers, descend from the same father, his Indus. No. 4415 4415 BLK). This father had high indicators of a complex assessment: live weight in 6 years 967 kg, an assessment of the exterior of meat articles 97 points, a complex class elite-record. At the same time, it has a high rating not only for its own productivity, but also for the quality of its offspring.

Analyzing the given data, the father of the bull-producer 4415 BLK-4415, from which LLC "Aksayskoye Moloko" was delivered to 5 bulls, we can assume that these steers will leave a noticeable mark in the formation of the herd on the farm. When assessing the bull's own productivity of 4415, we note that he surpassed his father in live weight at 15 months of age by 18 kg or 103.83%, and in terms of his own productivity, growth energy during the evaluation period from 8 to 15 months of age by 61 g or 5.14%. When assessing the quality of offspring, bull 4415 received an index of 105% or 5% higher, and surpassed its peers (table 5).

Table 5. Evaluation of bull 4415 BLK-4415, his father and sons

Degree	By your own productivity					
	live weight, kg	average daily growth, g	meat forms, point	body type and appearance	class	index
Bull	488	1247	56	5	elite-record	107
Father of the bull	470	1186	56	-	elite-record	108
Sons	The quality of the progeny					
n	average live weight, kg	average daily growth, g	meat forms, point	body type and appearance	class	index
15	438	1120	54	5	elite-record	106

His sons in the herd of LLC "Aksayskoye Moloko" will undoubtedly show an advantage of at least 5%, or even more, when evaluating their own productivity, when compared with their peers.

Even higher indicators of their own productivity can be expected from bull calves, whose individual numbers are 3386, 3465 and 3703, which have a higher live weight 10-40 kg higher than their peers purchased from JSC "Belokopanskoe".

Conclusions

Thus, we can say that in LLC "Aksayskoye Moloko" is a great, interesting and successful operation of beef cattle breeding with the aim of creating highly productive herds of Hereford and are used for this high-value bulls purchased in the best breeding plants and pedigree as Rostov region, Stavropol territory.

References

1. A. Zelenkov, A. Ermakov, G. Zelenkova et al., E3S Web of Conferences **135**, 01088 (2019)
2. A. Zelenkov, A. Ermakov, G. Zelenkova et al., IOP Conf. Series: Earth and Environmental Science **403** (2019) 012020

3. A. Zelenkov, G. Zelenkova, A. Ermakov et al., E3S Web of Conferences **164**, 06032 (2020)
4. D.W. Moser, National Beef Cattle Evaluation Consortium «Beef Sire Selection Manual Second Edition», **2**, p. 65-68 (2012)
5. J.A. Torres-Vázquez, Journal of Animal Science, **94** (1), p.21-27 (2016)
6. X.H. Zhao et.al., Experimental Biology and Medicine, **240** (9), p. 1152-1157 (2015)
7. A. Zelenkov, P. Zelenkov, G. Zelenkova, Vestnik OrelGAU. **3** (54), p.79-85 (2015)
8. J. Xia, et al., Mammalian Genome, **27** (5-6), p.246-255 (2016)
9. J.L. Williams et al., J. ANIM SCI, **Vol. 88, No. 2**, p.460-466 (2010)
10. K.J. Thornton et al., Annals of Animal Science, **15** (2), p.349-358 (2015)
11. A. Zelenkov, P. Zelenkov, G Zelenkova, Bulletin of the Don state agrarian University **4-1** (14), p. 35-41 (2014)
12. A. Ludwiczak et al., Proceedings of SPIE – The International Society for Optical Engineering, 9631 (2015)
13. P. Zelenkov, A. Zelenkov, G. Zelenkova, Veterinary pathology **3-4** (49-50), p. 15-19 (2014)
14. D. Lim, N.K. Kim, S.H. Lee, H.S. Park et al., International Journal of Genomics, 708562 (2014)
15. M. Hersom, A. Imler, T. Thrift, J. Yelich, J. Arthington, Journal of Animal Science, **93** (6), p.3169-3178 (2015)