Formation of meat productivity in descendants of Kalmyk breed improver bulls

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Abstract. The article analyzes the results of assessing by scoring and index methods the quality of the offspring of five Kalmyk breed bulls and their sons in terms of their own productivity and the formation of their carcass morphological composition. For this purpose, 10 sons of bulls Prometheus 1127, Grilyazh 916, Gomat DRZh-59223, Yago DRZh-39023 and Raskat 8692 were selected from the Solnechnoe Breeding Plant LLC, Oryol district, Rostov region. The sons of the evaluated stud bulls up to 8 months of age were raised on full suctionwith mothers, and from 8 to 15 months of age were kept in the same group under equal conditions and over a 7-month period, on average, feed was consumed per bull, containing 1569 feed units, 168 kg of digestible protein, 2032 kg of dry matter with exchange energy 15663 MJ. With this level of feeding, all the controlled sires and almost all of their sons, according to the score, met the requirements of the elite-record grading class. However, according to the results of the index assessment, only the bulls Prometheus 1127 and Grill-yazh 916 met the requirements of the improver category, and the remaining three bulls met the requirements of theneutral category. The descendants of the leading bulls with a pre-slaughter live weight of 412.1 and 419.9 kg exceeded peers of other groups in carcass weight by 8.5-14.1 kg, in muscle tissue weight by 9.4-15.4 kg, but by 3-5% less yield of fat, bones, cartilage and tendons and the highestmeat ratio.

1 Introduction

Beef cattle breeding has long been a traditional branch of animal husbandry in Russia, its development is currently very promising, as it is dictated by the need to meet the needs of the population in high-quality beef. Until 1990, it was produced 26-29 kg per capita (with a scientifically justified rate of 32 kg in those years) [1, 2]. To create a large industry of specialized beef cattle breeding as a supplier of high–quality beef in the future until 2025 in

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volumes of at least 1,700 - 2,000 thousand tons (in the same proportion to beef from dairy herds as in Europe) Russia has all the necessary prerequisites. According to the data, about 80 million hectares of natural forage lands are concentrated in arid, semi-desert and forest-steppe regions, to which Kalmyk animals are best adapted. The main method of improving Kalmyk cattle is purebred breeding, which allows you to work with a large number of relatively homogeneous animals. It is known that at the same time, phenotypic (external) signs and genotypic (hereditary) properties of animals are better preserved, which cause greater hereditary resistance. However, purebred animals also differ from each other in the unequal degree of development of a particular trait. Therefore, one of the most important points in improving the herd is the selection of animals based on their own productivity, the quality of offspring, taking into account the linear affiliation and the level of cultivation [3, 4]. With an improvement in the level of feeding and conditions of detention, the live weight of purebred bulls is 524 at the age of 20-28 months, and heifers - 435 kg. In experiments, Calmuck bulls with intensive cultivation up to 15.5 months of age had a live weight of 504 kg with fluctuations of 465-577 kg, and heifers 402 (360-450 kg). The average daily increase in bulls was 1020-1400 g, in heifers – 804 g. This indicates the genetic reserves of Kalmyk cattle. The improvement of Kalmyk cattle in the future should take place in the direction of creating animals of an enlarged long-growing, but intensively growing type. To do this, you can use interlinear crosses of heavy lines. This will allow, without changing the genotype of the breed, to significantly increase the growth energy and live weight of the main herd due to the manifestation of intrabreed interline heterosis. As a result, we will get animals of a heavy, high-intensity type that will have high growth energy and successfully consolidate these qualities in generations [5, 6,7].

At the same time, the accelerated development of beef cattle breeding is planned to be carried out through the rational use of the best foreign and domestic breeding resources. On their basis, the breeding base will be formed almost anew with the introduction of information technologies. With their help, the accuracy of zootechnical accounting will increase, an electronic database will be created, genealogical links and genetic and breeding data on the manifestation of productive traits and their transmission to descendants will be determined. On which it will be possible and is already being carried out a systematic analysis of the results of the compatibility of traits in the selection process, producing bulls are evaluated according to the quality of offspring and young animals according to their own productivity, which will significantly increase the effectiveness of the breeding process [8, 9, 10].

The expediency of increasing beef production in a market economy should be due to the introduction of intensive technologies that ensure sufficiently high production efficiency. Therefore, despite the existing serious competitive advantage, the efficiency of the industry will depend on the quality of management decisions made in the organization of the entire production process quality of offspring. For this purpose, 10 sons of Prometheus 1127 bulls from the Doublet 825 factory line, Grillage 916 – Pirate 6626, Gomat DRZH-59223 – Thunder 247, Iago DRZH-39023 – Jaguar 253 and bull Raskat 8692 from the Manege 7113 genealogical line were selected. The sons of all evaluated breeding bulls up to the age of 8 months were raised on full suckling with their mothers, and from 8 to 15 months of age they were kept in the same group under equal conditions and received the same level of feeding. Individual accounting of the live weight of experienced bulls was carried out at 8, 12 and 15 months of age and according to their data, the absolute, average daily gains were determined. According to the difference between the set and uneaten leftovers monthly for two adjacent days, the feed intake, monthly consumption and their costs per 1 kg of gain over 15 months were determined[11,1 2]. The meat forms of 15-month-old bulls were determined on a 60-point scale obtained from the results of an exterior assessment (general appearance and musculature, chest, withers, back, loin, sacrum, ham), the severity of the physique was determined by the height in the sacrum. Comparing the assessment of these signs with the

tests and summing up the results, we obtained a total score, and a complex index was found based on the percentage of indicators of the marked signs with the values of the same signs in peers. According to the total score, each bull was assigned a class, and according to the complex index, a genetic value. Bulls with a complex index of less than 100% are not recommended for use in reproduction. In addition to the complex index, the letter symbol "A" is assigned to the bulls for evaluation of their own productivity.

According to the average results of the characteristics of 10-15 sons taken into account, an assessment was carried out on the quality of their father's offspring, which is assigned a class for the sum of points, and for a complex index, a breeding category is assigned an improver with an index of more than 101%, with an index of 99-101% – neutral and less than 99% – a degrader. In addition to each tribal category, the letter symbol "B" is displayed [13, 14].

To assess meat productivity and meat quality, a control slaughter of 3 bulls from each group at the age of 15 months was carried out according to the method of VASHNIL, VIZ, VNIIMP (1977). At the same time, the live weight before slaughter, the mass of the steamed carcass, internal fat and the slaughter yield were taken into account. After 24 hours of cooling at a temperature of 0- (+4 °) C and deboning of the left half of the carcass, the absolute and relative content of muscle, fat, bone tissue and tendons were determined [15].

2 Materials and methods

To increase the breeding value of the main herd and select the repair young of the most promising factory lines in the breeding plant of LLC Solnechnoye, it is necessary to use more bulls in the reproduction of improvers. Since, when assessing the quality of offspring, about 40% of bulls receive such a breeding category. In our studies, under equal conditions, over a 7-month growing period, an average of 1568.8 feed units, 167.7 kg of digestible protein, 2032 kg of dry matter with an exchange energy of 15663 MJ were consumed per bull. At this level of feeding, the sons, evaluated by the quality of the offspring of 5 breeding bulls, had different indicators of their own productivity, and their fathers met the requirements of different breeding categories. At the same time, all controlled producer bulls and almost almost all of their sons met the requirements of the elite-record bonus class (Tables 1-5). However, the breeding category improver is assigned to producing bulls based on the results of an index assessment of their sons and the determination of a complex index based on five signs, which characterizes the genetic characteristics of each descendant. Bulls whose complex index is below 100% are not recommended for use in reproduction. To repair your own herd, it is advisable to leave steers with a complex index "A" above 110%.

and the use of improver bulls in reproduction. Therefore, the purpose of this work was to increase the breeding value of breeding bulls in LLC Plemzavod Solnechnoye in the Oryol district of the Rostov region based on their assessment of their own productivity and the quality of offspring.

3 Results

The increase in the breeding value of breeding bulls during 2022 and 2023 was carried out according to the current methodology by a two-stage method. First, the sons of the selected breeding bulls were evaluated by their own productivity using point and index methods, and then their fathers were evaluated by the

Table 1. Assessment of the quality of the progeny of the bull Prometheus 1127

Indicator		The individual number of the sons											
		23	24	33	37	35	60	67	75	97	103	M*	M1*
Live weight, kg	8 months	190	184	200	171	201	226	201	204	192	218	199	197
	15 months	422	416	421	409	429	442	436	433	394	429	423	410
	points	10	10	10	10	10	10	10	10	10	10	10	10
	index	102,9	101,5	102,7	99,9	104,6	107,8	106,3	105,6	96,1	104,6	103,2	101,0
Average daily increase over the period from 8-15 months	gram	1105	1104	1052	1133	1085	1028	1110	1090	961	1004	1068	1017
	points	10	10	10	10	10	10	10	10	8	10	10	10
	index	108,6	108,5	103,4	111,4	106,6	101,1	110,0	107,2	94,5	98,7	105,0	101,0
Feed costs per 1 kg of gain 8-15 months	food units	7,5	7,4	7,5	7,5	7,1	7,3	7,5	7,4	7,2	7,4	7,38	7,34
	points	8	8	8	8	8	8	8	8	8	8	8	8
	index	100,0	101,3	100,0	100,0	105,6	102,7	100,0	101,3	104,1	101,3	101,6	101,0
Evaluation of meat molds in 15 months	points	56	55	55	56	57	57	56	55	53	56	55,5	54,4
	points	10	10	10	10	10	10	10	10	8	10	9,6	9,1
	index	102,	101,1	102,9	102,9	104,8	104,8	102,9	101,1	97,4	102,9	102,0	101,0
Height in the sacrum at 15 months	cm	120	118	119	116	117	118	116	115	114	119	117,2	117,2
	points	10	10	10	10	10	10	10	8	8	10	9,6	9,6
	index	102,4	100,7	101,5	98,9	99,8	100,7	98,9	98,1	97,2	101,5	99,97	101,0
Total points		48	48	48	48	48	48	48	46	42	48	47,2	46,7
Class		E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.
The complex index, A		103,3	102,3	102,0	102,6	103,2	102,9	103,6	102,5	97,0	101,5	102,1	101,0
Prometheus bull complex index 1127, B 102,1; total points 47,2; E. R. class													

In this table and others: M*- is the average value of the sons of the bull being evaluated
M1* - is the average value of the peer sons of the evaluated bulls

When analyzing the own productivity of the sons evaluated by five breeding bulls according to the quality of offspring, the highest indicators were obtained from the descendants of Prometheus 1127 bulls of the Doublet 825 factory line and Grillage 916 of the Pirata 6626 factory line. The average live weight of 10 registered, 15-month-old sons of Prometheus bull 1127 was 423 kg, with fluctuations of 394-442 kg, and the average live weight of 50 peers was 410 kg (Table 1). The descendants of Prometheus bull 1127 outperformed their peers in all the average indicators of the studied traits, and their indices fluctuated at the level of 94-111%. Therefore, five of them had a complex index of "A" of more than 102, three had "A" of 103%, one had "A" of 101.5 and one had "A" of 97%. On average, the complex index was "B" 102.1%, and their father, Prometheus bull 1127, meets the requirements of the improver category with a complex index "B" 102.1 in terms of offspring quality. The average live weight of 10 recorded, 15-month-old sons of the bull Grillage 916 was 431 kg, with fluctuations of 419-449 kg (Table 2). His descendants surpassed 50 peers with slightly higher indicators than the sons of the bull Prometheus 1127.

Table 2. Evaluation of the quality of the offspring of the bull Grillage 916

Indicator		The individual number of the sons											
		07	213	15	18	46	48	51	14	59	52	M*	M1*
Live weight, kg	8 months	185	219	214	191	210	192	213	181	230	217	214	197
	15 months	420	441	434	426	430	423	433	427	437	440	431	410
	points	10	10	10	10	10	10	10	10	10	10	10	10
	index	102,4	107,6	105,8	103,9	104,9	103,2	105,6	104,2	103,6	109,5	105,8	101,0
Average daily increase over the period from 8-15 months	gram	1119	1057	1048	1119	1047	1100	1052	1171	986	1105	1079	1017
	points	10	10	10	10	10	10	10	10	8	10	9,8	10
	index	110,0	103,9	103,0	110,0	102,9	108,2	103,4	115,1	96,9	108,6	106,1	101,0
Feed costs per 1 kg of gain 8-15 months	food units	7,5	7,5	7,4	7,5	7,5	7,2	7,5	7,5	7,5	7,3	7,4	7,34
	points	8	8	8	8	8	8	8	8	8	8	8	8
	index	100,0	100,0	101,3	100,0	100,0	104,1	100,0	100,0	100,0	102,7	100,0	101,0
Evaluation of meat molds in 15 months	points	57	56	57	55	56	54	55	53	57	56	54,8	54,4
	points	10	10	10	10	10	10	10	10	8	10	9,6	9,1
	index	104,8	102,9	104,8	101,1	102,9	102,9	99,2	101,1	97,4	104,8	101,2	101,0
Height in the sacrum at 15 months	cm	117	119	120	117	118	116	119	118	119	120	117,4	117,2
	points	10	10	10	10	10	10	8	10	10	10	9,8	9,6
	index	99,6	101,4	102,2	99,6	100,5	98,8	101,4	100,5	101,4	102,2	99,5	101,0
Total points		48	48	48	48	48	48	46	48	44	48	48,3	46,7
Class		E. R.	E. R.	E. R.	E. R.	Э. р.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.
The complex index, A		103,3	103,1	103,4	102,9	102,4	103,4	101,9	104,2	100,4	105,5	102,9	101,0
The complex index of the bull Grillage 916, B 102,9; total points 48,3; E. R. class													

In one of the descendants of the bull Grillage 916, the complex index "A" was 105.5; in one – "A" 104.2; in four – "A" 103.3 and in two – "A" more than 102%. Only 2 descendants of this bull belong to the category of neutral with a complex index of 100- 101%. Therefore, its average value was "A" 102.9. According to the results of the assessment of the quality of offspring, their father, bull Grillage 916, was assigned the breeding category improver with a complex index "B" 102.9. The average live weight of 10 registered, 15-month-old sons of the bull Gomat DRZH-59223 of the Thunder 247 factory line was 406 kg, with fluctuations of 380-437 kg, and the average live weight of the same descendants of the bull Yago DRZH-39023 of the Jaguar 253 factory line was 413 kg, with fluctuations of 380-436 kg (Tables 3, 4).

Table 3. Assessment of the quality of the offspring of the bull Gomat DRZH-59223

Indicator		The individual number of the sons											
		098	099	107	062	056	034	030	090	037	042	M*	M1*
Live weight, kg	8 months	196	205	219	214	191	226	212	233	191	255	214	197
	15 months	386	420	394	394	396	410	422	423	380	437	406	410
	points	10	10	10	10	10	10	10	10	10	10	10	10
	index	92,8	100,9	94,7	94,7	95,2	98,5	101,4	101,7	91,3	105,0	97,6	101,0
Average daily increase over the period from 8-15 months	gram	904	1023	833	857	976	876	1000	904	852	866	909	1017
	points	12	15	9	12	12	12	12	12	12	12	12	10
	index	102,7	116,2	94,6	97,4	110,9	95,5	113,6	102,7	96,8	98,4	103,3	101,0
	food units	7,3	7,5	7,4	7,1	7,2	7,5	7,5	7,3	7,1	7,5	7,34	7,34

Feed costs per 1 kg of gain 8-15 months	points	8	8	8	8	8	8	8	8	8	8	8	8
	index	100	100	100	100	100	100	100	100	100	100	100	101,0
Evaluation of meat molds in 15 months	points	56	55	56	54	57	54	57	51	55	53	54,8	54,4
	points	10	10	10	10	10	10	10	8	10	8	9,6	9,1
	index	104	103	104	100	105	100	105	94	103	96	101,2	101,0
Height in the sacrum at 15 months	cm	120	119	116	116	117	118	118	115	116	119	117,4	117,2
	points	10	10	10	10	10	10	10	8	10	10	9,8	9,6
	index	101,6	100,8	98,3	98,3	99,8	100,0	100,0	97,4	98,3	100,8	99,5	101,0
Total points		50	53	47	50	50	50	50	47	50	50	49,7	46,7
Class		E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.
The complex index, A		100,2	104,2	98,3	98,1	102,2	99,6	104,0	99,2	97,9	100,4	100,4	101,0
The complex index of the bull Gomat DRJ -59223, B 100,4; total points 49,7; E. R. class.													

Therefore, their superiority over the indicators of the analyzed characteristics of 50 peers was less convincing and according to the results of the index assessment, only 30% of the sons of the bull Gomat DRZH-59223 belong to the category of improver, with a fluctuation of the complex index –

"A" 102.2-104.2%. In addition, 20% of his sons have a complex index "A" 100.2 and 100.4 % and correspond to the neutral tribal category. Among the peers of the bull Yago DRZH- 39023, 60% of the descendants belong to the category of improver, with a fluctuation of the complex index – "A" 101.7-104.5%. At the same time, there are no individuals among his descendants who meet the requirements of the neutral category. However, among the sons of both bulls, 50 and 40%, respectively, had a complex index "A" of 96.4-99.6%, which corresponds to the category of aggravator. Their complex index averaged "A" 100.4 and 100.8. Therefore, according to the results of the assessment of the quality of offspring, their fathers were assigned the breeding category neutral with a complex index "B" of slightly more than 100%. It is not recommended to use the descendants of these breeding bulls for sale as breeding young animals to other farms. They are transferred to the group of commercial young animals and, after intensive rearing, will be sold for beef production.

Table 4. Assessment of the quality of the offspring of the bull Yago DRZH-39023

Indicator		The individual number of the sons											
		45	58	87	94	40	25	41	80	57	47	M*	M_1*
Live weight, kg	8 months	188	191	201	182	185	189	191	196	181	182	189	197
	15 months	428	431	436	395	415	419	430	404	390	380	412	410
	points	10	10	10	10	10	10	10	10	10	10	10	10
	index	104,4	105, 1	106, 3	96,3	101,2	102,2	104,9	98,5	95,1	92,7	100,7	01,0
Average daily increase over the period from 8-15 months	gram	1143	1143	1119	1014	1095	1090	1138	990	995	943	1067	1017
	points	10	10	10	10	10	10	10	8	8	8	9,1	10
	index	112,4	112,4	110,3	99,7	107,6	107,2	111,9	97,3	97,8	92,7	104,9	101,0
Feed costs per 1 kg of gain 8-15 months	food units	7,4	7,4	7,3	7,4	7,5	7,5	7,4	7,5	7,5	7,4	7,43	7,34
	points	8	8	8	8	8	8	8	8	8	8	8	8
	index	101,3	101,3	102,7	101,3	100,0	100,0	100,3	98,7	100,0	98,7	100,5	101,0
Evaluation of meat molds in 15 months	points	56	55	56	54	57	54	57	51	55	53	54,8	54,4
	points	10	10	10	10	10	10	10	8	10	8	9,6	9,1
	index	102,9	101,1	102,9	99,2	104,8	99,2	104,8	92,7	101,1	97,4	100,7	101,0
Height in the sacrum at 15 months	cm	118	119	120	1116	118	118	119	115	113	112	117,4	117,2
	points	10	10	10	10	10	10	10	8	10	10	9,8	9,6
	index	10,6	100,8	98,3	98,3	99,8	100,0	100,0	97,4	98,3	100,8	99,5	101,0
Total points		48	48	48	48	48	48	46	42	46	44	46,5	46,7
Class		E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.
The complex index, A		104,5	104,1	104,1	98,9	102,6	101,7	104,4	97,1	98,4	96,4	100,8	01,0

Among the 10 sons of the bull Raskat 8692 from the genealogical line of the Manege 7113, with an average live weight at 15 months of age of 415 kg and an average daily gain of 1023 grams, four descendants with a live weight of 420-427 kg and an average daily gain of 1023-1095 grams had a complex index "A" of 101.2-102.2%, which corresponds to the minimum values of the requirements of the category the improver (Table 5). Five descendants had a complex index "A" of slightly more than 99-100%, these values meet the requirements of the neutral category. One of his descendants with a live weight of 392 kg and an average daily gain of 1009 grams has a complex index "A" of 96.4% meets only the requirements of the degrader. Therefore, according to the results of the assessment of the quality of offspring, the bull Raskat 8692 was assigned the breeding category neutral with a complex index "B" of 100.5. This producer bull and its descendants in reproduction can only be used to produce commercial young animals with growth energy with stall-pasture technology of more than 1000 g per day.

One of his descendants with a live weight of 392 kg and an average daily gain of 1009 grams has a complex index "A" of All descendants of bulls evaluated by the quality of offspring having a complex index of more than 103%, it is recommended to select them into the group of repair young for subsequent evaluation after use in reproduction.

Of the five bulls of the Kalmyk breed, evaluated by the quality of offspring, only Prometheus 1127 bulls of the Doublet 825 factory line and Grillage 916 of the Pirata 6626 factory line met the requirements of the improver breeding category. They are recommended for use in breeding stock reproduction. According to the results of the offspring quality assessment, the remaining three bulls met the minimum requirements of the neutral breeding category and were recommended for the production of environmentally friendly beef.

Table 5. Assessment of the quality of the offspring of the bull Roll 8692

Indicator		The individual number of the sons											
		164	199	207	239	240	242	133	354	136	173	M*	M_1*
Live weight, kg	8months	212	213	207	209	205	190	191	192	180	205	200	197
	15 months	427	424	422	420	417	408	416	422	392	407	415	410
	points	10	10	10	10	10	10	10	10	10	10	10	10
	index	104,1	103,4	102,9	102,4	101,7	99,5	101,5	102,9	85,6	99,3	101,2	101,0
Average daily increase over the period from 8-15 months	gram	1023	1004	1023	1001	1009	1038	1071	1095	1009	961	1023	1017
	points	10	10	10	10	10	10	10	10	10	8	10	10
	index	100,6	98,7	100,6	98,4	99,2	102,0	105,3	107,7	99,2	94,5	100,6	101,0
Feed costs per 1 kg of gain 8-15 months	food units	7,1	7,4	7,5	7,2	7,5	7,3	7,5	7,4	7,3	7,5	7,42	7,34
	points	8	8	8	8	8	8	8	8	8	8	8	8
	index	100	100	100	100	100	100	100	100	100	100	100	101,0
Evaluation of meat molds in 15 months	points	56	56	56	54	56	54	56	54	54	56	55	54,4
	points	10	10	10	10	10	10	10	10	10	10	10	9,1
	index	102,9	102,9	102,9	99,2	102,9	99,2	102,9	99,2	99,2	102,9	100,8	101,0
Height in the sacrum at 15 months	cm	120	119	117	117	116	115	116	119	115	117	117,1	117,2
	points	10	10	10	10	10	8	10	10	8	10	9,6	9,6
	index	102,6	101,8	99,8	99,8	99,1	98,1	99,1	101,8	98,1	99,8	100,0	101,0
Total points		48	48	48	48	48	46	48	48	46	46	47,6	46,7
Class		E. R.	E. R.	Э. р.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.	E. R.
The complex index, A		101,8	101,3	101,2	99,6	100,5	99,7	100,2	102,2	96,4	99,3	100,5	101,0
Comprehensive Bull Roll Index 8692, B 100,5; total points 47,6; E. R. class													

During the control slaughter of the descendants of the estimated breeding bulls, the highest removable and pre-slaughter live weight was noted in the successors of the bull Grillage 916 of the newly created and most common factory line Pirate 6626. With a significant difference (P>95), they outperformed their peers – the sons of other bulls by 6-15

kg in terms of slaughter and mass of paired carcasses, and their slaughter yield exceeded 58% (Table 6).

Table 6. Results of slaughter of bulls at the age of 15 months (n= 3 each)

Indicator	Estimated producer bulls				
	Prometheus 1127	Grilling 916	Gomat 59223	Iago 39023	Raskat 8692
Removable live weight, kg	422,7±3,4	430,7±3,8	407,0±3,1	412,8±3,3	415,2±3,5
Pre-slaughter live. weight, kg	412,1±3,1	419,9±3,9	396,8±3,7	402,5±3,9	404,8±4,0
Weight of the steamed carcass, kg	229,9±1,8	235,5±2,4	221,4±2,2	222,6±2,4	223,0±2,4
Weight of internal fat, kg	8,2±0,19	8,7±0,16	7,9±0,12	8,2±0,2	8,3±0,12
Slaughter weight, kg	238,1±0,8	244,2±1,2	229,3±0,9	230,8±1,1	231,3±1,1
A killer exit, %	57,78±1,1	58,15±1,1	57,79±1,2	57,34±1,0	57,14±1,2

4 Discussion of the results

At the same time, the latter have the highest indicators of morphological composition, yield of the edible part of the carcass and meat-and-bone ratio (Table 7, Fig. 1, 2). The lowest slaughter rates were noted in the sons of bulls Gomat 59223 and Yago 39023 of the factory lines Jaguar 253 and Thunder 247. The second place in terms of morphological composition of the carcass and other slaughter indicators is occupied by the descendants of Prometheus 1127 bulls of the factory line of Doublet 825 and Raskat 8692 of the genealogical line of the Manege 7113.

Table 7. Morphological composition of carcasses of gobies aged 15 months (n= 3)

Indicator	Estimated producer bulls				
	Prometheus 1127	Grilling 916	Gomat 59223	Iago 39023	Raskat 8692
Weight of the cooled carcass, kg	226,5±1,2	231,9±1,5	218,1±1,3	219,3±1,5	219,7±1,4
Mass of muscle tissue, kg	171,9±1,2	177,9±1,0	162,5±1,1	164,0±1,3	165,2±1,4
Weight of adipose tissue, kg	10,4±1,0	10,0±0,5	12,2±0,3	11,8±0,6	11,2±0,2
The weight of the edible part of the carcass, kg	4,6±0,04	4,3±0,03	5,6± 0,04	5,4±0,05	5,1±0,05
Weight of bones, cartilage and tendons, kg	44,2±1,3	44,0±1,2	43,4±1,4	43,5±1,7	43,3±1,3

It is noteworthy that the descendants of bulls Grillage 916 and Prometheus 1127 have muscle tissue content in the carcass at the level of 76.7 and 75.9%, which is 9.4-15.4 kg more than their peers from other breeding bulls. However, the latter, with an advantage in favor of the sons of the bull Gomat 59223, had the highest relative yield of fat, bones, cartilage and tendons and the lowest meat content coefficient.

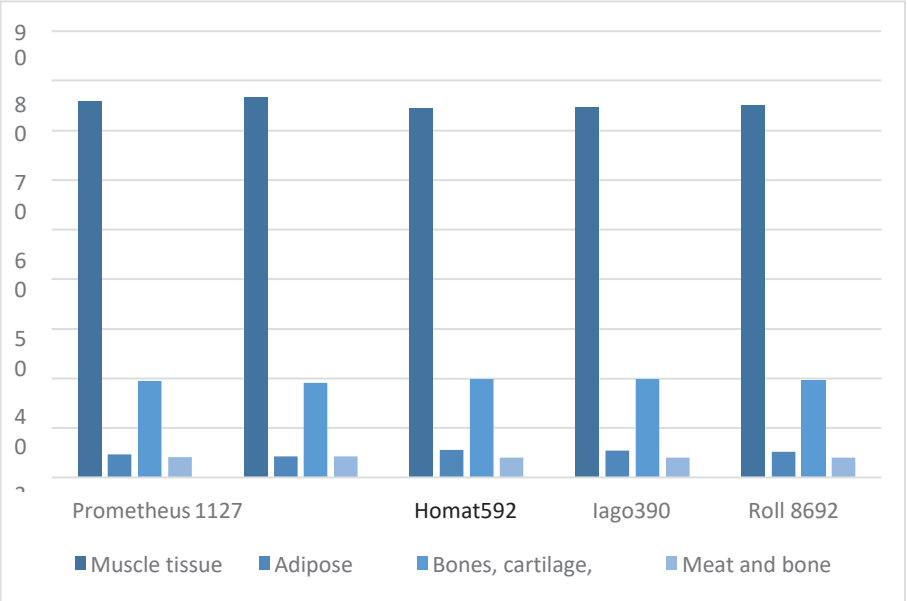

Fig. 1. Morphological composition of carcasses of 15-month-old bulls, %

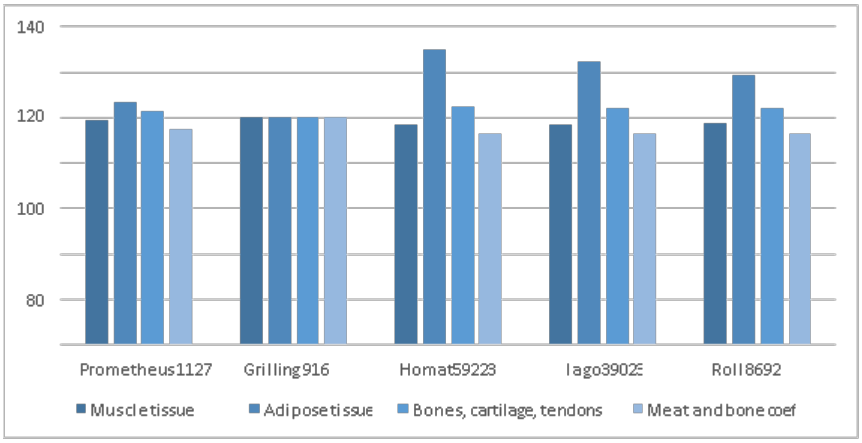

Fig. 2. The ratio of carcass tissues relative to the descendants of the bull Grillage 916

5 Conclusions

From the above, it follows that of the five estimated breeding bulls in terms of the quality of offspring and the formation of meat productivity, the most promising for the zone of the arid region are the successors of the bulls Grillage 916 of the Pirata 6626 factory line and Prometheus 1127 of the Doublet 825 factory line. Therefore, their successors, who have a positive assessment of their own productivity with a complex index of more than 103%, are recommended to be used more intensively in the reproduction of the breeding core, and the descendants of other bulls with an index of more than 101.5% should be used to repair the main herd. Descendants of the bull Roll 8692 of the Manege 7113 genealogical line with an index of more than 100% should be used to obtain commercial young. Intensive cultivation

of successors of bulls with the improver breeding category will contribute to an increase in the growth energy of young animals, the live weight of the main herd and the number of high-class animals to create the Volochaev intrabreed type of the Kalmyk breed.

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