ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

Х А Б А Р Ш Ы С Ы

ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

THE BULLETIN

OF THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN

1944 ЖЫЛДАН ШЫҒА БАСТАҒАН
ИЗДАЕТСЯ С 1944 ГОДА
PUBLISHED SINCE 1944

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АЛМАТЫ
АЛМАТЫ
ALMATY

2018

JANUARY
ЯНВАРЬ
ҚАҢТАР

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«Қазақстан Республикасы Ұлттық ғылым академиясының Хабаршысы».
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)
Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы»РҚБ (Алматы қ.)
Қазақстан республикасының Мәдениет пен ақпарат министрлігінің Ақпарат және мұрағат комитетінде 01.06.2006 ж. берілген **№5551-Ж** мерзімдік басылым тіркеуіне қойылу туралы куәлік

Мерзімділігі: жылына 6 рет.
Тиражы: 2000 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28, 219 бөл., 220, тел.: 272-13-19, 272-13-18,
www: nauka-nanrk.kz, bulletin-science.kz

Типографияның мекенжайы: «Аруна» ЖК, Алматы қ., Муратбаева көш., 75.

«Вестник Национальной академии наук Республики Казахстан».
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)
Собственник: РОО «Национальная академия наук Республики Казахстан» (г. Алматы)
Свидетельство о постановке на учет периодического печатного издания в Комитете информации и архивов Министерства культуры и информации Республики Казахстан **№5551-Ж**, выданное 01.06.2006 г.

Периодичность: 6 раз в год
Тираж: 2000 экземпляров

Адрес редакции: 050010, г. Алматы, ул. Шевченко, 28, ком. 219, 220, тел. 272-13-19, 272-13-18.
www: nauka-nanrk.kz, bulletin-science.kz

Адрес типографии: ИП «Аруна», г. Алматы, ул. Муратбаева, 75

Bulletin of the National Academy of Sciences of the Republic of Kazakhstan.
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)
Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty)
The certificate of registration of a periodic printed publication in the Committee of Information and Archives of the Ministry of Culture and Information of the Republic of Kazakhstan N 5551-Ж, issued 01.06.2006

Periodicity: 6 times a year
Circulation: 2000 copies

Editorial address: 28, Shevchenko str., of. 219, 220, Almaty, 050010, tel. 272-13-19, 272-13-18,
http://nauka-nanrk.kz /, http://bulletin-science.kz

Address of printing house: ST "Aruna", 75, Muratbayev str, Almaty

BULLETIN OF NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
ISSN 1991-3494
Volume 1, Number 371 (2018), 6 – 22

UDC 636.295.25

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GENETICS OF THE PRODUCTIVE PROFILE OF CAMELS OF DIFFERENT GENOTYPES OF THE KAZAKHSTAN POPULATION

Abstract. For the first time, camels of hybrid origin of F_2 (25%td, 25%kb, 50%kd), F_3 (12.5%td, 62.5%kb, 25%kd), F_4 (56.25%td, 31.25%kb, 12.5%kd), F_5 (28.1%td, 15.6%kb, 56.2%kd), pure Kazakh bactrian of the South Kazakhstan type and Mangistau population, arvana - Turkmen dromedary, Kazakh dromedary, bred in South Kazakhstan and Mangistau regions of the Republic of Kazakhstan, were studied in comparative aspect.

The genetic profile of live weight, dairy productivity, wool cutting, body measurements of the studied groups of camels is established. The results of the study showed the efficiency of breeding hybrid camel dams of the dromedary group for the production of camel milk, in view of the optimal ratio of milk fat and protein.

The phenotypic profile of camels of the Kazakh dromedary of the Arada F_5 type (28.1%td, 15.6%kb, 56.2%kd), is suitable for breeding "in itself". Camels have one compact hump of medium size - 2/3 of the oblique body length. Head profile is hook-nosed. The profile of the neck from the base of the neck to the head without bends is straight. The main color of the fleece (wool) is brown and sandy, without additional coloring. The main color of the covering hair is brown and sandy, there is an additional color that does not exceed 10% of the total livestock.

Keywords: Genetics, milk yield, Kazakh bactrian, arvana, Kazakh dromedary, hybrids.

Introduction. Kazakhstan is the only world center on the Eurasian continent, where it is possible to breed two species of camel dromedary (Camelus*dromedarius*) and two-humped bactrians (camelus *bactrianus*) of the Camelus genus [1].

It has been established that when mating camels of the Kazakh Bactrian breed bred in different conditions and belonging to different populations, the effect of intra-breed heterosisis is possible, which is more often manifested in heterogeneous selection [2]. That is, one of the effective options for obtaining high-yielding Kazakh Bactrians is the use of heterogeneous selection for intra-breed mating [3].

The presence of vast territories of semi-desert and desert pastures, high camel fitness allow intensive development of camel breeding in a productive direction [4].

In the practice of domestic camel breeding, along with thoroughbred breeding of Kazakh bactrians, two methods of breeding heterotic animals were widely spread: inter-species crossing between Kazakh bactrian and Turkmen dromedary, and interbreeding between Kazakh and Kalmyk bactrians.

One of the features of the manifestation of heterosis is the greatest degree of severity only in the first generation in hybrid Kazakh-Kalmyk bactrians [5] and hybrid camels [6]. Then the heterosis in subsequent generations fades out.

Interspecific crossing of camels of bactrians and dromedaries is practiced with the aim of breeding hybrids of the first generation, the so-called nars [7]. When breeding hybrids of the first generation "in themselves", the effect of heterosis in the second generation completely disappears. Preservation of heterosis in subsequent generations of interspecific hybrids of camels is an actual problem in the theory and practice of domestic camel husbandry. In this regard, the accumulation cross breeding of hybrids of the first generation of nars with the original parental forms, using traditional methods of interspecific hybridization, did not yield the expected results [8, 9].

One of the reserves to increase the production of camel meat is the increase in the number of camels of Kazakh bactrian breed and the Kazakh dromedary, which is a specialized meat breed of the combined direction of productivity. Further increase in the production of camel and improving its quality is associated with the rational use of the gene pool of the domestic breed of camels of Kazakh bactrian and dromedary of the Turkmen breed, as well as camels of different genotypes.

It should be noted that Kazakh bactrians, in comparison with interspecific camel hybrids, are low-yield [10]. In this regard, to improve the dairy, meat and wool productivity of Kazakh bactrians of different types and populations, it is necessary to develop effective zootechnicalselection parameters, based on the use of the coefficients of milking capacity, production of wool, etc.

In zootechnic science, hybridization refers to the crossing of animals belonging to different species. Hybridization as one of the methods of breeding includes the crossing of hybrids with other ones of different and identical origin. According to V.F. Krasot, et al. [11]: "The main task of this very difficult method of crossing is involving in the material culture of human of new valuable wild and semi-wild forms of animals.Depending on the ability or inability of hybrids to give offspring, hybridization is distinguished, which is widespread and gives us useful animals, and the hybridization used to create new breeds and species of animals. In connection with this, four types of hybridization of animals are distinguished: industrial, absorbent, introductory and reproductive".

"One of the promising and effective methods for further improving meat production is industrial crossbreeding and hybridization. They have become widespread in the meat cattle breeding in the user (commodity) herds in the production of crossbreds for fattening, as well as in the creation of new breeds and types of beef cattle" [12].

In the camel breeding, interspecific hybridization between the Bactrians of the Kazakh breed and the Dromedares of the Turkmen Arvana breed was widespread [13].

Hybridization according to Soviet scientists is a system of crossbreeding, based on the mating of individuals representing two (or more) genetically originated groups, and opposite to related crosses [14].

Breeders have long known that hybrids in relation to many signs, including economically important, in their values exceed both the original parental forms.

A. Baimukanov [15] proposed to take into account the weight at birth and at weaning when studying the growth rate of camels. B.S. Turumbetov [16] believes that it is still necessary to study and measure the body at birth, at weaning, at reaching puberty. Z.M. Musaev [17], while studying the growth and development of thoroughbred Kazakh bactrians, took into account the live weight and body measurements at birth, at one-year-old age, at the age of two and three years old.

That is, in camel husbandry the study of growth and development of camels is given special attention. This is due to the fact that the intensive growth of camels in the first months of post-embryonic development to some extent positively affects the formation of the direction of productivity. In particular, according to D.A. Baimukanov [18], intensive growth and development of throughbred Kazakh bactrians in the first three and six months of postembryonic development positively influence the formation of the dairy direction of productivity.

K.B. Saparov [19] considers that partial milking of female camels of the Turkmen Arvana breed with proper organization does not harm the development of the young stock.

D.A. Baimukanov [20] in his monograph indicates that the growth of camels of thoroughbred Kazakh Bactrians is the greatest in the first periods of postembryonic development. To ensure the appropriate growth factor, the correct organization of milking of female camels is necessary. However, the author is limited to data at birth, at three months and six months.

The need for the correct organization of feeding and maintenance of adult camels and young stock is noted in the recommendations on the development of camel breeding [21] and in the collection "Problems of the development of camel breeding in Kazakhstan" [22].

D.A. Baimukanov [23] says that: "The heterogeneity of the nars is caused by polygenic factors...". Further: "Hybrids of the first generation with both methods of crossing are similar in appearance to the dromedaries - single-horned, but the hump is more stretched from front to back. The shape of the head, neck, and fringe of the hybrid is similar to that of the Bactrian. Inheritance of dairy and wool productivity is intermediate. By massiveness, working qualities and endurance, hybrids exceed the original parent species".

In Kazakhstan conditions, hybrid camels of kospak are of particular value, which, depending on the Bactrian's blood, are divided into bal-kospak (75% of Bactrian), myrza-kospak (87.5% of Bactrian) and nar-kospak (93.75% of Bactrian) [23].

Of the interspecific hybrid camels, the nar-maya (F_1), iner-maya (F_1), kospak 1 (F_2), kez-nar 1 (F_3), kurt-nar (F_3) are well studied.

However, up to now, data on the patterns of postembryonic development of hybrids of kospak 2 (F_3), kospak 3 (F_4), kez-nar 2 (F_4), kez-nar 3 (F_3), kurt-nar (F_4) and their biological characteristics of the formation of productivity are insufficiently described. In addition, it should be noted that without certain knowledge about dairy, meat, wool productivity, scientifically grounded experiments and the obtained results, it is premature to assert the superiority of one or another genotype of interspecific hybrids.

Camel meat is used for the production of meat products in accordance with the "Halal" standard , traditionally used in the Islamic world. This is due to the fact that camel fat is a substitute for pork fat, traditionally used in the manufacture of sausage products [24]. In this aspect, according to the UN, Kazakhstan can become a leader in the short term in the production of camel milk and meat in the world market of meat and dairy industry.

According to A. Baimukanov [22], long-term high-productive cultural pastures and hayfields, which are based on the natural flora of deserts and semi-deserts, play an important role in creating a solid fodder base for desert animal husbandry.

A.Tastanov [25] believes that one of the reserves of rapid lifting of camel milking capacity is the hybridization of the Kazakh Bactrian with the Turkmen dromedary. In particular, milk yield for six months of lactation from hybrid camels of kez-nar and kurt-nar is 1700-1750 liters of milk, taking into account sucked milk by young camels. Further crossing of hybrid camels kez-nar and kurt-nar with producers of hybrid origin of the camel breeding department of the Kazakh scientific research institute of karakul breeding (Shymkent)kurt III and kurt IV is a promising direction for improving interspecific hybridization in camel breeding.

In camel hasbundry, animals selected for breeding compose pairs in such a way that selection and assortment complement each other and, together with the targeted breeding of young stock, they were effective methods of improving the breeds.

Aim of the work. Determination of the genetic profile of the productivity of camels of Kazakh Bactrian, Arvana, Kazakh dromedary and interspecific hybrids in the Republic of Kazakhstan.

Methods of research. The studies were conducted in the 2015–2018 period.

The objects of the research is thoroughbred camels of the Kazakh bactrian breed (kb), Arvanadromedar (td), Kazakh dromedary (kd) and hybrid camels - dromedary from rotary crossing, bred in the conditions of LLP "Taushyk" of Tupkaragan district, Mangistau region, PF "Usenov N" and "Gulmaira" of Otrar district, PF "Nurbol" of Suzak district and PF "Dauren-N" of Arys district of South-Kazakhstan region.

The production of wool was set during the spring cutting by individually weighed shorn wool in 20 kg scales with an accuracy of 0.1 kg. Subsequently, shorn wool was classified into four classes. According to the results of the analysis of wool, effective variants of selection and assortment of thoroughbred Kazakh bactrians of the western population and their interspecific hybrids were determined.

Formation of camel experimental herds during feeding was carried out at the request of the Pre-patent of the Republic of Kazakhstan No.16227 [26].

The live weight of camels was determined in two ways: the first - by individual weighing on stationary monophonic scales with an accuracy of 1.0 kg; the second - at the request of the Pre-patent of the Republic of Kazakhstan No.15886 [27].

Dairy productivity was determined based on the results of the control milkings for two adjacent days on the 3rd and 4th months of lactation, according to the Instruction for bonitation of camels. The monthly

milk yield was determined by carrying out the control milkings for two adjacent days (on the 21st, 22nd of each month). In the first two months of lactation, the monthly yield of the thrown camels was determined by the absolute increase in the live weight of their camels. When assessing dairy productivity, the extent of the usefulness of lactation was determined additionally upon request of the Provisional patent of the Republic of Kazakhstan No.16226 [28].

The content of fat and protein in milk was determined by the standard method, using the "Laktan 3" device (Russia).

Measurements of the body were measured on demand of the Instructions for bonitation of camels [29, 30].

Morphofunctional features of the udder of camels were determined by the method of A. Baimukanov [31].

Meat productivity of camels was studied according to the generally accepted method in the modification ofprofessor A. Baimukanov, et al. [32].

The main indicators of control slaughter of male camels of different genotypes were determined at the age of 30 months.

Biometric processing of digital materials was conducted according to N.A. Plokhinsky [33], E.K. Merkurieva and G.N. Shangin-Berezovsky[34].

The blood for the study was taken from the jugular vein in the morning from the unfed animals in the pen. The number of formed elements - erythrocytes and leukocytes was determined according to the conventional method in Goryaev's chamber, hemoglobin concentration in the Sali hemometer, total white blood - by refractometric method [20].

Results of the research.

1. Selective-genetic and productive profile of camelsF_2 (25%td, 25%kb, 50%kd). The object of the research was the Kazakh bactrians of the Mangistau population, Arvana - the Turkmen dromedary, the Kazakh dromedary, the second generation hybrids F_2 Aidaramir - arada and Baishin from the camel breeding farm of Taushyk LLP in the Tupkaragan region of Mangistau region (tables 1, 2).

Arvana is the Turkmen dromedary, a transboundary breed. In the conditions of the Caspian Despression, the Erben breed type of Arvana became widespread.

Kazakh Bactrians of the Mangistau populations are the main planned breed in the Mangistau region. It has become widespread in the Caspian Depression.

Table 1 – Genetic parameters of the productivity of experimental camels

Breed	Number of heads	Live weight, kg	Milk yield for 240 days of lactation	Fat	Protein
Kazakh bactrian	12	551.8±11.3	1182.3±18.7	5.42±0.08	3.40±0.02
Arvana	12	478.3±9.7	2645.7±28.3	3.23±0.07	3.12±0.04
Kazakh dromedary	12	485.6±7.8	2191.2±21.5	4.42±0.07	3.53±0.04
«Aidaramir - arada» F_2 (25%td, 25%kb, 50%kd)	12	613.4±12.6	2139.2±31.3	4.29±0.07	3.53±0.03
«Baishin» F_2 (25%td, 25%kb, 50%kd)	12	584.1±9.7	1837.3±41.2	4.32±0.06	3.53±0.04

Table 2 – Results of control slaughter of 30-month-old males of experimental groups of camels

Breed	Number of heads	Production live weight, kg	Removable live weight, kg	Preslaughter live weight, kg	Slaughter live weight, kg/Slaughter output, %
Kazakh bactrian	5	225.9±15.1	338.3±9.3	308.6±7.4	163.9±5.1/53.1±0.3
Turkmen dromedary Arvana	5	322.5±18.4	431.9±11.2	392.1±10.5	193.3±8.4/49.3±0.9
Kazakh dromedary	5	242.3±13.8	427.6±14.6	395.4±6.9	219.1±3.6/55.4±0.5
«Aidaramir - arada» F_2 (25%td, 25%kb, 50%kd)	5	261.7±19.2	457.8±22.4	418.5±9.1	231.0±6.3/55.2±0.8
«Baishin» F_2 (25%td, 25%kb, 50%kd)	5	256.4±12.9	429.2±18.7	403.7±7.7	224.4±7.1/55.6±0.4

The Kazakh dromedary of the Mangistau population is a unique breed group that has got widespread in the Mangistau region.

Baishin(F_2 d)is a group of hybrid camels of the second generation (50% of blood of the Kazakh dromedary, 25% of the Kazakh bactrian's blood, and 25% of the Turkmen dromedary's blood) obtained by crossing the hybrid females of the first generation of Iner-maya (F_1) with the producers of the Kazakh dromedary.

Aidaramir - arada(F_2 d) – is a group of hybrid camels of the second generation (50% of blood of the Kazakh dromedary, 25% of the Kazakh bactrian, 25% of the Turkmen dromedary) obtained by crossing hybrid females of the first generation of Nar-maya (F_1) with the producers of the Kazakh dromedary.

*Dairy productivity.*The study of dairy productivity is one of the most difficult in genetics and selection of camels. In the conducted studies, milk yield was studied for 240 days of lactation, the average content of fat and protein in milk during 240 days of lactation (table 1).

It was established that the hybrid camels of the Aidaramir group significantly exceed the Kazakh Bactrians by milk yield (P≤0.001), but they are inferior to fat content in milk and are not inferior to the mass fraction of protein in milk (table 1).

On the live weight, the effect of heterosisis observed. All the second generation female camels of "Aidaramir" and "Baishin" exceed their thoroughbred herdmates in terms of live weight (P≤0.001).

*Early ripeness and meat productivity.*Preslaughter live weight in 2.5 year old young males F2 (25%td, 25%kb, 50%kd) averages 403.7-418.5 kg. The slaughter yield in males F2 (25%td, 25%kb, 50%kd) averages 55.4% (table 2), due to the influence of the genes of the Kazakh dromedary.

2. Selective - genetic and productive profile of camels F_3 (12.5%td, 62.5%kb, 25%kd). The object of the research was the Kazakh bactrians of the South Kazakhstan type, the Arvana - the Turkmen dromedary, the Kazakh dromedary, the hybrid camels of the third generation F_3 Aidaramir - nar and Baikazhy from the Usenov N farm and the Gulmaira farm of Otrar district, the Nurbol farm of the Suzak district and the Dauren-N farm of the Arys district of the South-Kazakhstan region.

The Kazakh Bactrians of the South Kazakhstan type is a planned breed of camels in the South Kazakhstan region.

Arvana - the Turkmen dromedary is represented by the Sakarchagin breed type.

The Kazakh dromedary of the South Kazakhstan population is a limited local breed group.

Aidaramir - narF $_3$is a group of hybrid camels of the third generation (12.5% of Arvana, 62.5% of Kazakh bactrian, 25% of Kazakh dromedary) obtained by absorbing crossing of females - hybrids of the second generation of Aidaramir-arada with males-Kazakh bactrians.

Baikazhy F $_3$is a group of hybrid camels of the third generation (12.5% of Arvana, 62.5% of Kazakh Bactrian, 25% of Kazakh dromedary) obtained by absorbing crossing of Baishin females - hybrids of the second generation with males - Kazakh bactrians.

Dairy productivity.It was established that the hybrid camels of the Aidaramir - nar group significantly exceed the Kazakh bactrian, the Turkmen dromedary and the Kazakh dromedary in live weight (P≤0.01). A similar superiority is observed in hybrid camels "Baikazhy" (table 3).

Milk yield in hybrid camels of the third generation is significantly higher in comparison with the herdmates of Kazakh bactrian (P≤0,001), but lower in comparison with dromedary.

It was not possible to reveal general patterns in the inheritance of fat content in milk in hybrid camels of the third generation, but an intermediate type of inheritance of fat content in milk should be noted.

Table 3 – Zootechnical parameters of dairy productivity of experimental camels

Breed	Number of heads	Live weight, kg	Milk yield for 240 days of lactation	Fat	Protein
Kazakh bactrian	15	587.4±22.1	944.1±45.2	5.61±0.07	3.52±0.04
Turkmen dromedary Arvana	15	535.1±13.6	2921.7±25.9	3.17±0.05	2.99±0.02
Kazakh dromedary	15	551.9±16.4	2468.2±31.1	4.45±0.07	3.51±0.05
«Aidaramir-nar» F_3 (12.5%td, 62.5%kb, 25%kd)	15	628.2±17.2	1764.9±23.8	4.37±0.06	3.51±0.05
«Baikazhy» F_3 (12.5%td, 62.5%kb, 25%kd)	15	612.4±14.3	1543.4±28.4	4.46±0.07	3.51±0.04

Concerning the inheritance of the mass fraction of protein in milk in hybrid camels, the greater influence of the Kazakh dromedary is traced.

Thus, the Aidaramir-nar F_3 (12.5%td, 62.5%kb, 25%kd) has a live weight of 628.2 kg, a milk yield for 240 days of lactation of 1,764.9 kg, a fat content in milk of 4.37%, milk protein content 3.51%. Hybrid camels "Baikazhy" F_3 (12.5%td, 62.5%kb, 25%kd) were 612.4 kg, 1543.4 kg, 4.46% and 3.51% respectively.

3. Selective-genetic and productive profile of camels F_4 (56,25%td, 31,25%kb, 12,5%kd). The object of the reseach was the Kazakh bactrians of the South Kazakhstan type, the Arvana – the Turkmen dromedary, the Kazakh dromedary, the hybrid camels of the third generation F_4 of Aidaramir - kurt and Ardas from the Usenov N farm and Gulmaira farm of the Otrar district, the Nurbol farm of the Suzak district and the Dauren-N farm of the Arys district of the South-Kazakhstan region.

Aidaramir - kurt (F_4) – is a group of fourth-generation hybrid camels (56.25% of the Turkmen dromedary's blood, 31.25% of the Kazakh bactrian's blood, 12.5% of the Kazakh dromedary) obtained by crossing of third-generation hybrid females of Aidaramir-nar (F_3) with Turkmen dromedary producers.

Ardas (F_4) is a group of fourth-generation hybrid camels (56.25% of the Turkmen dromedary's blood, 31.25% of the Kazakh Bactrian's blood, 12.5% of the Kazakh dromedary) obtained by crossing of third-generation hybrid females of Baikazhy (F_3) with Turkmen dromedary producers.

*Genetics of postembryonal growth and development of camels.*The results of the study of the dynamics of the age variability of the live weight of females of experimental camels of the Kazakh dromedary type F_4 (56.25%td, 31.25%kb, 12.5%kd) from 15 days to 2.5 years old are given in table 4.

Table 4 – Age variability of live weight of experimental female camels, kg

Age	Group	unitofmeasurement		
		$X \pm m_x$	Cv	δ
15 days	Kazakh bactrian	32.5±1.8	12.4	3.7
	Arvana	36.9±2.1	9.8	2.4
	Kazakh dromedary	42.4±1.5	6.5	3.3
	«Aidaramir-kurt» F_4	44.2±2.4	7.7	4.1
	«Ardas» F_4	43.1±2.7	7.1	3.8
6 months	Kazakh bactrian	142.4±4.3	9.2	5.6
	Arvana	151.2±5.1	8.7	11.2
	Kazakh dromedary	148.6±4.8	8.5	9.1
	«Aidaramir-kurt» F_4	154.9±6.3	9.5	10.2
	«Ardas» F_4	161.7±5.9	7.9	12.7
18 months	Kazakh bactrian	233.8±5.8	6.2	12.7
	Arvana	263.2±4.4	9.3	8.2
	Kazakh dromedary	257.5±6.1	5.8	12.8
	«Aidaramir-kurt» F_4	278.4±6.3	6.4	14.3
	«Ardas» F_4	295.8±7.1	6.9	11.9
30 months (2.5 years)	Kazakh bactrian	327.3±5.7	5.2	9.6
	Arvana	355.2±8.2	7.4	18.1
	Kazakh dromedary	328.7±6.5	6.5	15.3
	«Aidaramir-kurt» F_4	389.5±10.1	9.3	17.5
	«Ardas» F_4	397.1±7.2	8.7	14.7

At the age of 15 days, the young camels - females of the Kazakh Dromedary type F_4 have an average live weight of 43.1-44.2 kg, which corresponds to the indices of the Kazakh dromedary (42.4 ± 1.5 kg), but significantly higher in comparison with herdmates of the Kazakh Bactrian (32.5 ± 1.8 kg) and Arvana (36.9 ± 2.1 kg).

When the six-month age is reached, the young female camels of the Kazakh Dromedary type F_4 exceed all experimental groups in terms of live weight. This superiority is associated with the effect of heterosis from the three-breed rotational cross.

In further age periods, the superiority in the live weight in females of the Kazakh dromedary type significantly increases in comparison with the thoroughbred herdmates.

At the age of 18 months, the live weight of the Kazakh Bactrian females reaches 233.8±5.8 kg, Arvana 257.5±6.1 kg, the Kazakh dromedary 257.5±6.1 kg, Aidaramir-kurt F_4 278.4±6.3 kg and Ardas F_4 295.8±7.1 kg.

At the age of 2.5 years, females of the Kazakh type Ardas F_4 exceed authentically in the live weight of the Kazakh bactrianherdmates by 69.8 kg or by 21.3% ($P<0.001$), arvana - by 41.9 kg or 11.7 % ($P<0.01$).

The live weight of 2.5 year old females of "Aidaramir-kurt" F_4 averages 389.5±10.1 kg, "Ardas" F_4 - 397.1±7.2 kg, which is significantly higher in comparison with the live weight of Kazakh bactrian (327.3±5.7 kg), arvana (355.2±8.2 kg) and the Kazakh dromedary (328.7±6.5 kg).

Table 5 shows the results of the study of the age dynamics of body measurements in experimental groups of male camels from birth to 18 months old. Young male camels of the Dromedary group of the

Table 5 – Age dynamics of body measurements of young male camels, cm

Species belonging	Age	Bodymeasurements			
		heightatwithers	oblique body length	chestcircumference	metacarpuscircumference
Bactrian (n=10)	atbirth	109.7±2.1	72.6±3.3	95.2±3.1	11.1±0.3
	3 months old	128.5±2.4	92.4±3.9	120.9±4.5	12.8±0.3
	6 months old	141.3±2.7	103.5±3.5	144.7±4.2	15.3±0.4
	9 months old	145.8±3.1	107.7±3.8	155.7±5.3	16.8±0.3
	12 months old	151.7±4.1	112.7±4.7	170.8±4.9	18.2±0.3
	18 months old	156.8±4.6	118.7±3.9	185.1±4.6	18.7±0.3
Arvana (n=10)	atbirth	112.3±1.4	71.4±2.5	102.92±4.2	12.1±0.2
	3 months old	131.9±2.7	95.3±3.1	140.12±3.7	12.7±0.3
	6 months old	147.4±3.2	114.4±2.7	155.80±4.2	13.5±0.4
	9 months old	152.7±3.9	119.2±3.2	160.7±4.1	14.2±0.3
	12 months old	163.5±2.6	123.1±3.9	172.5±2.8	14.5±0.3
	18 months old	169.1±2.8	128.3±3.5	176.2±5.4	15.8±0.2
Kazakh dromedary (n=10)	atbirth	111.4±1.6	65.7±3.2	87.8±4.5	11.6±0.3
	3 months old	132.1±1.2	83.1±3.3	124.1±3.4	13.2±0.4
	6 months old	144.2±3.5	99.2±3.7	147.6±4.7	14.1±0.3
	9 months old	148.1±3.7	109.1±3.4	153.5±4.2	14.5±0.4
	12 months old	159.3±3.2	117.4±3.1	167.4±3.2	15.2±0.3
	18 months old	167.4±2.5	121.4±3.7	171.3±3.4	15.5±0.5
Aidaramir-kurt» F_4 (n=10)	atbirth	114.2±2.4	70.2±3.1	97.2±3.9	11.6±0.2
	3 months old	135.3±4.3	93.5±3.6	127.5±4.4	13.1±0.3
	6 months old	142.9±4.8	106.2±3.4	150.71±3.9	15.9±0.3
	9 months old	154.7±3.7	115.3±4.3	155.9±4.0	16.6±0.4
	12 months old	166.8±4.1	120.2±2.8	173.4±3.1	17.2±0.3
	18 months old	169.7±3.7	121.1±2.7	188.7±3.6	17.5±0.4
«Ardas» F_4 (n=10)	atbirth	114.7±3.2	72.9±2.2	93.3±3.6	11.9±0.3
	3 months old	133.5±3.5	91.8±3.9	126.1±3.5	12.8±0.4
	6 months old	144.1±3.1	103.4±3.3	146.50±3.8	15.8±0.4
	9 months old	155.4±2.3	115.7±3.8	152.1±4.0	16.5±0.3
	12 months old	164.6±3.2	119.4±3.1	172.1±3.5	16.9±0.4
	18 months old	172.2±2.6	123.2±3.4	183.7±4.2	17.1±0.4

Kazakh type F_4 exceed in all measurements of the body of the herdmates of the Kazakh bactrian, arvana and the Kazakh dromedary.

In view of the high dairy productivity in camels of arvana, the Kazakh dromedary and dromedary of the Kazakh type F_4, there is a more intensive increase in height at the withers, oblique body length and chest circumference in their young camels in dairy period in comparison with the Kazakh Bactrian.

The established parameters of body measurements are recommended to be used as a standard for determining the intensity of growth and development from birth to 18-months-old age under various technologies of breeding and nursery of young camels in the milking and post-milking periods of ontogenesis.

*Genetics of blood and fertility of camels.*Morphobiochemical blood indices are characterized by hematological and biochemical studies. In connection with this, we carried out studies of the content of erythrocytes, leukocytes, hemoglobin in the blood, as well as the peculiarities of the protein blood coefficient in the experimental camels (table 6).

Table 6 – Hematological and biochemical parameters of blood of experimental camels (n = 40; Σ_n = 200)

Characteristics	Group				
	Kazakh Bactrian	Arvana	Kazakh dromedary	«Aidaramir–kurt» F_4	«Ardas» F_4
Erythrocytes, mln/ml	14.2±0.3	11.5±0.2	12.7±0.2	13.4±0.3	14.1±0.2
Leukocytesthous/ml	16.2±0.2	14.9±0.3	16.7±0.2	17.5±0.2	16.5±0.1
Hemoglobin, g/%	15.5±0.4	12.8±0.3	13.5±0.3	14.3±0.3	14.8±0.2
Thrombocytes, thous/ml	540.2±40.1	468.7±32.5	625.9±52.6	569.1±25.3	608.4±38.3
Totalprotein, g/%	6.8±0.09	6.2±0.07	6.5±0.08	6.4±0.06	6.5±0.05
Albumen, %	62.9±0.02	59.4±0.03	62.3±0.03	60.9±0.03	59.9±0.05
Globulin, %	37.1±0.03	40.6±0.03	37.7±0.03	39.1±0.02	40.1±0.02
Proteinratio, A/G	1.70±0.04	1.46±0.03	1.65±0.03	1.56±0.04	1.49±0.01

In arvana thoroughbred camels the blood contains erythrocytes of 11.5 million/ml, leukocytes of 14.9 thousand/mm and hemoglobin 12.8 g/%.

It was established that camels of the Dromedary group of the Kazakh type F_4 exceed Arvana in the content of erythrocytes and leukocytes, the concentration of hemoglobin, albumin in the total blood protein.

The concentration of thrombocytes in camels of the Dromedary group of the Kazakh type F_4 (569.1-608.4 thousand/ml) is significantly higher than in Arvana (468.7 thousand/ml) ($P<0.001$), but lower in comparison with the Kazakh dromedary (625.9 thousand/ml).

Protein coefficient of blood was 1.70 in female camels of the Kazakh Bactrian, 1.46 in Arvana, 1.65 in the Kazakh Dromedary, 1.56 in Aidaramir and 1.49 in Ardas.

In general, all blood values in the experimental camels corresponded to the physiological number. The observed fluctuations between the groups were probably due to inter-breed differences.

Female camels of the group dromedary F_4 of the new generation "Aidaramir-kurt" and "Ardas" have a fruit bearing duration from 405 days to 442 days, and the average duration is 421.1-422.5 days. The Kazakh Bactrians have an average fruit bearing duration of 442.4 ± 5.1 days. Arvana have a fruit bearing duration from 412 days to 442 days, an average of 425.1±3.9 days. The Kazakh dromedaries are characterized by a fruit bearing duration of 395-432 days, an average of 417.2±3.1 days (table 7).

Table 7 – Fruit bearing duration of camels, in days (n=40, Σ_n=200)

Breed	$X \pm m_x$	δ	Lim
Kazakh Bactrian	442.4±5.1	4.9	435-458
Arvana	425.1±3.9	3.2	412-442
Kazakh dromedary	417.2±3.1	3.5	395-432
«Aidaramir-kurt» F_4	422.5±3.2	4.5	405-442
«Ardas» F_4	421.1±2.8	4.5	409-439

The obtained data on the duration of fruit bearing are in keeping with previous studies.

Thus, the F_4 female camels (56.25%td, 31.25%kb, 12.5%kd) are closer to Arvana and the Kazakh dromedaryin fruit bearing duration.

Genetics of dairy productivity of camels. The live weight of the female camels of the dromedary group F_4 (56.25%td, 31.25%kb, 12.5%kd) was 579.7 - 584.5 kg, which was higher than the Kazakh bactrian (554.8 kg), arvana (561.2 kg) and the Kazakh dromedary (517.1 kg) (table 8).

Table 8 – Productivity of experimental camels (n=40, Σ_n=200)

Breed	Live weight, kg	Production of wool, kg	Milk yield for 270 days of lactation	Fat	Protein
Kazakh Bactrian	554.8±9.2	6.7±0.4	1481.4±30.8	5.31±0.08	3.38±0.03
Arvana	561.2±12.8	2.9±0.3	2911.7±24.6	3.28±0.07	3.09±0.04
Kazakh dromedary	517.1±7.3	3.7±0.3	2474.2±18.2	4.42±0.06	3.48±0.04
«Aidaramir-kurt» F_4	584.5±16.1	4.2±0.3	2399.1±21.5	4.25±0.08	3.48±0.03
«Ardas» F_4	579.7±14.9	4.3±0.2	2226.5±28.9	4.21±0.07	3.48±0.02

The milk yield for 270 days of lactation was composed in female camels of the Kazakh bactrian breed of the South Kazakhstan type - 1481.4±30.8 kg, Arvana - 2911.7±24.6 kg, the Kazakh dromedary - 2474.2±18.2 kg, "Aidaramir - kurt" F_4 - 2399.1±21.5 kg, "Ardas" F_4 - 2226.5±28.9 kg.

According to the protein content in the milk, camels of the new generation of the dromedary F_4 group are closer to the Kazakh dromedary, and the fat content in milk occupies an intermediate position between the arvana and the Kazakh dromedary.

By the production of wool, the female camels of the new generation of the dromedary group F_4 significantly exceed Arvana and the Kazakh dromedary ($P<0.01$). Female camels of the Kazakh Bactrian have an average shorn wool -6.7±0.4 kg, Arvana - 2.9±0.3 kg, the Kazakh dromedary - 3.7±0.3 kg, "Aidaramir-kurt" F_4 4.2±0.3 kg and "Ardas" F_4 - 4.3±0.2 kg.

Table 9 shows the results of a study of the dynamics of daily milk yield in experimental camels within six months of lactation.

Table 9 – Dynamics of daily milk yield of experimental camels (n=40, Σ_n=200), kg

Months	Group				
	Kazakh Bactrian	Arvana	Kazakh dromedary	«Aidaramir-kurt» F_4	«Ardas» F_4
April	5.2±0.19	8.8±0.21	9.2±0.15	7.9±0.19	8.3±0.25
May	5.6±0.21	9.3±0.24	9.5±0.18	8.2±0.19	8.6±0.23
June	5.9±0.23	11.9±0.22	10.7±0.21	8.5±0.20	8.8±0.23
July	6.0±0.22	12.5±0.23	11.5±0.21	9.2±0.20	8.9±0.23
August	5.4±0.25	11.6±0.24	11.1±0.21	8.9±0.22	8.7±0.23
September	5.7±0.22	12.1±0.24	11.4±0.21	9.1±0.20	8.9±0.23
Average	5.6±0.22	11.0±0.23	10.5±0.19	8.6±0.20	8.7±0.23

It was established that the female camels of the Dromedary group of the Kazakh type F_4 produce 8.6-8.7 kg on average per day during the six months of lactation, which is significantly higher in comparison with the camels of the Kazakh bactrian breed (5.6±0.22), but lower in comparison with Arvana (11.0±0.23 kg) and the Kazakh dromedary (10.5±0.19 kg).

Table 10 shows the results of research of the average daily milk yield and the fat content in milk, depending on the shape of the udder. The feale camels were divided into five groups according to the shape of the udder: cup-shaped, rounded, lobular, and primitive. For each experimental group, subgroups were formed according to the shape of the udder. In each subgroup, 10 heads of milking female camels were studied.

Table 10 – Average daily milk yield and fat content in milk for female camels depending on the shape of the udder

Group of animals	Indicators	Shapeoftheudder			
		cup-shaped	rounded	lobular	primitive
Kazakh Bactrian (n=10, Σ_n=40)	dailymilkyield, kg	6.5±0.15	5.8±0.14	4.3±0.17	3.3±0.22
	fat, %	5.34±0.07	5.32±0.06	5.31±0.08	5.31±0.11
	protein, %	3.39±0.03	3.39±0.03	3.38±0.04	3.38±0.04
Arvana (n=10, Σ_n=40)	dailymilkyield, kg	12.2±0.11	10.3±0.16	8.5±0.24	7.1±0.25
	fat, %	3.3±0.07	3.3±0.07	3.28±0.09	3.26±0.09
	protein, %	3.1±0.04	3.1±0.04	3.09±0.05	3.07±0.05
Kazakh dromedary (n=10, Σ_n=40)	dailymilkyield, kg	11.8±0.12	10.5±0.19	8.8±0.21	6.7±0.28
	fat, %	4.43±0.06	4.43±0.06	4.42±0.04	4.39±0.07
	protein, %	3.48±0.04	3.48±0.04	3.48±0.03	3.47±0.03
«Aidaramir-kurt» F_4 (n=10, Σ_n=40)	dailymilkyield, kg	10.2±0.19	9.7±0.21	7.1±0.26	6.3±0.31
	fat, %	4.27±0.08	4.27±0.08	4.25±0.08	4.22±0.08
	protein, %	3.51±0.05	3.50±0.04	3.48±0.03	3.46±0.03
«Ardas» F_4 (n=10, Σ_n=40)	dailymilkyield, kg	10.8±0.22	9.4±0.21	8.2±0.27	5.9±0.33
	fat, %	4.21±0.07	4.21±0.07	4.21±0.08	4.21±0.08
	protein, %	3.50±0.05	3.48±0.04	3.48±0.02	3.46±0.02

It was established that the female camels in all the experimental groups with the cup-shaped form of the udder significantly exceed the individuals with rounded ($P < 0.01$), lobular ($P < 0.01$) and primitive ($P < 0.01$) udders according to the average daily milk yield.

The parameters of the variation in fat content, protein in milk, depending on the shape of the udder, are insignificant. Therefore, it is necessary to strengthen breeding and stock work on the purposeful acquisition of milking herds of camels with cup-shaped and rounded udders.

Due to the fact that in all camel breeding farms in the south of Kazakhstan, 210 day milking is mainly practiced, we analyzed the dairy productivity of the female camels of the experimental groups with cup-shaped, round, lobular and primitive forms of the udder (table 11).

Table 11 – Dairy productivity of female camels with different shapes of the udderfor 210 days of lactation

Group of animals	Indicators	Shapeoftheudder			
		cup-shaped	rounded	lobular	primitive
Kazakh Bactrian (n=10, Σ_n=40)	X ± mx	1185.7±27.2	821.2±21.7	698.1±18.9	394.5±28.1
	%	100	67.7	51.8	27.9
Arvana (n=10, Σ_n=40)	X ± mx	2271.4±35.6	1968.8±29.3	1475.3±27.1	1052.1±31.5
	%	100	77.8	64.8	54.0
Kazakh dromedary (n=10, Σ_n=40)	X ± mx	1869.2±23.9	1711.7±28.1	1592.3±29.8	1385.6±27.9
	%	100	88.9	65.6	42.7
«Aidaramir-kurt» F_4 (n=10, Σ_n=40)	X ± mx	1745.3±29.1	1634.2±25.4	1514.6±29.5	1405.8±33.8
	%	100	88.6	63.5	38.4
«Ardas» F_4 (n=10, Σ_n=40)	X ± mx	1806.8±32.3	1618.5±30.1	1485.3±38.2	1374.7±41.2
	%	100	915	57.8	45.6

Camels with cup-shaped udders produce 8.5 to 32.3% more milk compared to individuals with rounded udder forms, 44.2 to 48.2% more compared to individuals with lobular udders, 46.0 to 72.9% more in comparison with herdmates with the primitive forms of the udder.

Based on the conducted studies, we consider it necessary to complete a herd of female camels for industrial production of milk with cup-shaped and round forms of the udder.

Female camels of the Dromedary group of the Kazakh type F_4 exceed the thoroughbred herdmates in height at the withers, oblique body length, metacarpus circumference. In the Kazakh bactrian camels, the height between the humps was 172.4 cm, the oblique body lenght was 158.8 cm, the chest circumference was 231.5 cm, and the metacarpus circumference was 21.2 cm (table 12).

Table 12 – Body measurements of the experimental female camels (n=40, Σ_n=200), cm

Group	height at withers	oblique body length	chest circumference	metacarpus circumference
Kazakh Bactrian	172.4±2.5	158.8±1.3	231.5±2.8	21.2±0.1
Arvana	185.3±2.3	156.5±1.7	215.9±2.5	19.5±0.2
Kazakh dromedary	182.2±1.5	152.7±1.4	218.2±2.9	20.0±0.1
«Aidaramir-kurt» F_4	186.1±2.1	160.0±1.1	234.5±2.1	20.5±0.2
«Ardas» F_4	188.7±1.8	159.4±1.6	239.3±1.9	20.5±0.1

Body measurements in Arvana camels were 185.3-156.5-215.9-19.5 cm, the Kazakh dromedary - 182.2-152.7-218.2-20.0 cm, Aidaramir-kurt F_4 - 186.1 -160.9-234.5-20.5 cm, Ardas F4 - 188.7-159.4-239.3-20.5 cm.

*Meatproductivity.*At the 30-month-old age, the control slaughter of the experimental male camels was carried out (table 13).

Table 13 – Results of control slaughter of experimental male camels aged 2.5 years old (n=5; Σ_n=25)

Characteristics	Group				
	Kazakh Bactrian	Arvana	Kazakh dromedary	«Aidaramir–kurt» F_4	«Ardas» F_4
Preslaughterliveweight, kg	343.2±8.1	362.7±6.4	335.9±7.3	394.8±8.5	412.3±9.1
Hotcarcassweight, kg	162.0±3.8	169.7±3.4	159.5±3.1	192.3±4.2	199.1±3.7
Hotcarcassoutput, %	47.2	46.8	47.5	48.7	48.3
Weight of hump fat, kg	15.4±0.3	17.3±0.4	13.5±0.3	16.6±0.3	17.2±0.3
Output ofhump fat, %	4.48	4.76	4.01	4.20	4.17

The results of the research showed that the slaughter yield of carcass without the index of hump fat is 47.2% for the Kazakh bactrians, 46.2% for arvana, 47.5% for the Kazakh dromedary, 48.7% for Aida-ramir-kurt and 48.% for Ardas F_4. The output of the hump fat varies from 4.01% to 4.76%. According to the degree of accumulation of hump fat, the camels of the dromedary group F_4 are inferior to arvana, and occupy an intermediate indicator between the Kazakh Bactrian and the Kazakh dromedary.

4. Selective-genetic and productive profile of camels F_5 (28.1%td, 15.6%kb, 56.2%kd). The object of the study was the fifth-generation hybrid camels F_5 Sannak and Aidaramir from the camel breedng farm of Taushyk LLP in the Tupkaragan district of Mangistau region.

Sannak $F_5$is a group of hybrid camels of the fifth generation F_5 (28.1% of the Turkmen dromedary's blood, 15.6% of the Kazakh Bactrian's blood, and 56.2% of the Kazakh dromedary's blood), obtained by the absorbing crossing of the fourth-generation hybrid of Ardas F_4 with themales of the Kazakh dromedary.

Aidaramir F_5 – is a group of hybrid camels of the fifth generation F_5 (28.1% of the Turkmen dromedary's blood, 15.6% of the Kazakh Bactrian's blood, and 56.2% of the Kazakh dromedary's blood), obtained by absorbing crossing of the fourth-generation female hybrids of Aidaramir-kurt F_4 with males of the Kazakh dromedary.

Table 14 shows the zootechnical characteristics of camels-producers of the dromedary groupF_5 (28.1%td, 15.6%kb, 56.2%kd).

Lek producers F_5 (28.1%td, 15.6%kb, 56.2%kd)are characterized by live weight of 616.6 kg average, wool shorn - 5.7 kg, output of pure fiber - 93.3%, height at the withers - 195.5 cm, oblique body length - 167.7 cm, chest circumference - 224.6 cm, Metacarpus circumference - 25.1 cm.

FemalecamelsF$_5$ (28.1%td, 15.6%kb, 56.2%kd) have an average live weight of 550.2±19.3 kg, wool shorn of 3.3±0.09 kg, a pure fiber output of 93.8±0.1%. Body measurements averaged 188.8 - 164.5 - 217.2 - 19.5 cm (table 15).

Table 14 – Zootechnical characteristics of the camels-producers

Indicators	F_5 (28.1%td, 15.6%kb, 56.2%kd)		
	«Sannak»	«Aidaramir»	Average
Number of heads	5	5	10
Live weigt, кг	620.8±9.3	612.4±8.5	616.6±17.9
Production of wool, kg	5.5±0.2	5.9±0.3	5.7±0.2
Outputofpurefiber, %	93.5±0.3	93.1±0.3	93.3±0.2
Heightatwithers, cm	195.7±1.6	195.3±1.8	195.5±2.1
Obliquebodylength, cm	168.8±1.2	166.7±1.4	167.7±1.3
Chestcircumference, cm	223.5±3.7	225.7±3.3	224.6±3.2
Metacarpus circumference, cm	24.8±0.12	25.3±0.11	25.1±0.1

Table 15 - Zootechnical characteristics of the female camels

Characteristics	F_5 (28.1%td, 15.6%kb, 56.2%kd)		
	«Sannak»	«Aidaramir»	Average
Number of heads	50	50	100
Live weigt, кг	565.5±22.1	534.9±16.7	550.2±19.3
Production of wool, kg	3.1±0.1	3.5±0.06	3.3±0.09
Outputofpurefiber, %	93.4±0.2	94.2±0.1	93.8±0.1
Heightatwithers, cm	188.6±1.6	189.0±1.4	188.8±1.2
Obliquebodylength, cm	163.4±1.2	165.6±1.1	164.5±1.3
Chestcircumference, cm	220.1±2.5	214.3±2.1	217.2±2.3
Metacarpus circumference, cm	19.8±0.2	19.3±0.1	19.5±0.1

From there, we began to practice breeding of the Kazakh-type dromedary F_5 (28.1%td, 15.6%kb, 56.2%kd) in itself.

*Dairy productivity.*The process of formation of dairy productivity in camels of different breeds has its own characteristics (table 16).

Table 16 – Parameters of dairy productivity of the experimental camels

Breed	Number of heads	Live weight, kg	Milk yield for 240 days of lactation	Fat	Protein
Kazakh bactrian	20	548.2±14.5	1371.9±25.4	5.43±0.08	3.41±0.02
Turkmen dromedary Arvana	20	482.6±7.1	2762.5±37.6	3.22±0.07	3.11±0.04
Kazakh dromedary	20	491.9±9.5	2293.7±29.2	4.41±0.06	3.54±0.04
«Sannak» F_5	20	552.5±11.3	1991.4±27.5	4.32±0.07	3.52±0.03
«Aidaramir» F_5	20	548.9±9.1	2217.2±19.1	4.32±0.07	3.51±0.03

In the live weight, the effect of heterosisis observed. All fifth-generation female camels of "Sannak" and "Aidaramir" exceed their thoroughbred herdmates in terms of live weight ($P \leq 0.001$). Female camels "Sannak" F_5 have an average live weight of 552.5±11.3 kg, and "Aidaramir" F_5 shows 548.9±9.1 kg. Camels of the Kazakh bactrian produce more fatty milk. Milking female camels of the Arvana breed give milk with less fat and protein.

Kazakh dromedaries, as well as female camels F_5 (28.1%td, 15.6%kb, 56.2%kd) produce milk with high protein content.

The "Sannak" F_5 female camels (28.1%td, 15.6%kb, 56.2%kd) for 240 days gave 1991.4±27.5 kg, with an average fat content of 4.32±0.07% and protein in milk 3.52±0.03%.

From the female camels of Aidaramir F5 (28.1%td, 15.6%kb, 56.2%kd) for 240 days of lactation 2217.2±19,1 kg were received.

*Meat productivity.*The production live weight was 328.2 kg for the Sannak males, 325.4 kg for the Aidaramir, and on the average for the Kazakh dromedary type F_5 (28.1%td, 15.6%kb, 56.2%kd) of 326.3±11.5 kg (table 17).

Table 17 – Results of control slaughter of 30-month-old male dromedaryF_5 (28.1%td, 15.6%kb, 56.2%kd)

Characteristics	F_5 (28.1%td, 15.6%kb, 56.2%kd)		
	«Sannak»	«Aidaramir»	Average
Production live weight	328.2±12.6	325.4±9.9	326.3±11.5
Removableliveweight, kg	432.1±9.5	413.5±7.7	422.8±11.9
Preslaughterliveweight, kg	419.5±8.2	388.3±6.8	403.9±6.4
Slaughterweight, kg	226.9±5.1	210.8±4.2	218.9±4.7
Slaughter output, %	54.1±0.3	54.3±0.3	54.2±0.2

After fattening, the live weight significantly increases in Sannak to 432.1 kg, in Aidaramir to 413.5 kg. After starvation, the live weight decreases on average by 6-8%, in particular in males of "Sannak" to 419.5 kg, "Aidaramir" to 388.3 kg. The slaughter output is on average 54.2±0.25.

Discussion. The development of stock and productive camel breeding is one promising direction for the development of free-range animal husbandry, as it involves an increase in the production of ecologically friendly and curative dairy products, camel wool and leather raw materials with high export potential [35-37].

Currently, according to the Statistics Committee of the Ministry of the National Economy of the Republic of Kazakhstan, as of January 1, 2017, the number of camels in all categories of farms exceeds 175 thousand heads, of which 70.8% are concentrated in personal subsidiary farmings. The share of the breeding stock of camels in the overall structure does not exceed 2.5%, while world experience shows that satisfying the demand for camel and dairy products in sufficient volume is impossible without the development of the breeding stock. It is necessary in the next 20 years to increase the share of brood camels to 50%.

The use of new achievements in genetics and selection in camel breeding will allow to develop the effective methods of selection and assortment of animals, with the further formation of unique herds of milking camels of the dromedary and bactrian group, with a stable genotype and high genetic potential [38-40].

Kazakhstan is a unique center on the Eurasian continent where it is possible to breed dromedary (single-humped camels), bactrian (two-humped camels) by thoroughbred breeding, and also to practice interbreeding and interspecific hybridization.

Kazakhstan is the birthplace of a unique breed of camels - the Kazakh Bactrian, which is considered to be the national property of the whole nation. The genetic diversity of camels in Kazakhstan creates all the prerequisites for the successful development of both stock and productive camel breeding. By means of interspecific hybridization of camels, a unique collection is created, including 30 generations, which has no analogues in the world. Some generations of interspecific hybrids are able to produce "a similar offspring".

A purposeful selection of camels aiming at increasing the protein coefficient is carried out [41-43]. Studies are continuing to improve the technology of camel maintenance and feeding, taking into account food resources and natural and climatic zones of Kazakhstan [44-47].

The use of new achievements in genetics and breeding in camel husbandry will allow to form the unique herds of milking female camels of the group dromedaries and bactrians, with a stable genotype and a high genetic potential [48-50].

A promising direction is the creation of new assortments and names of dairy products, taking into account the requirements of the EAEU, the needs of the population and the export potential of each region of Kazakhstan.

Camel hasbundryis mistakenly considered as a low-cost sub-sector of productive free-range animal husbandry, so the state support is minimized, in comparison with dairy and meat cattle breeding, as well as sheep breeding. To increase the production of camel breeding for a wide range of consumers, it is necessary to create prerequisites for increasing the number of stock highly milking and meat and dairy camels to 350,000 in the coming years. In the long-term future, to bring the number of camels to 1 million. It should be noted that without the State support in the form of subsidizing stock camel breeding for the production of a unit of milk, meat and wool products, it is impossible to interest every inhabitant of the village, head of farm, cooperative and LLP, to maintain camels, to conduct systematic breeding and stock work to increase the genetic potential and productivity, implementation of developments of domestic scientists.

Thus, Kazakhstan's camel breeding needs to be developed, relying on the genetic resources of the highly productive breeds and camel genotypes [51].

In the world community, for the production of fermented milk products, cow milk is often used, and in Kazakhstan camel milk may become the main raw material in dietetics for the coming years.

Conclusions. For the first time, camels of hybrid origin F_2 (25%td, 25%kb, 50%kd), F_3 (12.5%td, 62.5%kb, 25%kd), F_4 (56.25%td , 31.25%kb, 12.5%kd), F_5 (28.1%td, 15.6%kb, 56.2%kd), the thoroughbred Kazakh bactrians of the South Kazakhstan type and Mangistau population, arvana - the Turkmen dromedary, the Kazakh dromedary, bred in South Kazakhstan and Mangistau regions of the Republic of Kazakhstan.

The genetic potential of live weight and dairy productivity is established. The results of the research showed the efficiency of breeding hybrid camels for the production of camel milk, in view of the optimal ratio of milk fat and protein.

Camels of the Kazakh dromedary and hybrid origin F_2 (25%td, 25%kb, 50%kd), F_3 (12.5%td, 62.5%kb, 25%kd), F_4 (56.25%td, 31.25%kb, 12.5%kd), F5 (28.1%td, 15.6%kb, 56.2%kd) of the meat and milk production direction have one compact hump of medium size - 2/3 of the oblique body length. Head profile is hook-nosed. The profile of the neck from the base of the neck to the head without bends is straight. The main color of the fleece (wool) is brown and sandy, without additional coloring.The main color of the covering hair is brown and sandy, there is an additional color that does not exceed 10% of the total population. The thickness of the skin is generally thick of 5-7 mm. The length of the mane is short to 25 cm. The fringe is medium-sized, 2/3 of the oblique body length. The yield of pure wool fiber is 90-94%. The bang on the head s shortened. There is a fringe of wool on the forearm, the so-called breeches, lenght of up to 5 cm (short). There is a mane on the neck, length of 12-17 cm (classified as short to 15 cm, average 15-25 cm). There is a fringe of wool on the shoulder blade, the so-called epaulet, 3-5 cm long.

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ҚАЗАҚСТАНДЫҚ ПОПУЛЯЦИЯДАҒЫ ӨНІМДІ БЕЙІМДЕГІ ӘРТҮРЛІ ГЕНОТИПТІ ТҮЙЕЛЕРДІҢ ГЕНЕТИКАСЫ

Аннотация. Салыстырмалы аспектте түйелердің гибридтік шығу тегі F_2 (25%td, 25%kb, 50%kd), F_3 (12,5% td, 62,5% kb, 25% kd), F_4 (56,25% td, 31,25% kb, 12,5% kd), F_5 (28,1% td, 15,6% kb, 56,2% kd) алғаш зерттелген. Оңтүстіктік Қазақстандық типтегі Маңғыстаулық популяциядағы таза тұқымды қазақтың бактриандары, түркмен дромедары – арвана, қазақтың драмедары Қазақстан Республикасының Оңтүстік Қазақстан және Маңғыстау облысында өсіріледі.

Түйе топтарының генетикалық профилі анықталған, тірілей салмағы, сүт өнімділігі, жүн қырқымы, дене өлшемдері зерттелген. Зерттеудің нәтижесі көрсеткендей, өсіріліп жатқан гибритті драмедар түйе тобының аналықтарынан сүт өндіргенде сүттің майлылығы мен ақуыз арақатынасы тиімді.

Өсіруге жарамды Арада F_5 (28,1% td, 15,6% kb, 56,2% kd) қазақтың дромедар типті түйелерінің фенотиптік профилі анықталды. Тұлғасының қиғаш ұзындығының 2/3 бөлігін шағын өркеш алып жатыр түйенің. Түйе басының пішіні дөңмұрын. Мойынның пішіні, мойынның негізінен басына дейін иілмеген түзу келеді. Негізгі түсі жабағы (шудасы) жүннің қара қоңыр және сұр, және жалпы бастың 10% аспайтыны қосымша түстер.

Түйін сөздер: генетика, сүт өнімділігі, қазақтың бактриандары, арван, қазақтың драмедары, гибриттер.

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ГЕНЕТИКА ПРОДУКТИВНОГО ПРОФИЛЯ ВЕРБЛЮДОВ РАЗНЫХ ГЕНОТИПОВ КАЗАХСТАНСКОЙ ПОПУЛЯЦИИ

Аннотация. Впервые изучены, в сравнительном аспекте верблюды гибридного происхождения F_2 (25%td, 25%kb, 50%kd), F_3 (12,5%td, 62,5%kb, 25%kd), F_4(56,25%td, 31,25%kb, 12,5%kd), F_5 (28,1%td, 15,6%kb, 56,2%kd), чистопродные казахские бактрианы южно-казахстанского типа и мангистауской популяции, арвана – туркменский дромедар, казахский дромедар, разводимые в Южно-Казахстанской и Мангистауской областях Республики Казахстан.

Установлен генетический профиль живой массы, молочной продуктивности, настрига шерсти, промеров тела изученных групп верблюдов. Результаты исследования показали, эффективность разведения гибридных верблюдоматок группы дромедар для производства верблюжьего молока, в виду оптимального соотношения молочного жира и белока.

Определен фенотипический профиль веблюдов казахских дромедаров типа Арада F_5 (28,1%td, 15,6%kb, 56,2%kd), пригодные к разведению « в себе».У верблюдов один компактный горб средней величины – 2/3 косой длины туловища. Профиль головы горбоносый. Профиль шеи от основания шеи до головы без изгибов – прямой. Основная масть руна (шерсти) бурая и песчаная, без дополнительной окраски. Основная окраска кроющего волоса – бурая и песчаная, имеется дополнительная окраска, не превышающая 10% от общего поголовья.

Ключевые слова: генетика, удой молока, казахский бактриан, арвана, казахский дромедар, гибриды.

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www:nauka-nanrk.kz

ISSN 2518-1467 (Online), ISSN 1991-3494 (Print)

http://www.bulletin-science.kz/index.php/ru/

Редакторы *М. С. Ахметова, Т. М. Апендиев, Д. С. Аленов*
Верстка на компьютере *Д. Н. Калкабековой*

Подписано в печать 16.02.2018.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
14,2 п.л. Тираж 2000. Заказ 1.