

Original Article

Biological and productive features of camel breeds bred in Kazakhstan

Características biológicas e produtivas das raças de camelo criadas no Cazaquistão

E. Razuan^{a*} , A. Ombayev^a , S. Mirzakulov^b , B. Buralkhiyev^a  and A. Kozhabergenov^a 

^aNJSC “Kazakh National Agrarian Research University”, Almaty, the Republic of Kazakhstan

^bJSC «Almaty Technological University», Almaty, the Republic of Kazakhstan

Abstract

The article provides a comprehensive analysis of the productivity and biological characteristics of camel breeds, which are one of the main branches of animal husbandry grown in desert and semi-desert regions of Kazakhstan. Kazakh Bactrian breeds have less milk than Turkmen dromedary breed, but it has a higher fat and protein content. The milk of camel breeds is secreted by a conditioned reflex during molting, so it is worth considering that when milking them, it is necessary to see its colt. In general, the milk of the listed camel breeds is very abundant in the third month after the start of milking. The demand of the Kazakhstan population for camel products is growing from year to year. Camels are used as meat, dairy and wool animals, and food products obtained from them in the desert – semi-desert zone of the Republic are considered the main types of products (meat, milk and shubat) consumed daily by the population. As a result of the study, the breed characteristics of Kazakh Bactrian and Turkmen dromedary camels were widely confirmed by the results of separate studies, as well as a literary review. The results of research in the areas of breeding and milk and meat productivity of high-yielding camel breeds are presented. The reproduction of Kazakh Bactrian and Turkmen dromedary camel breeds in the period from birth to three years is relatively determined.

Keywords: bactrian, dromedary, milk, live weight, milk fat content, body size, productivity, colt, female camel, camel, region.

Resumo

O artigo apresenta uma análise abrangente da produtividade e das características biológicas das raças de camelos, que são um dos principais ramos da criação animal cultivada em regiões desérticas e semidesérticas do Cazaquistão. As raças cazaques de camelos bactrianos produzem menos leite do que a raça dromedária turcomena, mas têm maior teor de gordura e proteína. O leite das raças de camelos é secretado por um reflexo condicionado durante a muda, por isso vale a pena considerar que, ao ordenhá-las, o potro precisa estar presente. Em geral, o leite das raças de camelos listadas é muito abundante no terceiro mês após o início da ordenha. A demanda da população do Cazaquistão por produtos derivados de camelo cresce ano a ano. Os camelos são utilizados para a produção de carne, laticínios e lã, e os produtos alimentícios obtidos deles na zona desértica e semidesértica do país – como carne, leite e *shubat* – são considerados itens essenciais no consumo diário da população. Como resultado do estudo, as características da raça dos camelos camelos bactrianos cazaques e dos dromedários turcomenos foram amplamente confirmadas pelos resultados de estudos separados, bem como por uma revisão bibliográfica. São apresentados os resultados da pesquisa nas áreas de criação e produtividade de leite e carne de raças de camelos de alto rendimento. A reprodução das raças de camelos bactrianos cazaques e dromedários turcomanos no período do nascimento aos três anos é relativamente determinada.

Palavras-chave: bactriano, dromedário, leite, peso vivo, teor de gordura do leite, tamanho corporal, produtividade, potro, camelo fêmea, camelo, região.

1. Introduction

Kazakhstan is the fifth country in the world in terms of total pasture land area (187 million hectares), of which 126 million hectares cover desert and semi-desert areas.

In desert and semi-desert regions, the main types of livestock are camels, Karakul sheep, local coarse-haired

Kazakh sheep, goats and horses. Due to the scarcity of feed resources in these regions, the cultivation of dairy cattle is unprofitable. Even beef cattle have low productivity.

Camel breeding is one of the traditional branches of animal husbandry in our country. More than 64%

*e-mail: razuanergali@gmail.com

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(116 million ha) of all pasture land in the Republic can be used as efficiently as possible by raising camel cattle, which opens up a wide path to the development of this industry. The Kazakh people considered the sacred animal, whose meat and milk were both food and healing medicine, wool – clothing, and a reliable vehicle, the judge of four animals (Ombayev, 2019; Baimukanov et al., 2018; Baimukanov et al., 2019).

Camel breeding in the country has developed at different rates, depending on objective and subjective conditions. In 1920, 669.8 thousand individuals of camels were raised in Kazakhstan, and in 1941, due to the policy of forced collectivization, their number decreased to 104.6 thousand. For almost 70 years after that, the number of livestock ranged from 105.0 to 154.0 thousand, the maximum indicator was reached in 1994 (153.9 thousand). From 1980 to 1995, 5.0–9.0 thousand tons of camel meat, 4.5–5.0 thousand tons of shubat, 700–1000 tons of wool were produced annually. According to the Ministry of Agriculture of the Republic of Kazakhstan on January 1, 2024, the number of camels in the country is 282.8 thousand individuals (Ombayev et al., 2023).

As a result of scientific and production experiments, it was proved that the most common camel breed in Kazakhstan, the double-humped Kazakh camel, is the main way to produce cheap and high-quality camel meat. Camels quickly turn brown in spring and autumn pastures. First of all, it is necessary to combine camel breeding with shubat production. In meat-producing camel farms, along with the double-humped Kazakh camel, it is most profitable to breed hybrids obtained by crossing their females with the Kalmyk and Turkmen stud camels. Hybrid young stud camels weigh 80–120 kg more than local young camels. The slaughter yield of two- and three-year old camels fattened on pastures reaches 51.7–52.5%, in large adult camels – 55–58%.

Three independent types of camels of the Kazakh Bactrian breed are bred in certain ecological zones: the Ural-Bokeyev type is concentrated in the steppe zone of the Bokeyorda District of the West Kazakhstan region, in the Shalkar District of the Aktobe region and in the Kurmangazy District of the Atyrau region. Kyzylorda type – distributed in all camel breeding areas of Kyzylorda and Karaganda regions. The South Kazakhstan type is most common in South Kazakhstan, Zhambyl, Almaty regions. In the conditions of the Caspian lowland, Mangystau and Western populations are common. Mangystau populations of Kazakh Bactrian camels are distributed in the conditions of the Mangyshlak Peninsula. The Western type of Kazakh Bactrian camels is distributed in Zhylyoi, Makhambet, and Inder districts of Atyrau region (Baimukanov and Ombayev, 2009).

The healing properties of camel milk and shubat have been known since ancient times. Shubat was used as a product of animal origin with high healing properties for diseases of the lungs, stomach, various chronic diseases, as well as for weakening of the body and poisoning in general.

The healing properties of camel milk and shubat were given great importance by the Chinese in later times. Even in the Altai region of China, a special plant for the production of camel milk powder and long-term storage

of camel milk has been opened, providing it to non-camel regions of the country, including Shanghai.

One of the valuable products obtained from camels is wool. It is a valuable raw material for the textile industry in terms of its technological properties. In the Republic of Turkmenistan and in the south-western regions of Kazakhstan, camel wool is used for carpet weaving. Products made of camel wool are light, warm, as well as durable, stretchy. Among the countries, folk medicine methods are widespread, such as wearing flat belts for people with back pain, pressing on a body part where serum is collected in hot water. Long fiber camel wool woven fabrics are often used to make blankets. In the production of Mechanical Engineering from camel wool, belts of drilling rigs are manufactured. The fact that one of the tissues of the inner light clothing of astronauts is woven from camel wool also indicates the high quality of this raw material (Baimukanov et al., 2021; Ombayev et al., 2004b).

Successful development of camel breeding in the future requires mechanization of manual labor – such as milking, wooling, bathing of camels. For the successful development of camel breeding and increasing the production, the main attention should be paid to the continuous improvement of the breed and productive qualities of livestock, the widespread use of stud camels obtained from breeding farms in commercial farms.

2. Materials and Methods

Research work was carried out in 2021–2023 on the farms of the Turkestan region with camel breeds of Kazakh Bactrian and Turkmen dromedary.

Camels of the Kazakh Bactrian breed are small animals with a balanced body structure, short legs, deep breasts. It is very wooly, cold-resistant, well adapted for cultivation in desert-semi-desert arid steppe sandy regions. Due to the different weather conditions and pastures of the vast Kazakh land, the Kazakh Bactrian camel has a different family structure.

The body of Turkmen dromedaries is fragile compared to Kazakh double-humped camels. The fragility of the camel's body is distinguished by the lightness of its skull, the thinness of its neck, the thinness of its bones, the thinness and elasticity of its skin, and the thinness of its fur. Purebred dromedaries have only one compact hump, which is slightly shifted back and does not cover the area of the withers. Long-bristled fur in the shoulder area is the most reliable distinguishing feature of purebred aruanas.

Changes in the live weight and average daily weight gain of camel breeds were determined by pulling on the scales at birth, at the age of six, twelve, eighteen, twenty-four, thirty months.

The main physical dimensions of the camel were determined according to the method used in general. The height and body length of the withers, the heart and metacarpal girth were determined by the approach of I. I. Lacosa.

Milking camels were milked two (morning, evening) and three (morning, noon, evening) times daily. According to the technology established in camel breeding until the

age of 8 months, the colts of controlled female camels spent 15-20 days with their mother-in-law in a natural pasture, in the evening in a barn. Mother camels, grouped in milking groups, milked three seasons from 1 to 11 months, two seasons from 12 to 17 months.

3. Results and Discussions

In subsequent years, farmers in the south-west and south-east regions of Kazakhstan turned to the breeding of local Kazakh double-humped Bactrian camels, as well as Turkmen single-humped dromedary camels. The single-humped Turkmen aruana feels good in hot areas of the desert and semi-desert regions of Kazakhstan and Central Asia, the double-humped Kazakh camel breed can be bred in such hot places as well as in flat regions with frosty winters and show a rich yield characteristic of this breed.

In general, knowledge of the laws of growth and maturation of camel animals is very relevant from a scientific point of view, in terms of economic needs. After all, the formation of a young camel in the direction necessary for the farm directly depends on the characteristics of its individual growth and maturity.

According to the results obtained in the research conducted at the farm "Usenov N" in the Mayakum settlement of Otrar District of Turkestan region, the living weight and body shape of the descendants of the Turkmen dromedary camel breed and the Kazakh Bactrian camel breed from birth to 30 months of age correspond to the average indicators of these camel breeds. (Table 1).

According to Table 1, Kazakh Bactrian camel female colts weigh 33.7 kg, male ones - 37.9 kg, Turkmen dromedary camel colts weigh 35.1 kg and 38.7 kg, respectively. The difference between the live weight of colts depending on the camel breed is maintained at the age of 6 and 12 months, and the live weight of the Turkmen dromedary colts at the age of 12 months is 279.9 kg and 285.5 kg depending on gender, and in the Kazakh Bactrian colts - 277.7 and 283.5 kg, respectively. No significant difference between the live weight of young camels at the age of 30 months was observed. Of particular importance is the fact that the live weight of the Kazakh Bactrian female camels was 1.9% higher than that of the Turkmen dromedary camel breed, and 2.7% higher than male ones, and 5-year-old camels - 5.3 and 12.2%, respectively, depending on the breed and gender.

The Kazakh Bactrian and Turkmen dromedary in the experimental groups showed that the rate of growth of live weight of colts in the period from birth to six months of age, regardless of which gender they belong to, is very high. The natural weight gain of female and male Kazakh Bactrian colts at the age of six months from birth was 146.2 and 150.8 kg, respectively, while the natural weight gain of Turkmen dromedary colts was 146.6 and 152.8 kg, respectively. The average daily weight gain between six months and twelve months of colts was 64.8% compared to the first six months, and 35.2% between twelve and thirty months. Thus, the process of growth of the main live weight of Kazakh Bactrian and Turkmen dromedary camel breeds reaches its peak in the period up to six months of age, in the future, weight gain, changes in body shape, adaptation of the body to the natural environment, and other characteristics of the animal world are formed.

Thus, the Kazakh Bactrian showed that the camel breed can effectively use its ability to grow, obtaining the necessary nutrients for the body as a breed formed by local weather, natural pastures.

According to the data obtained in the experiment, the features of the difference in the size of the body shape depending on the camel breeds with the live weight of milking camels over 5 years old were studied (Table 2).

According to the data obtained, the average live weight of Kazakh Bactrian and Turkmen dromedary camel breeds aged five years and older was 514.05.7 kg, with a deviation of 2.67%, respectively; 504.05.3 kg, with a deviation of 2.77%.

In comparison with the Turkmen dromedary camel breeds, the difference was 3 cm in the withers height, 5 cm in the body length, 9 cm in the heart girth, and the difference in the metacarpal girth was not detected.

In camel breeding, it is especially important to study the dynamics of changes in the size of the body shape of camels in the period from the moment of birth to 30 months, since the physique of camel cattle is formed mainly from this period (Table 3).

Since the main product of this type of animal in camel breeding is milk, the dimensions of the body shape of female camels of the Turkmen dromedary and the Kazakh Bactrian camel breeds were studied in comparison. The difference in the withers height of 1-day-old colts was 1.2 cm, the oblique length of the trunk is 0.4, heart girth - 0.4, in 6-month-old colts - 3.8; 1.1; 2.4 cm, respectively,

Table 1. Changes in live weight of camel species from birth to 30 months by gender (n=5).

Age	Turkmen dromedary camel breed		Kazakh Bactrian camel breed	
	Female	Male	Female	Male
	$\bar{X} \pm mx$	$\bar{X} \pm mx$	$\bar{X} \pm mx$	$\bar{X} \pm mx$
1 day	35.1 $\pm$ 0.4	38.7 $\pm$ 0.5	33.7 $\pm$ 0.4	37.9 $\pm$ 0.4
6 months	181.7 $\pm$ 1.4	191.5 $\pm$ 1.4	179.9 $\pm$ 1.5	188.7 $\pm$ 1.3
12 months	279.7 $\pm$ 2.9	285.5 $\pm$ 5.1	277.7 $\pm$ 2.7	283.5 $\pm$ 5.1
18 months	325.4 $\pm$ 3.7	341.1 $\pm$ 5.4	324.9 $\pm$ 3.8	342.1 $\pm$ 5.3
24 months	355.7 $\pm$ 5.1	368.5 $\pm$ 5.9	354.9 $\pm$ 5.0	367.9 $\pm$ 5.7
30 months	398.0 $\pm$ 5.1	414.7 $\pm$ 4.7	397.7 $\pm$ 5.0	412.9 $\pm$ 4.8

Table 2. Body measurements and live weight of five and one older milking female camels (n=10).

Indicators	Turkmen dromedary camel breed		Kazakh Bactrian camel breed	
	X ± mx	C _v , %	X ± mx	C _v , %
Live weight. kg	514.0 ± 5.7	2.67	504.0 ± 5.3	2.77
Withers height	181.0 ± 0.9	2.48	178.0 ± 0.8	2.37
Body length. cm	157.0 ± 0.4	3.11	152.0 ± 0.3	3.17
Heart girth	217.0 ± 0.5	1.87	208.0 ± 0.5	1.93
Metacarpal girth	21.1 ± 0.1	1.71	21.2 ± 0.1	1.77

Table 3. Changes in body sizes in female camels from birth to 30 months of age (n=5).

Age	Withers height		Oblique length of the trunk		Heart girth		Metacarpal girth	
	X ± mx	C _v , %	X ± mx	C _v , %	X ± mx	C _v , %	X ± mx	C _v , %
Body measurements of Turkmen dromedary camels								
1 day	107.1 ± 1.1	2.8	58.9 ± 0.5	2.2	81.9 ± 2.2	6.4	11.1 ± 0.3	5.9
6 months	139.9 ± 2.7	4.3	88.5 ± 1.9	4.3	131.1 ± 3.2	5.7	12.1 ± 0.2	4.7
12 months	151.7 ± 2.2	4.3	116.9 ± 2.9	5.6	180.1 ± 2.9	3.9	14.9 ± 0.2	4.5
18 months	159.2 ± 3.9	4.4	121.7 ± 2.8	5.5	184.4 ± 3.1	3.8	16.4 ± 0.3	4.7
24 months	169.1 ± 3.2	4.4	133.4 ± 3.0	5.4	184.9 ± 3.1	3.8	17.5 ± 0.4	5.0
30 months	173.3 ± 2.2	2.9	136.1 ± 2.5	5.1	191.9 ± 3.2	3.6	18.4 ± 0.3	3.7
Body measurements of Kazakh Bactrian camels								
1 day	105.9 ± 1.4	2.7	88.1 ± 0.6	2.7	81.5 ± 0.6	4.7	12.7 ± 0.1	3.8
6 months	136.1 ± 1.6	2.7	87.4 ± 1.8	2.9	128.7 ± 2.8	4.4	13.4 ± 0.2	3.9
12 months	149.8 ± 2.4	3.1	114.9 ± 2.8	5.3	179.1 ± 2.9	3.8	16.2 ± 0.3	3.7
18 months	157.7 ± 3.2	3.1	119.5 ± 2.8	5.3	180.1 ± 2.9	3.8	17.7 ± 0.3	4.1
24 months	168.9 ± 3.2	4.1	131.9 ± 3.5	5.7	182.9 ± 3.7	4.5	18.2 ± 0.3	4.3
30 months	170.9 ± 3.3	3.7	133.9 ± 3.5	5.1	187.9 ± 3.3	4.9	19.5 ± 0.3	3.9

in 12-month-old - 1.9; 2.0; 1.0 cm, in 18-month-old colts - 1.5; 2.2; 4.3 cm, in 24-month-old colts - 2.0; 1.5; 2.0., in 30-month-old colts - 2.4; 2.2; 4.0 respectively.

According to the results of the study, the metacarpal girth of the Kazakh Bactrian camel breed at birth was 1.6; 1.3 at 6 months; 1.3 at 12 months; 1.3 at 18 months; 0.7 at 24 months; 1.1 cm at 30 months, respectively, unlike camels of the Turkmen dromedary camel breed.

According to the data obtained, a significant difference was not established, since the basic body size of camels of the Kazakh Bactrian and Turkmen dromedary camel breeds mainly correlated with the average indicators corresponding to these breeds.

The result of comparing the milk yield of Turkmen dromedary and Kazakh Bactrian camels was that their daily milk yield during three milking periods (April -

February of the next year) was 6.07-12.27 L and 4.95-8.89 l, respectively, and the maximum milk yield in July, August and September was 10.71-12.27 and 8.20 - 8.89 l (Table 4).

Analyzing the data obtained, it was found that the highest milk yield was observed in the first six months of the milking season, which in the spring and summer months accounted for 65% of all milk productivity in the milking season. And since January, the milk yield of younger ones begins to decrease sharply.

If we take the milk yield of Kazakh Bactrian and Turkmen dromedary camels in the first month of the milking season as 100%, the milk yield of the second month is 117.0 - 107.4%, the third 121.2 - 106.3%, the fourth 136.9 - 116.4%, the fifth 148.4 - 125.4%, the sixth 134.6 - 129.0%, the seventh 134.7 - 108.6%, the eighth 122.0 - 89.5%, ninth 109.9 - 85.5%, tenth 85.1 - 76.6%,

Table 4. Average daily milk yield of dairy camels (n=30).

Milking months	Two times milking		Three times milking	
	Kazakh Bactrian breed	Turkmen dromedary breed	Kazakh Bactrian breed	Turkmen dromedary breed
April	-	-	6.19± 0.12	9.51 ± 0.10
May	-	-	7.01±0.12	9.88±0.09
June	-	-	7.50±0.09	10.11±0.09
July	-	-	8.20±0.10	10.71±0.09
August	-	-	8.89±0.10	11.54±0.10
September	-	-	8.35±0.12	12.27±0.10
October	-	-	8.07±0.14	10.01±0.09
November	-	-	7.55±0.14	8.51±0.10
December	-	-	6.58±0.16	7.87±0.10
January	-	-	5.10±0.17	7.05±0.12
February	-	-	4.95±0.14	6.07±0.11
March	3.50±0.16	5.19±0.13	-	-
April	3.47±0.15	5.20±0.13	-	-
May	2.91±0.18	4.87±0.14	-	-
June	2.17±0.19	4.41±0.15	-	-
July	2.15±0.17	3.92±0.17	-	-
August	1.91±0.17	2.05±0.17	-	-
Average	5.56±0.14	7.60±0.15		

eleventh 74.6 - 59.6%, twelfth 58.4 - 56.4%, thirteenth 56.0 - 54.7%, fourteenth 48.6 - 52.9%, fifteenth 35.0 - 46.4%, sixteenth 35.7 - 42.6%, seventeenth month 31.9 - 22.2%.

In general, it was found that in farms, it is possible to increase the volume of milk produced from each dairy cattle by 1.5-2.0 times, extending the milking season from 9 to 17 months by grazing the Kazakh Bactrian and Turkmen dromedary female camels on natural pastures throughout the year, separating the colts from the mother at the age of 8-12 months.

In terms of nutritional value and taste, camel meat is not inferior to beef, it is considered a dietary dish, since it does not contain the inner layers of fat. Camel meat is rich in phosphorus, potassium, iron, vitamins B1, B2, B9, PP, C, E and A.

Table 5 lists the average slaughter yield of the Kazakh Bactrian and the Turkmen dromedary male camels, which shows the live weight before slaughter, weight after slaughter and slaughter yield, depending on the breed characteristics of camels raised under the same conditions of maintenance of the farm.

At the age of two to three years, Kazakh Bactrian male camels gained 92.1 kg, the difference in slaughter weight was 51.0 kg, the slaughter yield was 53.6-53.9%. Meanwhile, Turkmen dromedary male camels gained 96.4 kg during this period, the difference in slaughter weight was 48.4 kg, and the slaughter yield was 54.2-55.1%. Although there was a difference in the pre-slaughter weight of the Kazakh Bactrian and the Turkmen dromedary male camels of

47.0 kg at the age of two and 51.3 kg at the age of three, significant differences in the average slaughter yield were not detected.

As a result of the analysis of our own and research by scientists in this field, carried out with camel cattle in general, the significance of the biological features inherent in them was revealed.

It turns out that a camel loses 22 percent of its total weight during the 50°C heat without eating food for 8 days. Camel will not die even if it loses 40 percent of its body fluid, and a person will die if he loses 12 percent of his body fluid. Another secret of camel endurance in the desert is that during the day the body temperature can reach 41°C. On cold desert nights, however, body heat drops to 30°C. The cell membrane has the ability to prevent it from losing a lot of water. If there is a blood composition in the camel's body, water appears to flow freely in the blood vessel, even when it falls at the lowest level. In addition, the protein albumin, which increases thirst tolerance, is much more present in the blood than in other animals (Omar, 2010; Ombayev, 2012).

The camel's tolerance for both heat and cold is due to its hump. Indeed, the camel hump is considered a set of fat that regulates the need of the camel's body for water and nutrients necessary for the body. The steepness of the camel's hump indicates its strength, and poor grazing, lack of food needs, in difficult winter years, when it hurts for a long time in the spring, when it is strongly reduced, its hump is tilted to one side and significantly shrinks. Camel

Table 5. Average slaughter yield of camel breeds (n=3).

Camel breeds	Age of male camels	Pre-slaughter live weight, kg	Slaughter weight, kg	Slaughter yield, %
Kazakh Bactrian breed	Two years old	433.3 ± 2.13	232.7 ± 2.39	53.6 ± 0.37
	Three years old	525.4 ± 2.16	283.7 ± 1.96	53.9 ± 0.29
Turkmen dromedary breed	Two years old	480.3 ± 2.45	264.1 ± 1.53	55.1 ± 0.32
	Three years old	576.7 ± 2.94	312.5 ± 1.46	54.2 ± 0.22

humps are made up entirely of fat cells. The higher the fat content, the more rational it is for survival in a desert area. The fact that a camel's fat cells accumulate in its hump, and not in its stomach, as other mammals do, can protect it from the sun's rays. In addition, camels use their humps to expel excess heat from their bodies. How a camel can withstand water has long been of interest to human beings. It was only in the XIX century that opinions close to reality began to form. People believed that camels store water in the hump or stomach. And indeed, it turns out that the whole body of a camel is used as a reservoir. In the body of a camel, the tissues absorb water and, when it comes, use it sequentially $87,4 \pm 1,8$. To do this, camels drink 50-60 liters of water in one go. And it turns out that large single-humped camels can absorb up to 100 liters (Ombayev, 2015).

Walking in a desert area for more than two weeks, a camel loses up to 25-33% of its weight. For example, a camel that pulled 600 kilograms when it went on the road, and when it returned, it lost weight to 450 kilograms. And the humps are used to protect against fat reserves and heat. The weight of an adult camel can reach 700-800 kg. Thick camel hair reflects the sun's rays and protects these animals from the heat. Thanks to their vigilance, camels are able to see movement in the desert at intervals of up to a kilometer, even on a hot sunny day. Due to the reserves of fat stored in its hump, a camel can live without food and water for up to a month. These animals find oases, feeling the water source 50-60 kilometers away. Due to the special structure of the camel's nose, the exhaled moisture returns to the body. During a dust storm, camels can tightly squeeze their nostrils and close them so that sand does not get into the nose (Baimukanov et al., 2004; Baimukanov and Baimukanov, 2012).

Camel urine smells very bad, in addition, when they spit, they spit out stomach fluid, not just saliva. The thick lips of the camel allow it to calmly eat desert thorns without fear of injury. The camel is divided into two-humped and one-humped. The Kazakh double-humped camel is a breed of cattle that tolerates both hot areas of the desert-semi-desert sandy zone and harsh winters of the flat steppe zone, and the single-humped Turkmen aruana is well adapted in hot areas of desert-semi-desert zones in Kazakhstan.

Camel cattle are an animal that has been hardened for centuries in the fresh air, outdoors, and even in a barn that does not need much, grazing at four times of the year, finding and eating the food it needs. It differs from other types of livestock in that it quickly increases its maturity

in natural pastures and accumulates more than 100 kg of fat on its humps, effectively using it in severe winters, drought years, and even in water shortages.

Another biological feature of the camel cattle is its sexual maturity: females arrive at the first mating at the age of three, and males at the age of four or five. Camels mate once every two years, because, unlike other animals, they have a gestation period of 11 months, and a milking period – 15-18 months (Tasov et al., 2000).

The peculiarity of camel cattle is in its skin. The skin layer is very thick, mainly due to the fact that in ancient times our ancestors attributed it to the group of manure skins, which they were able to effectively use for their intended purpose. We noticed that the camel's skin contains more pores than other breeds of animals. I would like to say that the endurance of camel animals, both cold and heat, depends a lot on these holes. Since the camel is the largest of the domestic animals, the path of hot and cold air exchange in its body is probably carried out by these pores.

In general, although camel milk and dairy products have been thoroughly studied, meat productivity, wool and skin composition have not yet been fully studied.

The milk distribution of camel cattle is special: it does not have an udder pocket in which milk accumulates, as in cattle. When the camel is not milked, during the inter-milking break, the udder pocket is empty, the size of the nipples is small and drooping. Those who do not know this phenomenon may say, "there is no milk in the camel." However, when milking a camel, its udder pocket is filled with milk, and the nipples double in size and length. This phenomenon has been proven by scientists that "the accumulation of milk in the camel udder has a higher function of the milk ducts, and not the udder pocket." The taste, drink and healing properties of shubat, which is made from camel milk, have long been known. Its digestibility in the human body is 98%. The proportion of dry matter in the composition corresponds to 14.5-15.5%, fat - 5.5-6.5%, protein – 4.0-4.5%, milk sugar – 5.0-5.5%, minerals - 0.6-0.8%. 4-6 liters of milk with a fat content of 5.5-7.0% per day are milked from a double-humped (1200 liters per season), 12-15 liters with a fat content of 3.5-4.2% are milked from a single-humped (Turlybayev et al., 2004; Baimukanov, 1991; Baimukanov et al., 2002).

From hybrids of double-humped and single-humped camels, 3000 l of milk with a fat content of 4.0-4.5% is produced per season. Camel milk is stored for a longer period due to its higher bactericidal properties than cow's milk (it does not ferment for up to 24 hours in 30°C heat). The observation of doctors showed that people

who regularly use shubat do not suffer from tuberculosis at all. At the same time, it is known that the treatment of stomach diseases with shubat gives good results (Musayev et al., 2000).

Camel milk is stored for a longer period due to its higher bactericidal properties than cow's milk (it does not ferment for up to 24 hours in 30°C heat). The observation of doctors showed that people who regularly use shubat do not suffer from tuberculosis at all. At the same time, it is known that the treatment of stomach diseases with shubat gives good results. The effectiveness of camel farming directly depends on the rational organization of meat production work. Camel meat contains 17-22% protein and 12% fat tissue. In terms of nutritional properties and fertility, camel meat is on a par with beef (Musayev and Kenzhebayev, 2006; Arynov, 2007; DPS, 2011).

The efficiency of camel farming can also be increased through meat production. In terms of nutritional properties and fertility, camel meat is on a par with beef. Some residents of the region of our republic do not pay more attention to camel meat than other animal meat. The main reason: the large size of the camel's body, the inability of one family to store its meat for a long time, and the population of the region, which is fully provided with lamb, beef and horse meat, does not use camel meat for food. However, camel meat is close in nutritional properties and digestibility to beef, and even belongs to the group of highly nutritious meat, the meat content of which is 17-22% protein, 12% fat. The main way to produce cheap and high-quality camel meat is to feed the camel. Camels quickly turn brown in spring and autumn pastures. First of all, it is necessary to combine camel breeding with shubat production. In meat-producing camel farms, along with the Kazakh double-humped camel, it is profitable to grow as many hybrids obtained by crossing their females with the Kalmyk and Turkmen males. Hybrid stud camels weigh 80-120 kg more than local camel colts. The slaughter yield of two-year-old and three-year-old stud camels fattened on pastures reaches 51.7-52.5%, in large adult camels - 55-58%. Since the weight of camels varies depending on the season of the year, it is appropriate to transfer adult male and female to meat in June-July, and young stud camels in November-December (Baimukanov et al., 2006; Ombayev et al., 2004a).

Among these animals, females are aggressive. They usually show aggression when competing with males. Due to the special structure of the flat and wide paws, camels do not fall into loose hot sand. They can turn their legs in different directions. For example, a horse can kick forward with its front legs and only kick the back with its hind legs. And in camels it is not so. The dryness of the camel's body begins only after a quarter of all the water in its body has been lost, not counting the reserves in its hump. Most of the moisture these animals get from plants. Since camel feces are dry, nomadic Bedouins use it as fuel for fires. Despite their humps, camels have straight spines. Only when the body temperature exceeds 41 degrees do they begin to sweat. The normal body temperature for them is 40-41 degrees during the day and 34-35 degrees at night (Baimukanov et al., 2015).

Camel food is mainly grazed on pastures, it is a profitable industry compared to other farm animals, as it does not require much maintenance, nutritious food and complex construction, warm stable conditions.

Camels do not have horn hooves on their fingers. In place of the hoof, a small claw grows, which is arched and curved only at the tips of the paws. The foot is flat and the underside is warty, covered with a soft callouse. Therefore, these animals are called tylopoda. The camel has warts, hairless bald spots on the chest, knees and tongue. When the camel shrinks, the wart areas do not feel the effects of hot sand. Because of this, the camel continues to settle in the hot sand.

The thick lips of the camel allow it to calmly eat desert thorns, without fear of injury. Camels have two rows of eyelashes instead of one. This density of eyelashes helps to reliably protect the eyes from sand. Camels drink water faster than other creatures. At a time, it can absorb up to 150-180 liters of water, which is later converted by its body into adipose tissue in the hump (Mankibayev, 2016).

4. Conclusions

In order to effectively use the vast pasture lands of Kazakhstan, including in desert and semi-desert regions, the local population has long been engaged in the breeding of camels, horses, meat-fat sheep with coarse wool. The cultivation of camel cattle in this region is very profitable for the peasant farms. After all, camel cattle are a type of animal that is adapted to the harsh nature of desert-semi-desert lands, weather conditions, which are distinguished by the fact that it provides milk, shubat, meat, wool and leather, which are very necessary for humans, being fed with plant species that are not used by other animals, spicy grass, salt water.

1-day-old colts of the Kazakh Bactrian camel breed weighed 33.7 kg (female) and 37.9 kg (male) depending on gender, the Turkmen dromedary colts weighed 35.1 kg and 38.7 kg, respectively, and the live weight of the same-year-old colts in Turkmen dromedary camel breed weighed 279.9 kg and 285.5 kg, respectively, and in Kazakh Bactrian camel breed - 277.7 and 283.5 kg, respectively. No significant difference between the live weight of young camels at the age of 30 months was observed. The live weight of the Kazakh Bactrian female camels was 1.9% higher than that of the Turkmen dromedary camel breed, and 2.7% higher than males, and 5-year-old camels - 5.3 and 12.2%, respectively, depending on the breed and gender. In general, the process of growth of the main live weight of Kazakh Bactrian and Turkmen dromedary camel breeds reaches its peak in the period up to six months of age, in the future, weight gain, changes in body shape, adaptation of the body to the natural environment, and other characteristics of the animal world are formed.

An average of 5.56 liters of milk with a fat content of 5.5 - 7.0% per day were milked from the Kazakh Bactrian breed, 2878.6 liters were milked in the milking season, 7.60 liters with a fat content of 3.5 - 4.2% were milked from the Turkmen dromedary purebred aruana, and 3936.0 liters were milked in the season. The taste, drink and healing

properties of shubat, which is made from camel milk, have long been known. Its digestibility in the human body is 98%. The proportion of dry matter in the composition corresponds to 14.5-15.5%, fat - 5.5-6.5%, protein - 4.0-4.5%, milk sugar - 5.0-5.5%, minerals - 0.6-0.8%.

And the biological features of the Kazakh Bactrian and the Turkmen dromedary camel breeds are characterized by many of the following qualities inherent only in camel animals:

- the camel has a very high ability to gain weight and accumulate fat on the hump from birth to thirty months. By accumulating up to 150 kg of fat on the hump, can effectively use it in winter, in poor years of grazing, by the end of the most difficult times, its hump begins to fall next to him. Research and experience have found that the power of a camel's hump fat is higher than the power it receives through feed, and that hump fat is used when food and water are scarce. Camel cattle can survive in a situation where they lose about a quarter of their weight;
- the camel's milking period lasts 17-18 months, it can drink 100 liters of water at a time, and the water it drinks is stored in the cells of its stomach for a long time;
- the scrotum of male camels is located somewhat deepening between the thighs. The testicles are not very large. The penis bends S-shaped inside a special pocket and is located to the front of the testicular gland. The rest of the penis can change its position during sexual intercourse with the help of special muscles next to it, being located in a bent position backwards;
- female camels have smaller ovaries, the path to the uterus is oblong, the hardening uterus is double-pocketed;
- the physiological sexual maturity of the Kazakh Bactrian camel females occurs at the age of 15-18 months, mate at the age of four, and the sexual maturity of the Turkmen dromedary camels is at the age of 12-15 months, the mating is not earlier than the age of three. Kazakh Bactrian male camels are used for mating at the age of five, Turkmen dromedary male camels at the age of four. The sexual activity of males begins to decline from the age of 16-17, and they are used as breeding animals until the age of 20. And female camels are used to produce offspring up to the age of 25, and then written off;
- pregnancy of the Kazakh Bactrian females lasts 410-440 days, and Turkmen dromedary - 390-415 days;
- when camels exhale, most of the moisture from the inside can be retained by the creases on the inside of their beak and allow them to use the moisture in the air at the moment of inhalation as well. Even when storms stand in the sand, the camel's nostrils close and do not let dust into the lungs;
- the camel can change its body temperature to 34°C at night and 42° during the day, which allows it to save moisture, as the temperature decreases, the release of moisture from the body decreases. The camel is an animal that breathes slowly and keeps its mouth closed at all times. In this, its property that helps to save moisture;
- the stomach of a camel consists of three parts (tazkaryn, torkaryn and mayekkaryn) with a capacity of 250 liters.

The inner layer of the stomach tends to suck water and feed juice. The mayekkaryn is two-layered, with cell-typed bulging sprouts. On the mayekkaryn, these sprouts are more clearly visible than on the torkaryn. Camel stomach is adapted for easy digestion of very large grasses;

- the tip of the legs consists of toes with two claws, the fingers are covered with horny pads, not hooves. The pads of the front legs of camels are solid. The construction of their legs allows camels to easily walk on sand and snow, while slippery road and puddles cause problems. Unlike other ungulates, the camel allows using the pasture for a long time without trampling the grass;
- the wool cover of the camel is one of the unique properties that has adapted it to live in desert and semi-desert steppes, protecting it from the scorching heat in summer;
- on the body of a camel there are seven bare toes, like horns, which can protect the animal from the heat of sand up to 70°C. The thickest part of camel skin is on the hump, then on the thighs, then on the chest. The skin of the hump is chronic, which is due to its ability to stretch when it gets fat and contract when it loses weight.

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