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BREEDING AND GENETIC MONITORING OF DROMEDARY GROUP CAMELS OF SOUTH KAZAKHSTAN POPULATION

Abstract. For the first time the dromedary camels of Kazakhstani population of new genotypes derived by rotational crossbreeding were researched. The genetic productivity potential of dromedary group camels of South Kazakhstan type of new generation was established.

New generation dromedary has a fruiting duration from 398 days to 445 days, including F2 (25% td, 25% kb, 50% kd) – 419,4 ± 4,1 days, F3 (12,5% td, 62, 5% kb, 25% kd) – 428,2 ± 3,9 days, F4 (56,25% td, 31,25% kb, 12,5% kd) – 418,8 ± 4,4 days, F5 (28,1% td, 15,6% kb, 56,2% kd) days.

The results showed that with the increase in the blood share of dromedaries, the fat content in milk proportionally reduces. As the blood share of dromedaries increases, the rate of protein ratio of milk also rises.

It was found that Kazakh dromedary camels (11.2%) and dromedaries of new generation (10,9-13,7%) have lower frequency of the formation of aneuploid cells in comparison with thoroughbred Arvan (15.3%), which is consistent with previously conducted research.

Kazakh dromedary camels have the frequency of the formation of polyploid cells of 2.8% on average; dromedaries of new generation have from 1.8% to 2.9%, which is significantly lower in comparison with thoroughbred Arvan (3.4%).

The frequency of genetically ill-defined cells in dromedary group "BAISHIN" F3 was 8,0±1,1%, "BAYKAZHY" F3 – 5,8±0,81%, "ARDAS" F4 – 8,4 ± 1,4% and "SANNAK" F5 – 7,3 ± 0,95%. The findings prove the high herd status of dromedaries of new generation and the prospects for their extension in South Kazakhstan.

The discussion of the results. Kazakhstan is the center where breeding of Bactrians (two-humped camels) and dromedaries (single-humped dromedaries) is possible; there are various options for crossing in connection with the widespread hybridization between them. Genetic resources of interspecific hybrids in Kazakhstan have been presented by 22 generations. In recent years, breeders bred dromedaries with new genotypes by rotational crossbreeding in Kazakhstan.

To that end, dromedaries of new genotypes derived by rotational crossbreeding became the object of study for the first time.

New generation of dromedaries has a duration of fruiting from 398 days to 445 days, including F2 (25% td, 25% kb, 50% kd) - 419,4 ± 4,1 days, F3 (12,5% td, 62, 5% kb, 25% kd) - 428,2 ± 3,9 days, F4 (56,25% td, 31,25% kb, 12,5% kd) - 418,8 ± 4,4 days, F5 (28,1% td, 15,6% kb, 56,2% kd) days.

It was established that the content of fat in milk varies in dromedaries within 4.2-4.5%, and protein content is 3.5-3.7%. There is great potential for further breeding of dromedary camels with different genotypes on the content of milk fat and protein, due to purposeful selection of camels with a high content of the studied traits. Dromedaries F2 (25% td, 25% kb, 50% kd) have milk yield of 8.13±0.2 during the day, fat content of 4.34±0.04% and protein content of 3.54±0,03%. F3 (12,5% td, 62,5% kb, 25% kd) female camels have, respectively, milk yield of 6,13±0,3 kg with a fat content of 4,49±0,05% and 3,60±0,02% of milk protein. F4 (56,25% td 31,25% kb, 12,5% kd) female camels produce milk for seven months of lactation on average 7,16±0,2 kg with a fat content of 4,16±0,04% and protein content of 3,56 ± 0,02%. It was established that F5 (28,1% td, 15,6% kb, 56,2% kd) female camel produce milk 8,01 ± 0,2 kg on average per day, with a fat content of 4,37±0,06% and protein content of 3,54±0,03%.

Dromedaries with a live weight of 2 rank (525-600 kg) have significantly higher milk yield for 240 days of lactation compared to camels of 1 (600 kg) and 3 rank (less than 525 kg) on body weight (R≤0,01). In general, female camel which have bodyweight of 525-600 kg with various blood share produced commercial milk at least 1528.7 kg, including F2 (25% td, 25% kb, 50% kd) – 1939,1 ± 41,2 kg, F3 (12,5% td, 62,5% kb, 25% kd) – 1528,7 ± 38,5 kg, F4 (56,25% td, 31,25% kb, 12, 5% kd) – 1649,2 ± 33,8 kg, F5 (28,1% td, 15,6% kb, 56,2% kd) – 1861,9 ± 45,4 kg for 240 days of lactation.

Female camels of 2 rank in live weight have excellent indicators of reproductive capacity and high levels of safety of young camels in the first months of post-embryonic growth and development. Most importantly, they have a higher proportion of camels with the desired shape of the udder.

It was found that Kazakh dromedary camels (11.2%) and dromedaries of new generation (10,9-13,7%) have lower frequency of the formation of aneuploid cells in comparison with thoroughbred Arvan (15.3%), which is consistent with previously conducted research.

Kazakh dromedary camels have the frequency of the formation of polyploid cells of 2.8% on average; dromedaries of new generation have from 1.8% to 2.9%, which is significantly lower in comparison with thoroughbred Arvan (3.4%).

The frequency of genetically ill-defined cells in dromedary group "BAISHIN" F3 was 8,0 ± 1,1%, "BAYKAZHY" F3 – 5,8 ± 0,81%, "Ardas" F4 – 8,4 ± 1,4% and "SANNAK" F5 – 7,3 ± 0,95%. The findings prove the high herd status of dromedaries of new generation and the prospects for their extension in South Kazakhstan.

Conclusion. The novelty of the research is the identification of the genetic potential for milk production and cytogenetic status of dromedaries of new genotypes derived by rotational crossbreeding. The breeding area of "BAISHIN" F3, "BAYKAZHY" F3, "ARDAS" F4 and "SANNAK" F5 dromedary groups will increase the production of camel milk in South Kazakhstan region. In further selection and breeding operation, use of animals with well known karyotypic status will allow predicting the level of cytogenetic variability in their offspring and in populations of dromedaries of different genotypes.

The results of studies are recommended in all camel breeding farms of South Kazakhstan region, specialized in dromedary breeding.

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Key words: dromedary,_genotypes of camels, yield of milk, live weight, fat content, milk protein, fruiting, karyotype.

Introduction. Genetic resources of gene pool of camels breeds farmed in Kazakhstan differ by biological diversity, both in Central Asia and the Eurasian continent [1].

The gene pool of camels is composed of the diversity of genes and alleles that are available in today's population [2, 3]. In particular, in each part of the population of camels, the gene pool is constantly changing from generation to generation. New combinations of genes form the unique camel genotypes that have no analogues in the world.

In camel husbandry, each individual has its value of each [4]. In terms of the evolution of individual camel is a unit of selection, which dies or passes its genome to the next generation [5]. In nature, individuals are aggregated into relatively compact, dense groups, different in size, occupied space and number density. Thoroughbred camels have clearly distinguished uterine family, lines, meruses, micro populations, local populations, environmental populations and geographic populations according to the size of occupied population territories and the degree of coupling between camels [6].

Kazakhstan is the center where breeding of Bactrians (two-humped camels) and dromedaries (dromedaries) is possible, in this regard, the hybridization between them, and options for crossing became widespread [7]. Nowadays, genetic resources of interspecific hybrids comprise 22 generations. The most high-value in terms of the Central Asia and Kazakhstan are transboundary breeds of camels, such as Kazakh Bactrian, Turkmen Bactrian and Kazakh dromedary, as well as the new generation of camels of dromedary group Arad, baynar and Baytur. In recent years, breeders of Kazakhstan paid deliberate attention to the breeding of dromedary by rotational crossbreeding.

Study of dromedary camels of new genotypes, which are bred by rotational crossbreeding, is scientific interest and is the right choice for camel research.

The object of study is camels of dromedary group of South Kazakhstan type of new generation.

The aim of the study. The development of new genotypes of Kazakh dromedary camels by rotational crossbreeding. Productivity increase of the Kazakh dromedary camels potential.

Method and methodology of study. Measurements of camel bodies were studied according to the instructions on valuation of camels (2014) [8]. Live weight was identified by individual weighing and calculated manner. The live weight of camels were determined by weighing on fixed scales and calculation method of the patent of RK demand №15886 (2008) [9].

Wool clip was studied during spring shearing at 20 kg scales, up to 0.05 kg precision by weighing individual shorn wool with molt [10].

Milk yield was studied during 210 days of lactation through control milking of 12 foaled camels of uterine families with 2 adjacent days (20, 21 date of each month from May to April). The content of fat in milk was studied by acid and protein method in the milk analyzer AM-2 and "Laktan".

Growth and development of young camels was analyzed from birth to 2.5 years of age with determination of body weight, height at the withers, body length, chest girth, cannon bone circumference and calculations of body indices. The biometric processing was performed by the method of V.L. Petuhov and others. (1985) [11].

Preparations of metaphase chromosomes colored with azure-eosin, were analyzed under a light microscope of "Axioskop 40" brand and "Axiostar plus" of "Carl Zeiss Iena" company (Germany) according to the method of D.A. Baymukanova and others (2002) in two ways: visually under the microscope and on the basis of obtained prints chromosomes [12].

Karyological chromosome analysis and comprehensive assessment of the karyotype of camels was carried out by the standard method of RK patent 13848 (2006) [13].

Processing of digital data on the frequency of aneuploidy, polyploidy and chromosomal karyotype aberration of camels was carried out according to the method of N.A. Plohinskyi [14].

The outcomes of the study

Duration of the fruiting of dromedary camels of different blood. Having general information on the Bactrian, Arvan camels, and Kazakh dromedary, we began studies on the duration of pre-natal development of dromedary camels of different blood. The obtained findings enabled to determine a variation in the duration of the fruiting of female camels in the context of types and populations. Figure 1-10 shows the launch of a new generation of dromedary camels and corresponding drawings.

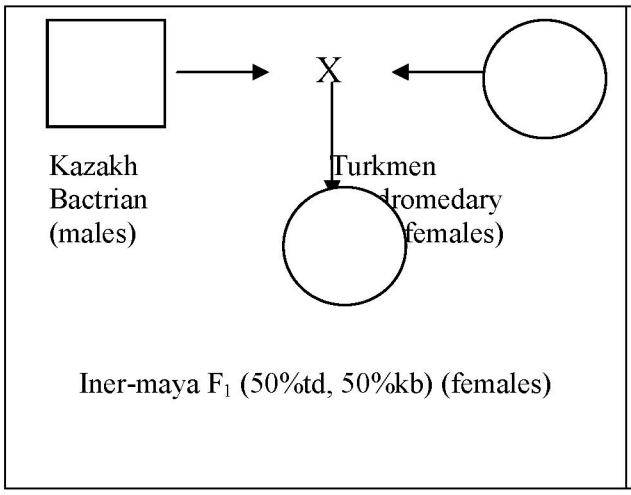

Figure 1 – Breeding scheme of «Iner-maya F_1 (50%td, 50%kb)» hybrids of the first generation

Figure 2 – Hybrid female camel of «Iner-maya» (50%td, 50%kb) first generation

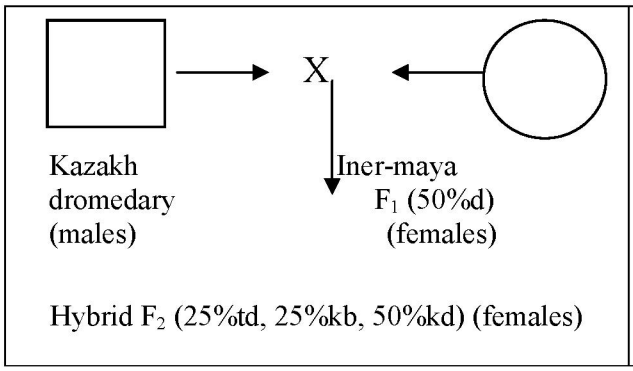

Figure 3 – Breeding scheme of "BAISHIN" F_2 (25%td, 25%kb, 50%kd) Kazakh dromedary of the second generation

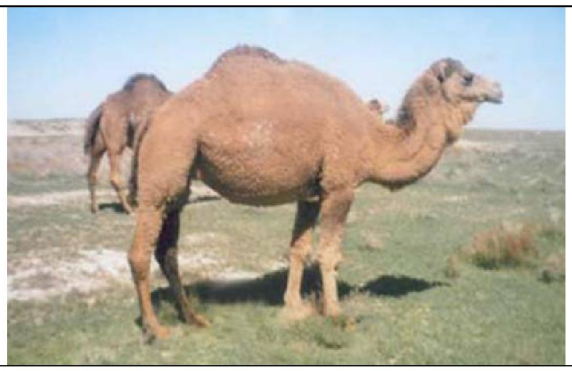

Figure 4 – "BAISHIN" F_2 (25%td, 25%kb, 50%kd) female camel

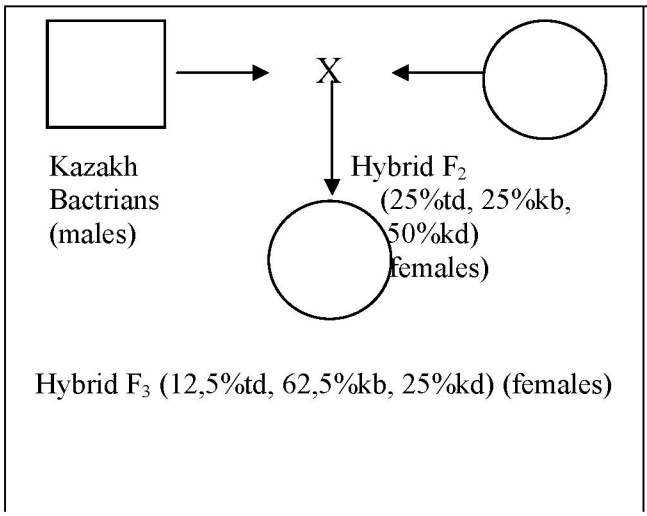

Figure 5 – Breeding scheme of "BAYKAZHY" F_3 (12,5%td, 62,5%kb, 25%kd) Kazakh dromedaries of the third generation

Figure 6 – "BAYKAZHY" F_3 (12,5%td, 62,5%kb, 25%kd) female

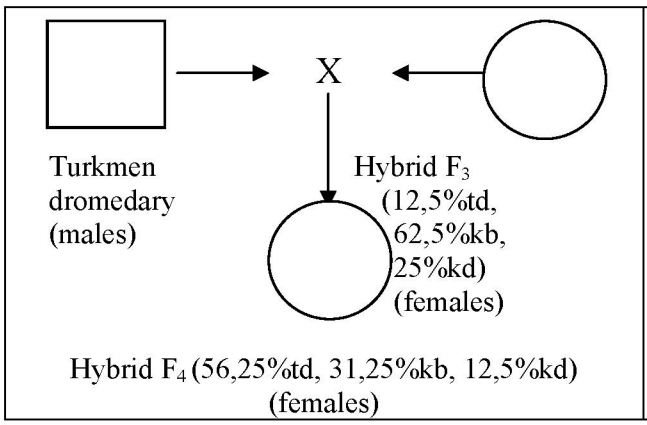

Figure 7 – Breeding scheme of "ARDAS" F_4 (56,25%td, 31,25%kb, 12,5%kd) Kazakh dromedaries of the fourth generation (females)

Figure 8 – "ARDAS" F_4 (56,25%td, 31,25%kb, 12,5%kd) female (females)