

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

THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN

PUBLISHED SINCE 1944

1

JANUARY – FEBRUARY 2020

ALMATY, NAS RK

NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

Б а с р е д а к т о р ы

х.ғ.д., проф., ҚР ҰҒА академигі

М.Ж. Жұрынов

Р е д а к ц и я а л қ а с ы:

Абиев Р.Ш. проф. (Ресей)
Абишев М.Е. проф., корр.-мүшесі (Қазақстан)
Аврамов К.В. проф. (Украина)
Аппель Юрген проф. (Германия)
Баймуқанов Д.А. проф., корр.-мүшесі (Қазақстан)
Байтулин И.О. проф., академик (Қазақстан)
Банас Иозеф проф. (Польша)
Берсимбаев Р.И. проф., академик (Қазақстан)
Велесько С. проф. (Германия)
Велихов Е.П. проф., РҒА академигі (Ресей)
Гашимзаде Ф. проф., академик (Әзірбайжан)
Гончарук В.В. проф., академик (Украина)
Давлетов А.Е. проф., корр.-мүшесі (Қазақстан)
Джрбашян Р.Т. проф., академик (Армения)
Қалимолдаев М.Н. проф., академик (Қазақстан), бас ред. орынбасары
Лаверов Н.П. проф., академик РАН (Россия)
Лунашку Ф. проф., корр.-мүшесі (Молдова)
Мохд Хасан Селамат проф. (Малайзия)
Мырхалықов Ж.У. проф., академик (Қазақстан)
Новак Изабелла проф. (Польша)
Огарь Н.П. проф., корр.-мүшесі (Қазақстан)
Полещук О.Х. проф. (Ресей)
Поняев А.И. проф. (Ресей)
Сагиян А.С. проф., академик (Армения)
Сатубалдин С.С. проф., академик (Қазақстан)
Таткеева Г.Г. проф., корр.-мүшесі (Қазақстан)
Умбетаев И. проф., академик (Қазақстан)
Хрипунов Г.С. проф. (Украина)
Юлдашбаев Ю.А. проф., РҒА академигі (Ресей)
Якубова М.М. проф., академик (Тәжікстан)

«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,
<http://www.bulletin-science.kz/index.php/en/>

© Қазақстан Республикасының Ұлттық ғылым академиясы, 2020

Типографияның мекенжайы: «NurNaz GRACE», Алматы қ., Рысқұлов көш., 103.

Г л а в н ы й р е д а к т о р
д.х.н., проф. академик НАН РК
М.Ж. Журинов

Р е д а к ц и о н н а я к о л л е г и я:

Абиев Р.Ш. проф. (Россия)
Абишев М.Е. проф., член-корр. (Казахстан)
Аврамов К.В. проф. (Украина)
Апель Юрген проф. (Германия)
Баймуканов Д.А. проф., чл.-корр. (Казахстан)
Байтулин И.О. проф., академик (Казахстан)
Банас Иозеф проф. (Польша)
Берсимбаев Р.И. проф., академик (Казахстан)
Велеско С. проф. (Германия)
Велихов Е.П. проф., академик РАН (Россия)
Гашимзаде Ф. проф., академик (Азербайджан)
Гончарук В.В. проф., академик (Украина)
Давлетов А.Е. проф., чл.-корр. (Казахстан)
Джрбашян Р.Т. проф., академик (Армения)
Калимолдаев М.Н. академик (Казахстан), зам. гл. ред.
Лаверов Н.П. проф., академик РАН (Россия)
Лунашку Ф. проф., чл.-корр. (Молдова)
Мохд Хасан Селамат проф. (Малайзия)
Мырхалыков Ж.У. проф., академик (Казахстан)
Новак Изабелла проф. (Польша)
Огарь Н.П. проф., чл.-корр. (Казахстан)
Полещук О.Х. проф. (Россия)
Поняев А.И. проф. (Россия)
Сагян А.С. проф., академик (Армения)
Сатубалдин С.С. проф., академик (Казахстан)
Таткеева Г.Г. проф., чл.-корр. (Казахстан)
Умбетаев И. проф., академик (Казахстан)
Хрипунов Г.С. проф. (Украина)
Юлдашбаев Ю.А. проф., академик РАН (Россия)
Якубова М.М. проф., академик (Таджикистан)

«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

© Национальная академия наук Республики Казахстан, 2020

Адрес типографии: «NurNazGRACE», г. Алматы, ул. Рыскулова, 103.

Editor in chief

doctor of chemistry, professor, academician of NAS RK

M.Zh. Zhurinov

Editorial board:

Abiyev R.Sh. prof. (Russia)
Abishev M.Ye. prof., corr. member. (Kazakhstan)
Avramov K.V. prof. (Ukraine)
Appel Jurgen, prof. (Germany)
Baimukanov D.A. prof., corr. member. (Kazakhstan)
Baitullin I.O. prof., academician (Kazakhstan)
Joseph Banas, prof. (Poland)
Bersimbayev R.I. prof., academician (Kazakhstan)
Velesco S., prof. (Germany)
Velikhov Ye.P. prof., academician of RAS (Russia)
Gashimzade F. prof., academician (Azerbaijan)
Goncharuk V.V. prof., academician (Ukraine)
Davletov A.Ye. prof., corr. member. (Kazakhstan)
Dzhrbashian R.T. prof., academician (Armenia)
Kalimoldayev M.N. prof., academician (Kazakhstan), deputy editor in chief
Laverov N.P. prof., academician of RAS (Russia)
Lupashku F. prof., corr. member. (Moldova)
Mohd Hassan Selamat, prof. (Malaysia)
Myrkhalykov Zh.U. prof., academician (Kazakhstan)
Nowak Isabella, prof. (Poland)
Ogar N.P. prof., corr. member. (Kazakhstan)
Poleshchuk O.Kh. prof. (Russia)
Ponyaev A.I. prof. (Russia)
Sagiyani A.S. prof., academician (Armenia)
Satubaldin S.S. prof., academician (Kazakhstan)
Tatkeyeva G.G. prof., corr. member. (Kazakhstan)
Umbetayev I. prof., academician (Kazakhstan)
Khripunov G.S. prof. (Ukraine)
Yuldashbayev Y.A., prof., academician of RAS (Russia)
Yakubova M.M. prof., academician (Tadjikistan)

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>

© National Academy of Sciences of the Republic of Kazakhstan, 2020

Address of printing house: «NurNaz GRACE», 103, Ryskulov str, Almaty.

UDC 636.2.084.4

**V. V. Lyashenko¹, N. A. Balakirev², Yu. A. Yuldashbayev³,
I. V. Kayeshova¹, A. K. Karynbayev⁴, A. V. Gubina¹, I. P. Prokhorov³**

¹Penza State Agrarian University, Penza, Russia;

²FSBEI HE «Moscow State Academy of Veterinary Medicine and Biotechnology», Moscow, Russia;

³Russian State Agrarian University – Moscow Agricultural Academy
named after K. A. Timiryazev, Moscow, Russia;

⁴Educational Scientific and Production Center Bayserke-Agro LLP, Almaty region, Kazakhstan.

E-mail: lyashenko_pnz@mail.ru, ovismgavm@mail.ru, zoo@rgau-msha.ru,
kaeshova.i.v@pgau.ru, gubina.a.v@pgau.ru, zoo@rgau-msha.ru, Uzniijrtaraz@mail.ru

MODERN TECHNOLOGIES FOR INCREASING THE REPRODUCTION LEVEL IN DAIRY CATTLE

Abstract. The work aims to study the features of herd reproduction in the conditions of a modern specialized unit for growing repair young animals.

The studies were carried out in the conditions of Megaferma OOO in the Kuznetsky region, which is part of the Rusmolco Company in the Penza region, on the number of animals in the modern herd reproduction center. The object of the research was the replacement heifers of the Holstein breed; the subject of the research was: live weight of heifers in different technological periods and the efficiency of insemination of heifers with sexed and ordinary sperm.

The studies show the dynamics of live weight of the Holstein heifers of different origin (Holland, the USA, Russia) during directed growing; the achievement of live weight of 350 kg was established by the period of the first insemination at the age 12 months; the Dutch heifers had a higher growth rate during all growing periods.

The results of studies indicate that when using sexed semen, the pregnancy rate of heifers from the first insemination was 54.5%; 82.5% of heifers were received from the studied livestock, which is 29.5% more than from the insemination with ordinary semen. When inseminating with sexed semen of heifers of different origins (Hungary, Germany, Russia), the existing differences in the experimental groups were found. The pregnancy rate from the first insemination in the studied livestock ranged from 48.7 to 59.7%, and the yield of heifers - from 77.5 to 89.4%.

Such indicators are consistent with the international practice of using sexed semen and with the guarantees of the semen producer. Consequently, an increase in the number of heifers in offspring allows breeding farms to abandon the acquisition of expensive breeding young stock.

Key words: technology, growing, Holstein breed, reproduction, origin, replacement heifers, insemination, sexed semen, offspring.

Relevance. In Russia, dairy cattle breeding is one of the main branches of animal husbandry, therefore it should be competitive in the external and domestic markets. Sustainable development of the industry is ensured by increasing production volumes, significantly expanding the range of products, the use of innovative technologies and modern equipment in the production process, as well as the widespread use of domestic and foreign cattle genetic resources [1,2]. In the studies of local scientists, there has been a steady increase in the number of Holstein cows on dairy farms in Russia. This is due to the import of cattle, as well as the use of accumulation cross breeding of animals of this breed with Black-and-motley breed and other breed groups of cattle [3,4].

The acquisition of modern dairy complexes and farms by imported livestock requires significant financial investments. In addition, imported animals do not always adapt to local natural and climatic conditions, which subsequently affects their health, productive and breeding qualities. Obviously, for the improvement of the dairy herd and its replenishment by herd replacements, it is necessary to organize their own breeding of elite calves.

In most regions of Russia, the key issue of herd reproduction is the growing of replacement young animals. In agricultural entities, the average age of heifers at the first insemination is 22-23 months with an average live weight of 340-350 kg, which is 6-7 months and 30-50 kg less than the indicators proposed in the recommendations for the growing of heifers of dairy and combined breeds.

Therefore, for replacement heifers, it is necessary to create conditions for the formation of a strong healthy body and the subsequent high dairy productivity with long-term economic use of cows. This is of particular importance in conditions of intensive milk production in modern dairy complexes and farms.

The problem of providing the herd with the necessary number of replacement heifers is not always possible to solve with traditional reproduction methods. In the body of bulls, two types of germ cells - spermatozoa are formed: with X-chromosomes and Y-chromosomes; so, in dairy cattle breeding, about 51% of calves born in cows are bulls and 49% - heifers. Modern large dairy farms and complexes specializing in milk production need a large number of replacement heifers to update the herd. Currently, new unique mechanisms are used in animal husbandry to ensure the necessary reproduction rate, among which the most innovative is the use of genetic material, divided by sex [5,6].

Many studies have established that the regulation of the sex of offspring in farm animals is of considerable practical interest, as it helps to accelerate genetic progress in selection and breeding work [7,8,9,10].

The aim of the work is to study the characteristics of herd reproduction in the conditions of a modern specialized enterprise of replacement young stock reproduction.

Materials and methods of research. The modernization of the dairy cattle breeding industry in the Penza region, as in other parts of Russia, is carried out through the construction of new modern dairy complexes, the reconstruction of existing dairy farms, the active introduction of innovative milk production technologies, the acquisition of highly productive imported cattle and the use of highly efficient modern technological equipment. The formation of highly productive dairy herds is carried out through the acquisition of cows, bred heifers or heifers from Europe, the USA, Canada, and Australia.

In 2015, in Tatarskiy Kanadei of the Kuznetsk district, the Rusmolco ran Megaferma OOO, Russia's largest modern center for the herd reproduction, amounted to 5200 animals, designed to equip the company's dairy complexes. The center consists of two sites, combined in a single cycle of growing heifers from the age of 5 months to the period of 7 months of pregnancy, followed by their return to the company's dairy complexes.

The technology for growing replacement heifers at all sites of Rusmolco provides the creation of optimal conditions for the intensive production of young animals of a random age, the implementation of planned gains in live weight, and the timely identification of animals ready for insemination. To achieve this goal it is necessary to fulfill several objectives: to ensure the safety of young animals more than 97%; to grow heifers for the first insemination at 12 months of age with a live weight of at least 350 kg.

The studies were carried out in the conditions of Megaferma OOO. The objects of the research were the heifers of the Holstein breed, received for growing from dairy complexes of RAO Narovchatskoye, the Narovchatskiy district, and of OSP MTK Pachelmskoye of Arshinovka.

The genetic and paratypical factors were subject to study. Genetic factors included the origin of animals, and paratypical ones – the growth, development and reproductive qualities of heifers.

A comparative assessment of the growth and development of heifers of different origin was studied by the dynamics of weight growth. The weight growth of replacement heifers was taken into account in terms of live weight by carrying out regular control weighings at the age corresponding to the technological periods of growing (at birth, at the age of 5, 10 and 12 months), followed by the calculation of growth rate indicators.

The reproductive qualities of animals of the studied groups were evaluated according to zooveterinary records.

Research results. In Megaferma, replacement heifers born from cows of the Rusmolco dairy herd, as well as imported heifers, are being grown. Therefore, the peculiarities of growth and development of heifers of different origin were studied during directed growing in a specialized enterprise. For research by the method of analogues (according to age and live weight) 180 animals born from imported mothers of Holland (the first group – 60 animals), the USA (the second group – 60 animals), as well as domestic cattle (the third group – 60 animals) were selected.

Table 1 – Change in live weight of heifers according to the technological periods

Live weight, kg:	Country of origin/group		
	Holland / the first	The USA / the second	Russia / the third
at birth	37.0 ± 0.67	37.5 ± 0.58	37.5 ± 0.46
5 months	201.0 ± 0.89***	190.1 ± 1.37	190.8 ± 1.42
10 months	327.0 ± 1.06***	316.4 ± 1.53	314.9 ± 1.50
12 months	373.5 ± 1.88***	359.5 ± 1.90	359.1 ± 1.92
*p < 0.05; **p < 0.01; ***p < 0.001.			

Table 1 shows the dynamics of the live weight of experimental animals in control age periods.

It was established that Dutch heifers exceeded American and Russian peers in all age periods in terms of live weight: at the age of 5 months - by 5.7% (p < 0.001) and 5.3% (p < 0.001), at the age of 10 months – by 3.3% and 3.8%, at the age of 12 months - by 3.8% (p < 0.001) and 3.9% (p < 0.001) respectively.

Based on the research results, it can be concluded that the technology for growing replacement heifers in Rusmolko helps to achieve optimal live weight (360 kg) for the first insemination at the age of 12 months, and not at the age 16 months as is accepted in the recommendations for young stock breeding.

Studies of the influence of the first fruitful insemination age and live weight of heifers on the value of subsequent milk yield revealed the great importance of the live weight of heifers. The increase in the insemination age unreasonably raised the cost of growing first-calf heifers [11].

Considering that since 2015, Megaferma with artificial insemination of replacement heifers began to use the modern biotechnological method of reproduction using sexed semen, the objects of the research included the study of its effectiveness in breeding livestock.

The studies were carried out on heifers (929 animals) of the Holstein breed, grown in Megaferma of the Kuznetskiy district.

According to local and foreign scientists, sexed semen is an effective tool for increasing the breeding stock of cattle, so it is necessary to carefully plan and prepare for insemination both animal and sperm. It is especially important to choose heifers that meet the requirements for the insemination [12,13,14,15,16, 17,18,19].

In this regard, one of the main technological features on the second site of Megaferma is the selection and preparation of animals for insemination. The first insemination of heifers is done with sexed semen. The semen is supplied to Russia from America and Canada, and the main suppliers are AltaGenetics, SEMEX, WWS. In total, in 2018, sexed semen of the breeding bulls was imported in the amount of 230676 doses or 6.4% of the total sperm production [20].

The results of the insemination by sexed semen of the replacement heifers of the Holstein breed in the conditions of the specialized enterprise Megaferma in 2017 are presented in table 2.

Table 2 – The insemination efficiency of the replacement heifers

Indicator	Number of animals	
	heads	%
Total number of heifers	929	100
First insemination (by sexed sperm):		
The number of heifers of the first fruitful insemination, animals	507	54.5
The number of unfertilized heifers, animals	422	45.5
Re-insemination (with ordinary sperm):		
Total number of heifers	422	100
The number of heifers of the fruitful re-insemination, animals	227	53.8
The number of unfertilized heifers, animals	195	46.2

Since, the necessary condition for the successful use of sexed sperm is the health of the herd and the fatness of the animals, the specialists of Megaferma carefully select the heifers suitable for the first insemination with the sexed semen. Pregnancy from the first insemination in the studied livestock was 54.5%, but 44.5% of heifers remained unfertilized. Upon repeated insemination of these heifers with the ordinary semen, the pregnancy increased by 9.3%, but 46.2% of the animals required the third insemination.

An indicator of the effectiveness of insemination is the number of the received offspring (table 3).

Table 3 – Obtaining offspring during insemination of heifers with the sexed and ordinary sperm

Indicator	Number of animals	
	heads	%
Total number of calves	610	100
Calves received from the first insemination with the sexed semen:	412	67.5
Including:		
- heifers	340	82.5
- bull-calves	72	17.5
Calves received from the repeated insemination with the ordinary semen:	198	32.5
Including:		
- heifers	105	53.0
- bull-calves	93	47.0

Of the total studied population (929 animals), 65.7% of calves were obtained. At the first insemination of heifers with the sexed sperm, 67.5% of the calves received, and at the repeated insemination of the unfertilized heifers with the usual semen, 32.5% of calves. It should be noted the high yield of heifers from insemination with the sexed semen – 82.5%. When re-inseminating the heifers with the ordinary semen almost the same output of heifers and bull-calves was received.

Studies have found that using sexed semen gave 29.5% more heifers than ordinary semen, with almost the same pregnancy, and the yield of heifers was 82.5%.

In connection with the acquisition of dairy farms with imported and domestic livestock, the research objectives included the study of the insemination effectiveness with sexed sperm of the Holstein replacement heifers of different origins. Three groups of heifers of different origin were formed taking into account the year of birth: imported in 2017 from Hungary (the 1st group – 315 animals) and from Germany (the second group – 311 animals), as well as domestic heifers (the third group – 300 animals), born in dairy farms of Rusmolco.

The results of the insemination of replacement heifers of the Holstein breed of different origin in the conditions of Megaferma enterprise are shown in table 4.

The largest percentage of fruitfully inseminated animals was recorded in the third group (59.7%), which is higher by 11% and 4.1% than in heifers of the second group and the first group, respectively. A significant number of replacement heifers remained unfertilized.

The results of the re-insemination with ordinary semen also indicate the differences between the experimental groups. The best indicator of fruitful insemination (59.6%) was for the heifers of the second group, and the lowest result (44.6%) was in animals of the third group. In general, the fruitful insemination of heifers by sexed and ordinary sperm does not exceed 60%.

The efficiency of insemination is characterized by obtaining offspring (table 5).

From the data of table 5, it follows that the results of the insemination of the heifers of the studied groups using the sexed semen differ. The largest number of heifers after the first insemination was received from German animals - 89.4%, but at the same time, the largest number of deadborn offspring (13.7%) was recorded in this group, which is obviously associated with problems of adaptation to the maintenance conditions. In Hungarian and Russian animals, the rates of heifers are slightly lower, and amounted to 83.2 and 77.5%, respectively.

Table 4 – Results of insemination of heifers

Indicator	Country /group		
	Hungary/ 1 st group	Germany/ 2 nd group	Russia/ 3 rd group
Total number of heifers, -heads -percent	315 100	314 100	300 100
First insemination (sexed semen):			
The number of heifers of the first fruitful insemination: -heads -percent	175 55.6	153 48.7	179 59.7
The number of unfertilized heifers, -heads -percent	140 44.4	161 51.3	121 40.3
Repeated insemination (ordinary semen):			
The number of heifers of the re-insemination: -heads -percent	140 100	161 100	121 100
The number of heifers of the repeated fruitful insemination, -heads -percent	77 55.0	96 59.6	54 44.6
The number of unfertilized heifers, -heads -percent	63 45.0	65 40.4	67 55.4

At repeated insemination, the number of heifers and bull-calves obtained in the experimental groups had insignificant differences.

Table 5 – Obtaining offspring after insemination of heifers with sexed and ordinary semen

Indicator	Country /group		
	Hungary/ 1 st group	Germany/ 2 nd group	Russia/ 3 rd group
First insemination (sexed semen):			
Total number of heifers	175	153	179
Received calves from the first insemination with sexed semen, animals:	161	132	170
including: heifers, - heads - percent	134 83.2	118 89.4	132 77.5
- bull-calves, heads - percent	27 16.8	14 10.6	38 22.5
Registered: - deadborn, number - percent - twins, number - percent	14 8 1 0.6	21 13.7 1 1	9 5 0 0
Repeated insemination (ordinary semen):			
Total number of heifers	77	96	54
Received calves from the repeated insemination with ordinary semen: - animals	71	87	50
Including: - heifers, heads - percent	35 49.3	48 55.2	28 56.0
- bull-calves, heads - percent	36 50.7	39 44.8	22 44.0
Registered: - deadborn, number - percent	6 7.8	9 9.4	4 7.4

**В. В. Ляшенко¹, Н. А. Балакирев², Ю. А. Юлдашбаев³, И. В. Каешова¹,
А. К. Қарынбаев⁴, А. В. Губина¹, И. П. Прохоров³**

¹Пенза мемлекеттік аграрлық университеті, Пенза, Ресей,
²ФМБОМ ЖО «Мәскеу ветеринария және биотехнология академиясы», Мәскеу, Ресей,
³РГАУ. А. Тимирязев атындағы МСХА, Мәскеу, Ресей,
⁴«УНПЦ Байсерке-Агро», Алматы облысы, Қазақстан

СҮТТІ МАЛ ШАРУАШЫЛЫҒЫНДА ӨСІМІН МОЛАЙТУ ДЕҢГЕЙІН АРТТЫРУДЫҢ ҚАЗІРГІ ЗАМАНҒЫ ТЕХНОЛОГИЯЛАРЫ

Аннотация. Қазіргі заманғы сүт кешендері мен фермаларды импорттық мал басына жинақтау үлкен қаржылық салымдарды талап етеді, сондай-ақ әкелінетін жануарларды жергілікті табиғи-климаттық жағдайларға бейімдеу мәселелерін туғызады, бұл одан әрі олардың денсаулығы мен өнімділігіне әсер етеді. Жоғары өнімді табынды қалыптастыру үшін элиталық бұзауларды жеке өсіруді ұйымдастыру қажет. Жеке жөндеу қашарларын өсіру өндірістің тұйық циклын құруға, мал импортын қысқартуға, жануарларды асыраудың және азықтандырудың ерекше жағдайларына бейімдеу мәселелерін шешуге мүмкіндік береді.

Сүтті мал шаруашылығында өсірудің дәстүрлі әдістерімен табынды жөндейтін төлдердің қажетті санымен қамтамасыз ету проблемасын шешу қиын, сондықтан қазіргі заманғы биотехнологиялық әдістерді пайдаланады, олардың бірі қашарларды секциялы тұқыммен ұрықтандыру болып табылады.

Жұмыстың мақсаты - қазіргі заманғы мамандандырылған кәсіпорын жағдайында мал төлін өсіру ерекшеліктерін зерттеу.

Зерттеулер Пенза облысының "УК" Русмолко "ЖШҚ құрамына кіретін Кузнецкий ауданының "Мега-ферма" ЖШҚ жағдайында табынның өсімін молайту жөніндегі қазіргі орталықтың Жануарлар басына орындалды. Зерттеу объектісі голштин тұқымының жөндеу қашарлары болды; зерттеу пәні: әртүрлі технологиялық кезеңдерде қашарлардың тірі салмағы және қашарларды секциялы және кәдімгі тұқыммен ұрықтандыру тиімділігі болды.

Зерттеулерде бағытталған өсіру кезінде әртүрлі шығу тегі голштин тұқымдас қашарлардың (Голландия, АҚШ, Ресей) тірі салмағының серпіні көрсетілген; 12 айда алғашқы ұрықтандыру жасына 350 кг тірі салмағына қол жеткізу белгіленді; голландиялық қашарлар өсірудің барлық кезеңдерінде өсудің жоғары қарқындылығы болды.

Зерттеу нәтижелері бойынша, секцияланған ұрықты пайдаланған кезде қашарлардың бірінші ұрықтандырудан 54,5% - ды құрағанын көрсетті; зерттелетін мал басынан 82,5% қашарлар алды, бұл кәдімгі ұрықпен ұрықтандырудан 29,5%-ға артық.

Секстелген тұқыммен ұрықтандыру кезінде әртүрлі текті қашарларды (Венгрия, Германия, Ресей) тәжірибелі топтарда бар айырмашылықтар анықталды. Зерттелетін мал басының алғашқы ұрықтандырудан бастап ұлтарактығы 48,7%-дан 59,7%-ға дейін, ал қашарлардың шығуы-77,5% - дан 89,4% - ға дейін болды. Мұндай көрсеткіштер секстелген ұрықты пайдаланудың әлемдік практикасына және тұқым өндірушінің кепілдігіне сәйкес келеді.

Демек, төлде қашарлар санының артуы асыл тұқымды шаруашылықтарға қымбат тұратын асыл тұқымды төлді сатып алудан бас тартуға мүмкіндік береді.

Түйін сөздер: технология, өсіру, голштин тұқымы, өсіру, шығу тегі, жөндеу қашарлар, ұрықтандыру, секстелген тұқым, төл алу.

**В. В. Ляшенко¹, Н. А. Балакирев², Ю. А. Юлдашбаев³,
И. В. Каешова¹, А. К. Карынбаев⁴, А. В. Губина¹, И. П. Прохоров³**

¹Пензенский государственный аграрный университет, Пенза, Россия,
²ФГБОУ ВО «Московская академия ветеринарной медицины и биотехнологии»,
³РГАУ – МСХА имени К. А. Тимирязева, Москва, Россия,
⁴ТОО «УНПЦ Байсерке-Агро» Алматинская область, Казахстан

СОВРЕМЕННЫЕ ТЕХНОЛОГИИ ПОВЫШЕНИЯ УРОВНЯ ВОСПРОИЗВОДСТВА В МОЛОЧНОМ СКОТОВОДСТВЕ

Аннотация. Комплектование современных молочных комплексов и ферм импортным поголовьем требует больших финансовых вложений, а также создает проблемы адаптации завозимых животных к местным природно-климатическим условиям, что в дальнейшем отражается на их здоровье и продуктивности. Для формирования высокопродуктивного стада необходимо организовать собственное выращивание элитных

телят. Выращивание собственных ремонтных телок позволит создать замкнутый цикл производства, сократить импорт скота, снять проблемы с адаптацией животных к специфическим условиям содержания и кормления.

Традиционными методами воспроизводства в молочном скотоводстве трудно решить проблему обеспечения стада необходимым количеством ремонтного молодняка, поэтому используют современные биотехнологические методы, одним из которых является осеменение телок сексированным семенем.

Цель работы – изучить особенности воспроизводства стада в условиях современного специализированного предприятия по выращиванию ремонтного молодняка.

Исследования выполнялись в условиях ООО «Мегаферма» Кузнецкого района, входящего в состав ООО «УК «Русмолко» Пензенской области, на поголовье животных современного центра по воспроизводству стада. Объектом исследований служили ремонтные телки голштинской породы; предметом исследований являлись: живая масса телок в различные технологические периоды и эффективность осеменение телок сексированным и обычным семенем.

В исследованиях представлена динамика живой массы телок голштинской породы разного происхождения (Голландия, США, Россия) при направленном выращивании; установлено достижение живой массы 350 кг к возрасту первого осеменения в 12 месяцев; голландские телки имели более высокую интенсивность роста во все периоды выращивания.

Результаты исследований свидетельствуют, что при использовании сексированного семени стельность телок от первого осеменения составила 54,5%; от исследуемого поголовья получили 82,5% телок, что на 29,5% больше, чем от осеменения обычным семенем.

При осеменении сексированным семенем телок разного происхождения (Венгрия, Германия, Россия) установлены имеющиеся отличия в опытных группах. Стельность от первого осеменения у исследуемого поголовья колебалась от 48,7 до 59,7%, а выход телок – от 77,5 до 89,4%. Такие показатели соответствуют мировой практике использования сексированного семени и гарантиям производителя семени.

Следовательно, увеличение численности телок в приплоде позволяет племенным хозяйствам отказаться от приобретения дорогостоящего племенного молодняка.

Ключевые слова: технология, выращивание, голштинская порода, воспроизводство, происхождение, ремонтные телки, осеменение, сексированное семя, получения приплода.

Information about authors:

Lyashenko V.V., Penza State Agrarian University, Penza, Russia; <https://orcid.org/ID 0000-0003-0098-4620>

Balakirev N.A., academician of RAS, Doctor of Agricultural Sciences, Professor, Head of the Department of Small Animal Breeding of the Moscow State Academy of Veterinary Medicine and Biotechnology named after K. I. Skryabin, 23, Akademik Skryabin str., Moscow, Russia; ovismgavm@mail.ru; <https://orcid.org/0000-0003-4325-9904>

Yuldashbayev Yu.A., academician of the Russian Academy of Sciences, Doctor of Agricultural Sciences, Professor, Dean of the Faculty of Zootechnics and Biology, Professor of the Department of Private Zootechnics, Russian State Agrarian University - Moscow Agricultural Academy named after K.A. Moscow, Russia; zoo@rgaumsha.ru; <https://orcid.org/0000-0002-7150-1131>

Kayeshova I.V., Penza State Agrarian University, Penza, Russia; <https://orcid.org/ID 0000-0003-4466-3888>

Karynbayev A.K., Doctor of Agricultural Sciences, academician of the Russian Academy of Natural Sciences, academic adviser of the Educational Scientific and Production Center Baysyerke-Agro LLP, Talgar district, Almaty region, Kazakhstan; Uzniijrtaraz@mail.ru; <https://orcid.org/0000-0003-4717-6487>

Gubina A.V., Penza State Agrarian University, Penza, Russia; <https://orcid.org/ID 0000-0002-5880-8518>

Prokhorov I.P., Doctor of Agricultural Sciences, Professor, Professor of the Department of Dairy and Beef Cattle Breeding, Russian State University - K. A. Timiryazev Moscow Agricultural Academy, Moscow, Russia; zoo@rgaumsha.ru

REFERENCES

[1] Mysik A.T. (2017). The state of animal husbandry and innovative ways of development. *Zootechnics. M.*, N 1. P. 2-9 (in Russ.).

[2] Dunin I., Kochetkov A., Sharkaev V. (2011). The main characteristics of dairy farming in the Russian Federation. *Dairy and beef cattle breeding. M.*, N 7. P. 2-3 (in Russ.).

[3] Labinov V.V., Prokhorenko P.N. (2015). Modernization of black-and-motley cattle in Russia based on the use of the Holstein gene pool. *Dairy and beef cattle breeding. M.*, N 1. P. 8-10 (in Russ.).

- [4] Prokhorenko P. (2015). The Holstein breed and its influence on the genetic progression of black-and-motley cattle in European countries and the Russian Federation. Dairy and beef cattle breeding. M., N 2. P. 2-7. (in Russ.).
- [5] Nikulin D.M. (2014). Sexed semen: efficiency in dairy farming. Niva Trans-Urals. Kurgan, N 11 (122). P. 78-79 (in Russ.).
- [6] Fomichev Yu., Strekozov N., Markelova V., Erokhin A., Sovetkin S. (2012). Cryopreserved sexed semen of bulls. Assessment of quality and safety. Dairy and beef cattle breeding. M., N 5. P. 2-4 (in Russ.).
- [7] Eghiazaryan A.V., Lantukh M.N. (2016). Experience with sexed semen in Russia and abroad. Dairy and beef cattle breeding M., N 1. P. 6-8 (in Russ.).
- [8] Dulger G.P., Nezhdanov A.G. (2014). Assisted reproductive technologies in the reproduction of cattle. Russian Veterinary Journal. Farm animals. M., N 4. 9 p. (in Russ.).
- [9] Usenbekov E.S., Aliev M., Spanov A.A., Siyanbekov S.T. (2016). Implementation of the method of embryo transplantation and insemination of heifers with sexed sperm at the Bayserke-Agro LLP dairy farm. Agrarian science - to agriculture. Barnaul. P. 198-199 (in Russ.).
- [10] Golovan V., Yurin D., Kucheryavenko A. (2019). Increasing the percentage of heifers yield. Livestock of Russia. M., N 3. P. 43-45 (in Russ.).
- [11] Sidorova V.Yu., Popov N.A., Ivanov V.A. (2019). The directed development of the young Holstein breed. Zootechnics. M., N 1. P. 23-27 (in Russ.).
- [12] Fedenko S.V. (2017). Sexed semen - a modern way of insemination. Youth and science. Yekaterinburg, N 1. 42 p. (in Russ.).
- [13] Korenev M.M., Furaeva N.S., Zvereva E.A., Vorobiyova S.S. (2015). Use of sexed semen of servicing bulls in insemination of heifers of dairy breeds. Dairy and beef cattle breeding. M. N 8. P. 10-12 (in Russ.).
- [14] Dzhakupov I.T., Konukhov V.A., Kabakov V.V. (2011). Fertilization of cows and heifers during insemination with sexed sperm. Scientific notes of the educational institutions of the Vitebsk order of the badge of honor. State Academy of Veterinary Medicine scientific-practical journal. Vitebsk. N 2 (2). P. 35-37. (in Russ.).
- [15] Usenko V.V., Koshchaev A.G., Likhoman A.V., Litvinov R.D. (2014). Experience and prospects of using sexed semen to increase the number of dairy cows in the Kuban. Scientific journal KubSAU. Krasnodar, N 101 (07). P. 1-15 (in Russ.).
- [16] Baimukanov D.A., Abugaliyev S.K., Seidaliyev N.B., Semenov V.G., Chindaliyev A.E., Dalibayev E.K., Zhamalov B.S., Muka Sh.B. (2019). Productivity and estimated breeding value of the dairy cattle gene pool in the Republic of Kazakhstan. Bulletin of the National Academy of Sciences of the Republic of Kazakhstan. Vol. 1, N 377 (2019), 39–53 <https://doi.org/10.32014/2019.2518-1467.5>. ISSN 2518-1467 (Online), ISSN 1991-3494 (Print)
- [17] Baimukanov D.A., Seidaliyev N.B., Alentayev A.S., Abugaliyev S.K., Semenov V.G., Dalibayev E.K., Zhamalov B.S., Muka Sh.B. (2019). Improving the reproductive ability of the dairy cattle. Reports of the National Academy of Sciences of the Republic of Kazakhstan. Vol. 2, N 324 (2019), 20–31. <https://doi.org/10.32014/2019.2518-1483.33>. ISSN 2518-1483 (Online), ISSN 2224-5227 (Print).
- [18] Bekenov D.M., Chindaliyev A.E., Zhaksylykova G.K., Baigabylov K.O., Baimukanov A.D. (2019). Accelerated reproduction of breeding stock using sexed semen in conditions of «Bayserke-Agro» LLP. News of the National Academy of Sciences of the Republic of Kazakhstan. Series of Agrarian Sciences. Vol. 4, N 52 (2019), 11–14. <https://doi.org/10.32014/2019.2224-526X.42>. ISSN 2224-526X.
- [19] Bekenov D.M., Spanov A.A., Chindaliyev A.E., Baimukanov A.D., Sultanbai D.T., Zhaksylykova G.K., Kalimoldinova A.S. (2019). Comparative study of the fruitfulness of cow insemination of a milking herd at various levels of productivity in the conditions of Bayserke-AGRO LLP. Reports of the National Academy of Sciences of the Republic of Kazakhstan. Vol. 4, N 326 (2019), 27–30. <https://doi.org/10.32014/2019.2518-1483.110>. ISSN 2518-1483 (Online), ISSN 2224-5227 (Print).
- [20] Dunin I., Erokhin A., Dunin M., Kochetkov A. (2011). The efficiency of insemination of heifers with sexed semen. Dairy and beef cattle breeding. M. N 3. P. 9-10 (in Russ.).

Publication Ethics and Publication Malpractice in the journals of the National Academy of Sciences of the Republic of Kazakhstan

For information on Ethics in publishing and Ethical guidelines for journal publication see <http://www.elsevier.com/publishingethics> and <http://www.elsevier.com/journal-authors/ethics>.

Submission of an article to the National Academy of Sciences of the Republic of Kazakhstan implies that the described work has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see <http://www.elsevier.com/postingpolicy>), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The National Academy of Sciences of the Republic of Kazakhstan follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http://publicationethics.org/files/u2/New_Code.pdf). To verify originality, your article may be checked by the Cross Check originality detection service <http://www.elsevier.com/editors/plagdetect>.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the National Academy of Sciences of the Republic of Kazakhstan.

The Editorial Board of the National Academy of Sciences of the Republic of Kazakhstan will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

www.nauka-nanrk.kz

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

<http://www.bulletin-science.kz/index.php/en/>

Редакторы *М. С. Ахметова, Т. А. Апендиев, Д. С. Аленов*
Верстка на компьютере *Д. А. Абдрахимовой*

Подписано в печать 10.02.2020.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
19,5 п.л. Тираж 500. Заказ 1.