ISSN 2224-526X

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

ҚАЗАҚ ҰЛТТЫҚ АГРАРЛЫҚ УНИВЕРСИТЕТІ

Х А Б А Р Л А Р Ы

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ
АГРАРНЫЙ УНИВЕРСИТЕТ

N E W S

OF THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN

KAZAKH NATIONAL
AGRARIAN UNIVERSITY

АГРАРЛЫҚ ҒЫЛЫМДАР СЕРИЯСЫ

♦

СЕРИЯ АГРАРНЫХ НАУК

♦

SERIES OF AGRICULTURAL SCIENCES

5 (47)

ҚЫРКҮЙЕК – ҚАЗАН 2018 ж.
СЕНТЯБРЬ – ОКТЯБРЬ 2018 г.
SEPTEMBER – OCTOBER 2018

2011 ЖЫЛДЫҢ ҚАҢТАР АЙЫНАН ШЫҒА БАСТАҒАН
ИЗДАЕТСЯ С ЯНВАРЯ 2011 ГОДА
PUBLISHED SINCE JANUARY 2011

ЖЫЛЫНА 6 РЕТ ШЫҒАДЫ
ВЫХОДИТ 6 РАЗ В ГОД
PUBLISHED 6 TIMES A YEAR

АЛМАТЫ, НАН РК АЛМАТЫ, ҚР ҰҒА ALMATY, NAS RK

Известия Национальной академии наук Республики Казахстан. Серия аграрных наук.
ISSN 2224-526X
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 **№ 10895-Ж**, выданное 30.04.2010 г.

Периодичность 6 раз в год
Тираж: 300 экземпляров

Адрес редакции: 050010, г. Алматы, ул. Шевченко, 28, ком. 219-220, тел. 272-13-19, 272-13-18
http://nauka-nanrk.kz/agricultural.kz

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

News of the National Academy of Sciences of the Republic of Kazakhstan. Series of Agrarian Sciences.
ISSN 2224-526X
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 10895-Ж, issued 30.04.2010

Periodicity: 6 times a year
Circulation: 300 copies

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

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

N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF AGRICULTURAL SCIENCES
ISSN 2224-526X **https://doi.org/10.32014/2018. 2224-526X.11**
Volume 5, Number 47 (2018), 81 – 86

UDC 636.2.081.631

N. B. Seidaliyev, E. K. Dalibayev, B. S. Zhamalov, Sh. B. Muka

Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan

MONITORING DATA OF THE EXISTING SYSTEM OF ORGANIZATION OF THE SELECTIVE PROCESS IN THE DAIRY CATTLE BREEDING OF THE REPUBLIC OF KAZAKHSTAN

Abstract. Scientific research has been carried out to monitor the existing system of organizing the selective process in dairy cattle breeding in the Republic of Kazakhstan.

It is proposed to implement the following measures in the management system of the selective process: the development of an automated place of researcher and classificator in the information analytical system (IAS) so that they could not only enter the data, but also monitor the entire course of zootechnical events in the IAS; the development in IAS of the program of integration with dairy laboratories on automatic entering the analysis data directly to the IAS so that the data on productivity of animals contain indicators not only on milk, but also on its quality; the development of a mobile application for the linear evaluation of the body type with the automatic recording of these data in the IAS; the data entry into the IAS database on animal genealogy; the formation of groups of heifers and lactating first-calf cows during the first 3 months - this age of the breeding stock is justified by the creation of a new IAS database controlled by researchers, the milk yield is predetermined by the purpose of organizing breeding work with dairy cattle from ground zero; monthly check milking with milk sampling, analysis of its quality in independent dairy laboratories and all data entry into the IAS program - for selection of cows on the basis of the entered selection traits in the IAS; carrying out a linear estimation of the cows' appearances and assigning to each animal a classification rating for the body type - to complement the estimation of the breeding value of animals; formation of cattle-breeding groups - to select highly productive cows for the purpose of custom mating; drawing up a plan and conducting custom mating - to get the bull-calves, whose fathers will be outstanding servicing bulls with high genetic characteristics; to conduct a genomic estimation of bull-calves obtained from custom mating.

Keywords: dairy cattle breeding, monitoring, selective process, management, productivity.

Introduction. In dairy cattle breeding of the Republic of Kazakhstan, the main task is further intensification of the industry aimed at increasing the genetic potential of the productive qualities of domestic breeds and the extent of its implementation. The advancement of molecular biology, population genetics, biotechnology, the development and implementation of large-scale breeding, the use of computer programs for the analysis of breeding information enriched the arsenal of tools for studying biological patterns and management of animals heredity, and breed formation processes [1].

The research trend is the study of intrabreed structures, in particular breeding herds according to selective and genetic indicators in dynamics, on a certain ecological background will allow to evaluate the gene pool of the breed and to provide a theoretical justification for its qualitative improvement, to avoid the "selective plateau", to maintain the required level of variability of traits with simultaneous increase in the productivity of herds [2].

F.F. Eisner [3] considered individual selection in breeding herds as the most important element in the selective work. Recognizing the role of modern programs based on methods of population genetics, he repeatedly emphasized that the greatest effect in improving the inherited qualities of dairy cattle can be achieved with a reasonable combination of large-scale and in-depth individual selection.

Of the same opinion are L.K. Ernst et al. [4]. They consider it necessary to persevere further search for ways to speed up the selective process in accordance with the requirements of scientific and technological progress, the development of new high performance technologies that promote the greatest realization of the genetic potential of animals. The search should go both in the direction of increasing the effectiveness of individual methods of breeding and in the development of better organizational forms of breeding work. It is a work for the future, and it should be conducted on the basis of clear scientific developments and long-term forecasts.

The theoretical fundamental of modern breeding is population genetics, based on the combinative variability of traits and the knowledge of the patterns of their inheritance. Over the past decades, significant potential has been accumulated in this area, the use of which allows us to work in the right direction, to predict the effect of breeding programs, simulating them with an accurate calculation to the average for cows of the same age as a whole for the breed [5].

Aim of the research. To monitor the existing system of organizing the selective process in dairy cattle breeding. To form the groups of heifers and first-calf heifers (Alatau, Simmental, Holstein, and Black-and-motley) of basic farms with the study of their genealogy and productive qualities of ancestors.

Materials and methods. Objects of the research were breeding stock, as well as the servicing bulls-producers. Materials for the research were the documents of primary zootechnical and breeding accounting (from the IAS system), as well as the results of experimental studies, visual assessment, weighing, measurements, control milking of animals. In addition, biochemical studies of milk were carried out. For the analysis of dairy productivity, live weight and genealogy, the data of brood and zootechnical accounting of the economy were used. All animals were in the same conditions of feeding and maintenance. Cows were fed with the fodder taken in the farm.

Results of the research. In the light of current tasks on the accelerated improvement of breeds of agricultural animals, the breeder should not be limited to breeding work only with individual animals and their related groups. It is necessary to analyze the changes in the entire breeding herd and a fairly accurate assessment of its phenotypic and genetic parameters of the main breeding features. Estimation of the genetic indicators of stud stocks allows in a more substantiated way to plan the further improvement of the breed. Necessary conditions for fairly objective assessments are the reliability of the primary documentation and the accuracy of controlling the dairy productivity, especially milk and fat and protein content [6, 7].

Currently, in the Republic of Kazakhstan, the Republican Chamber for Dairy Cattle has been established, in which 7 breeds of dairy and dairy-meat directions of productivity are registered: Alatau, Aulieata, Black-and-motley, Red Steppe, Simmental breeds of domestic selection and Holstein Friesian breed with Swiss world selection. Also, the subjects of the selective process are breeding farms for cattle of the mentioned breeds, as well as scientific research organizations (SRO). Besides, in the breeding process, there are involved laboratories for determining the quality of milk, information-analytical system (IAS). The regional agricultural departments subordinated to the Ministry of Agriculture of the Republic of Kazakhstan should manage the entire selective process.

Therefore, for the profitable functioning, the subjects of the selective process must be integrated into a controllable system, which currently does not exist. For example, there are incorrect data on breeding or productive indicators of animals in the IAS database. Based on these incorrect data, the Republican Chamber for Dairy Cattle produces an unconfirmed pedigree status for these animals. In addition, to control zootechnical events in the IAS, researchers do not have constant access to the IAS database. In addition, the results of analysis of dairy laboratories must be entered manually in the IAS, which greatly hampers the work of breeders. Also in our country, there are no cattle farms for growing bull-calves of their own reproduction, which predetermines the import dependence on the genetic material of the world gene pool.

In order to develop a management system for the selection process, it is necessary to carry out the following measures:

- development in the IAS of an automated place for researcher and a classificator so that they could only enter the data, but also monitor the entire course of zootechnical events in the IAS;

- development in the IAS of the program of integration with dairy laboratories on automatic entering the analysis data directly into the IAS that the data on productivity of animals contain indicators not only on milk, but also on its quality;

Genealogical affiliation of formed first-calf heifers and ancestral productivity

The nickname and number of the servicing bull (fathers)	Number of first-calf heifers (daughters), heads	Productivity of the mother of the bull, kg	Average productivity of the mothers of the formed groups (by the highest one), kg
Mezhdurechensk-Agro LLP			
011HO08385 MR Minister	1	10372	8400
011HO09497 Glen-Toctin Altaomax-ET	5	11400	7366
137722550 Brandt-View Altacognati-ET	4	11850	6900
011HO09688 DE-SU ALTASOLO-ET	2	15973	7541
011HO09898 Pine-Tree Altaosofine	12	12131	7131
011HO00565 Sandy-Valley Altaxxx-Red-ET	1	16430	9611
NL385596512 RODERICK WH	2	14250	7813
USA 076HO00551 Solomon-ET	1	15720	7995
Mamed Farm			
8027 Chili	1	11180	5206
68108976 Niagra	2	12450	5880
181455 Kilian	5	10500	5832
7643 Vazhniy	2	9870	5006
1 Wunder	4	13120	5724
2641 Melnik	5	11410	5446
Kamyshinskoe Farm			
Benevola 66596063	21	12502	6320
HIDDEN-VALLEY-GARTHM100135646	28	16231	5960
Demokrat 100444050	24	14966	6085
Skaibak 100047673	38	9898	7015
Romanser 76HO0159	29	19227	6089
Lakemon 100490163	68	9835	5760
Rokin-red 133917657	34	12807	6096
Taylor-red 011HO00527	22	14449	6198
Integrated agricultural production company «Almaty breeding farm»			
181329 EMORI	2	10450	4950
192878 JAG *	6	11254	5206
193926 JACK *	4	11500	5880
197821 Teddy	20	10147	5832
197970 KURS	19	13232	5006
470210067 ADAPTIC	36	12007	5724
68108976 Niagra	10	12986	5446
USA000000198986 Roseledge Style ET	6	13542	6320
Fame 76BS0909	8	13535	5960
Bestman 000193763	5	12986	6085
Aidarbayev Farm			
470210067 ADAPTIC	1	12007	7015
197821 Teddy	1	10147	7632
193926 JACK	1	11500	7006
USA 076HO00551 Solomon-ET	5	15720	7463
Mozart 137668966	5	10623	7401
Lauraider	19	12455	6867
Kirova LLP			
Mazda 136722780	54	12062	5980
Skaibak 100047673	72	9898	6047
Lakemon 100490163	24	9835	5970

- development of the mobile application for conducting a linear assessment of the body type with the automatic entry of these data in the IAS;

- the data entry into the IAS database on animal genealogy;

- the formation of groups of heifers and lactating first-calf cows during the first 3 months - this age of the breeding stock is justified by the creation of a new IAS database controlled by researchers, the milk yield is predetermined by the purpose of organizing breeding work with dairy cattle from ground zero;

- monthly check milking with milk sampling, analysis of its quality in independent dairy laboratories and all data entry into the IAS program - for selection of cows on the basis of the entered selection traits in the IAS;

- carrying out a linear estimation of the cows' appearances and assigning to each animal a classification rating for the body type - to complement the estimation of the breeding value of animals;

- formation of cattle-breeding groups - to select highly productive cows for the purpose of custom mating;

- drawing up a plan and conducting custom mating - to get the bull-calves, whose fathers will be outstanding servicing bulls with high genetic characteristics;

- to conduct a genomic estimation of bull-calves obtained from custom mating.

When these measures are implemented in the IAS, the breeding value of animals will automatically be calculated, which will predetermine the attribution of an animal to a certain category of breeding animals, in addition, the bulls of domestic reproduction will have a genomic evaluation, and after the production of their daughters, they will be estimated for the quality of the offspring. Recognized as enhancers, they form an elite gene pool of both domestic selection and the world one, which neutralizes import dependence on the world gene pool and creates a competitive environment among dairy breeds.

Formation of groups of heifers and first-calf-heifers

From 2015 to the present, work is constantly being carried out to form groups of first-calf heifers in order to organize targeted breeding work with dairy cattle. Therefore, a monitoring of the breeding stock of the basic farms of the SRO was conducted.

Information on the formed groups of 6 basic farms is presented in table.

As can be seen from table, a total of 609 cows were formed from 3 regions.

The genealogical structure of cattle of the listed farms is presented in table.

It was established that the dairy productivity of mothers for lactation of the formed groups has significant fluctuations (4950...9611 kg), but the productivity of the mothers of their fathers is much higher (9835...16231 kg), which predetermines the genetic potential of the cows of the formed groups.

Conclusion. Groups of first-calf heifers of different breeds were formed in 6 basic farms. In these groups, bulls-fathers of all breeds have a sufficiently high genotype (12129...19,500 kg of milk from their mothers), hence it follows that in the basic farms there is a purposeful work to improve the dairy productivity of the herds. In addition, it was found that, in spite of the heterogeneity of the productivity of the mothers of the formed groups (4535...7678 kg at the highest lactation), their genotype on average corresponds to the growth in the dairy productivity of their daughters.

REFERENCES

[1] Abugaliyev S.K., Shamshidin A.S. Analysis of breeding and productive features of domestic breeds of cows and world breeding cows in the South-East of Kazakhstan // News of the National Academy of Sciences of the Republic of Kazakhstan. 2012. N 2. P. 52-54 (in Russ.).

[2] Zuev A.V., Osadchaya O.Yu. Problems and solutions for creating highly productive dairy herds. M., 2006. 265 p. (in Russ.).

[3] Eisner F.F. Breeding work with dairy cattle. M.: Agroproizizdat, 1986. 178 p. (in Russ.).

[4] Ernst L.K., Prokhorenko P.N., Prudov A.I., Grigoriev Yu.N. Strategy of genetic improvement of cattle of Russia // Zootechnics. 1997. N 11. P. 2-7 (in Russ.).

[5] Teziev T.K., Khadartseva Z.B., Kozyrev S.G. Genetic and practical foundations for the creation of highly productive herds of cows in the Republic of North Ossetia-Alania. M., 2003. 142 p. (in Russ.).

[6] Getokov O.O., Dolgiev M.M., Uzhakhov M.I. Perfection of Red Steppe cattle in the North Caucasus // Zootechny. 2012. N 7. P. 3-14 (in Russ.).

[7] Zubriyanov V.F. Problems of selection and breeding work in dairy cattle breeding in Kazakhstan // Bulletin of Agricultural Science of Kazakhstan. 1992. N 4. P. 76-82 (in Russ.).

Н. Б. Сейдалиев, Е. К. Далибаев, Б. С. Жамалов, Ш. Б. Муқа

Қазақ малшаруашылығы және жемшөп өндірісі ғылыми зерттеу институты,
Алматы, Қазақстан

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДА ҚОЛДАНЫСТАҒЫ СҮТТІ ІРІ ҚАРА МАЛ ШАРУАШЫЛЫҚТАРЫНДА АСЫЛДАНДЫРУ ҮДЕРІСІН БАҚЫЛАУ ҮШІН ҒЫЛЫМИ ЗЕРТТЕУЛЕР ЖҮРГІЗІЛДІ

Аннотация. Іріктеу үрдісін басқару жүйесінде келесі іс-шараларды жүзеге асыру ұсынылады: АТЖ-да (ақпаратты талдау орталығы) автоматтандырылған ғылыми қызметкер мен бонитердың орны, олар тек деректерді жазып қана қоймай, АТЖ-дағы зоотехникалық барлық оқиғаларын бақылап отырады; осы талдауды АТЖ-да тікелей автоматты түрде енгізу туралы сүт зертханаларымен интеграциялау бағдарламасының АТЖ-дағы жануарлардың өнімділігі туралы деректерде сүттің ғана емес, сондай-ақ сүт сапасының көрсеткіші де бар; АТЖ-да осы деректерді автоматты түрде сызықтық бағалау үшін мобильді қосымшаны әзірлеу; жануарлардың генеалогиясының деректерін АТЖ базасына енгізу; қашарлар мен бірінші сауымдағы сиырлардың (алғашқы үш айда) топтарын қалыптастыру, асыл тұқымды малдың осы жасы зерттеушілер бақылайтын АТЖ жаңа деректер базасын құру арқылы негізделген, сүт «нөлден» сүтті ірі қара малмен асыл тұқымды жұмыс ұйымдастыру мақсатында алдын-ала анықталған; ай сайын сүт іріктеуімен сүтпен қамтамасыз ету, тәуелсіз сүт зертханаларында оның сапасын талдау және АТЖ бағдарламасына барлық деректерді енгізу - АТЖ ішіне енгізілген іріктеу өлшемдерінің негізінде сиырларды таңдау үшін; сиырдың сыртқы түрлеріне сызықтық бағалау жүргізу және әрбір жануарға құрылыстың түрі бойынша жіктеу рейтингі - жануарлардың асыл тұқымды құндылығын бағалауды толықтыруға; өндіруші бұқа сиыр топтарын қалыптастыру - іріктелген жоғары өнімді сиырларды тапсырыспен шағылыстыру; бұқалар алу үшін - жоспарды құрастыру және тапсырыспен жұптастыру, әкелердің жоғары генетикалық сипаттамалары бар танымал бұқа өндірушілерге бұқалар алу үшін; тіркеуден өткен тапсырыспен шағылысудан алынған бұзаулардың геномдық бағасын жүргізу.

Түйін сөздер: сүтті мал шаруашылығы, мониторинг, асылдандыру үдерісі, басқару, өнімділік.

Н. Б. Сейдалиев, Е. К. Далибаев, Б. С. Жамалов, Ш. Б. Муқа

ТОО «Казахский научно-исследовательский институт животноводства и кормопроизводства»,
Алматы, Казахстан

РЕЗУЛЬТАТЫ МОНИТОРИНГА СУЩЕСТВУЮЩЕЙ СИСТЕМЫ ОРГАНИЗАЦИИ СЕЛЕКЦИОННОГО ПРОЦЕССА В МОЛОЧНОМ СКОТОВОДСТВЕ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация. Проведены научные исследования по мониторингу существующей системы организации селекционного процесса в молочном скотоводстве Республики Казахстан. Предлагается в системе управления селекционным процессом осуществить следующие мероприятия: разработка в информационной аналитической системе (ИАС) автоматического места научного сотрудника и бонитера, чтобы они могли не только заносить данные, но и контролировать весь ход зоотехнических событий в ИАС; разработка в ИАС программы интегрирования с молочными лабораторями по автоматическому введению данных анализа непосредственно в ИАС, чтобы в данных по продуктивности животных были показатели не только по удою, но и качеству молока; разработка мобильного приложения по проведению линейной оценки типа телосложения с автоматическим занесением этих данных в ИАС; введение данных в базу ИАС данных по генеалогии животных; формирование групп нетелей и лактирующих коров-первотелок в первые 3 месяца– данный возраст маточного поголовья обоснован созданием контролируемой научными сотрудниками новой базы данных ИАС, удой предопределяется целью организации селекционной работы с молочным скотом с «нуля»; проведение ежемесячных контрольных доений с отбором проб молока, анализом его качества в независимых молочных лабораториях и внесением всех данных в программу ИАС – для осуществления отбора коров на основе занесенных признаков отбора в ИАС; проведение линейной оценки экстерьера коров и присвоение каждому животному классификационной оценки за тип телосложения – для дополнения оценки

племенной ценности животных; формирование быкопроизводящих групп коров – для отбора высокопродуктивных коров с целью проведения заказного спаривания; составление плана и проведение заказного спаривания – для получения бычков, отцами которых будут выдающиеся быки-производители с высокими генетическими характеристиками; провести геномную оценку бычков, полученных от заказного спаривания.

Ключевые слова: молочное скотоводство, мониторинг, селекционный процесс, управление, продуктивность.

About the authors:

Seidaliyev Nurzhan Beskempirovich, Candidate of Agricultural Sciences, Senior Researcher, Department of Breeding and Selection of Dairy Cattle, Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan; s.nurzhan_b@mail.ru; https://orcid.org/0000-0002-2985-6967

Dalibayev Ermek Kurmanbaevich, Senior Researcher, Department of Breeding and Selection of Dairy Cattle, Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan; erdal62@mail.ru; https://orcid.org/0000-0002-2712-7445

Zhamalov Bakbergen Seydakhanuly, Researcher, Department of Breeding and Selection of Dairy Cattle, Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan; bakbergen.zhamalov@mail.ru; https://orcid.org/0000-0002-4026-5244

Muka Shynar Bakytkyzy, Master of Biological Sciences, Researcher, Department of Breeding and Selection of Dairy Cattle, Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan; chika-1718@mail.ru; https://orcid.org/0000-0003-4891-5990

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

http://agricultural.kz/

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

Подписано в печать 10.10.2018.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
5,9 п.л. Тираж 300. Заказ 5.

Национальная академия наук РК
050010, Алматы, ул. Шевченко, 28, т. 272-13-18, 272-13-19