

ISSN 2518-1629 (Online),
ISSN 2224-5308 (Print)

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
Өсімдіктердің биологиясы және биотехнологиясы институтының

Х А Б А Р Л А Р Ы

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
Института биологии и биотехнологии растений

NEWS

OF THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
of the Institute of Plant Biology and Biotechnology

**БИОЛОГИЯ ЖӘНЕ МЕДИЦИНА
СЕРИЯСЫ**



СЕРИЯ

БИОЛОГИЧЕСКАЯ И МЕДИЦИНСКАЯ



SERIES

OF BIOLOGICAL AND MEDICAL

6 (330)

**ҚАРАША – ЖЕЛТОҚСАН 2018 ж.
НОЯБРЬ – ДЕКАБРЬ 2018 г.
NOVEMBER – DECEMBER 2018**

**1963 ЖЫЛДЫҢ ҚАҢТАР АЙЫНАН ШЫҒА БАСТАҒАН
ИЗДАЕТСЯ С ЯНВАРЯ 1963 ГОДА
PUBLISHED SINCE JANUARY 1963**

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

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

Б а с р е д а к т о р

ҚР ҰҒА академигі, м. ғ. д., проф. **Ж. А. Арзықұлов**

Абжанов Архат проф. (Бостон, АҚШ),
Абелев С.К., проф. (Мәскеу, Ресей),
Айтқожина Н.А., проф., академик (Қазақстан)
Ақшулақов С.К., проф., академик (Қазақстан)
Алшынбаев М.К., проф., академик (Қазақстан)
Бәтпенев Н.Д., проф., корр.-мүшесі (Қазақстан)
Березин В.Э., проф., корр.-мүшесі (Қазақстан)
Берсімбаев Р.И., проф., академик (Қазақстан)
Беркінбаев С.Ф., проф., (Қазақстан)
Бисенбаев А.К., проф., академик (Қазақстан)
Бишимбаева Н.Қ., проф., академик (Қазақстан)
Ботабекова Т.К., проф., корр.-мүшесі (Қазақстан)
Жансүгірова Л.Б., б.ғ.к., проф. (Қазақстан)
Ellenbogen Adrian prof. (Tel-Aviv, Israel),
Жамбакин Қ.Ж., проф., академик (Қазақстан), бас ред. орынбасары
Заядан Б.К., проф., корр.-мүшесі (Қазақстан)
Ishchenko Alexander prof. (Villejuif, France)
Исаева Р.Б., проф., (Қазақстан)
Қайдарова Д.Р., проф., академик (Қазақстан)
Кохметова А.М., проф., корр.-мүшесі (Қазақстан)
Күзденбаева Р.С., проф., академик (Қазақстан)
Локшин В.Н., проф., корр.-мүшесі (Қазақстан)
Лось Д.А., prof. (Мәскеу, Ресей)
Lunenfeld Bruno prof. (Израиль)
Макашев Е.К., проф., корр.-мүшесі (Қазақстан)
Миталипов Ш.М. (Америка)
Муминов Т.А., проф., академик (Қазақстан)
Огарь Н.П., проф., корр.-мүшесі (Қазақстан)
Омаров Р.Т., б.ғ.к., проф., (Қазақстан)
Продеус А.П. проф. (Ресей)
Purton Saul prof. (London, UK)
Рахыпбеков Т.К., проф., корр.-мүшесі (Қазақстан)
Сапарбаев Мұрат проф. (Париж, Франция)
Сарбасов Дос проф. (Хьюстон, АҚШ)
Тұрысбеков Е.К., б.ғ.к., асс.проф. (Қазақстан)
Шарманов А.Т., проф. (АҚШ)

«ҚР ҰҒА Хабарлары. Биология және медициналық сериясы».

ISSN 2518-1629 (Online),

ISSN 2224-5308 (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 №5546-Ж мерзімдік басылым тіркеуіне қойылу туралы куәлік

Мерзімділігі: жылына 6 рет.

Тиражы: 300 дана.

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

© Қазақстан Республикасының Ұлттық ғылым академиясы, 2018

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

Г л а в н ы й р е д а к т о р

академик НАН РК, д.м.н., проф. **Ж. А. Арзыкулов**

Абжанов Архат проф. (Бостон, США),
Абелев С.К. проф. (Москва, Россия),
Айтхожина Н.А. проф., академик (Казахстан)
Акшулаков С.К. проф., академик (Казахстан)
Алчинбаев М.К. проф., академик (Казахстан)
Батпенов Н.Д. проф. член-корр.НАН РК (Казахстан)
Березин В.Э., проф., чл.-корр. (Казахстан)
Берсимбаев Р.И., проф., академик (Казахстан)
Беркинбаев С.Ф. проф. (Казахстан)
Бисенбаев А.К. проф., академик (Казахстан)
Бишимбаева Н.К. проф., академик (Казахстан)
Ботабекова Т.К. проф., чл.-корр. (Казахстан)
Джансугурова Л. Б. к.б.н., проф. (Казахстан)
Ellenbogen Adrian prof. (Tel-Aviv, Israel),
Жамбакин К.Ж. проф., академик (Казахстан), зам. гл. ред.
Заядан Б.К. проф., чл.-корр. (Казахстан)
Ishchenko Alexander, prof. (Villejuif, France)
Исаева Р.Б. проф. (Казахстан)
Кайдарова Д.Р. проф., академик (Казахстан)
Кохметова А.М. проф., чл.-корр. (Казахстан)
Кузденбаева Р.С. проф., академик (Казахстан)
Локшин В.Н., проф., чл.-корр. (Казахстан)
Лось Д.А. prof. (Москва, Россия)
Lunenfeld Bruno prof. (Израиль)
Макашев Е.К. проф., чл.-корр. (Казахстан)
Миталипов Ш.М. (Америка)
Муминов Т.А. проф., академик (Казахстан)
Огарь Н.П. проф., чл.-корр. (Казахстан)
Омаров Р.Т. к.б.н., проф. (Казахстан)
Продеус А.П. проф. (Россия)
Purton Saul prof. (London, UK)
Рахыпбеков Т.К. проф., чл.-корр. (Казахстан)
Сапарбаев Мурат проф. (Париж, Франция)
Сарбасов Дос проф. (Хьюстон, США)
Турьсыбеков Е. К., к.б.н., асс.проф. (Казахстан)
Шарманов А.Т. проф. (США)

«Известия НАН РК. Серия биологическая и медицинская».

ISSN 2518-1629 (Online),

ISSN 2224-5308 (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 №5546-Ж, выданное 01.06.2006 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,
www.nauka-nanrk.kz / biological-medical.kz

© Национальная академия наук Республики Казахстан, 2018

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

Editor in chief

Zh.A. Arzykulov, academician of NAS RK, Dr. med., prof.

Abzhanov Arkhat, prof. (Boston, USA),
Abelev S.K., prof. (Moscow, Russia),
Aitkhozhina N.A., prof., academician (Kazakhstan)
Akshulakov S.K., prof., academician (Kazakhstan)
Alchinbayev M.K., prof., academician (Kazakhstan)
Batpenov N.D., prof., corr. member (Kazakhstan)
Berezin V.Ye., prof., corr. member. (Kazakhstan)
Bersimbayev R.I., prof., academician (Kazakhstan)
Berkinbaev S.F., prof. (Kazakhstan)
Bisenbayev A.K., prof., academician (Kazakhstan)
Bishimbayeva N.K., prof., academician (Kazakhstan)
Botabekova T.K., prof., corr. member. (Kazakhstan)
Dzhansugurova L.B., Cand. biol., prof. (Kazakhstan)
Ellenbogen Adrian, prof. (Tel-Aviv, Israel),
Zhambakin K.Zh., prof., academician (Kazakhstan), deputy editor-in-chief
Ishchenko Alexander, prof. (Villejuif, France)
Isayeva R.B., prof. (Kazakhstan)
Kaydarova D.R., prof., academician (Kazakhstan)
Kokhmetova A., prof., corr. member (Kazakhstan)
Kuzdenbayeva R.S., prof., academician (Kazakhstan)
Lokshin V.N., prof., corr. member (Kazakhstan)
Los D.A., prof. (Moscow, Russia)
Lunenfeld Bruno, prof. (Israel)
Makashev E.K., prof., corr. member (Kazakhstan)
Mitalipov Sh.M. (America)
Muminov T.A., prof., academician (Kazakhstan)
Ogar N.P., prof., corr. member (Kazakhstan)
Omarov R.T., Cand. biol., prof. (Kazakhstan)
Prodeus A.P., prof. (Russia)
Purton Saul, prof. (London, UK)
Rakhypbekov T.K., prof., corr. member. (Kazakhstan)
Saparbayev Murat, prof. (Paris, France)
Sarbassov Dos, prof. (Houston, USA)
Turysbekov E.K., cand. biol., assoc. prof. (Kazakhstan)
Sharmanov A.T., prof. (USA)

News of the National Academy of Sciences of the Republic of Kazakhstan. Series of biology and medicine.

ISSN 2518-1629 (Online),

ISSN 2224-5308 (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 5546-Ж, issued 01.06.2006

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> / biological-medical.kz

© National Academy of Sciences of the Republic of Kazakhstan, 2018

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

NEWS

OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN

SERIES OF BIOLOGICAL AND MEDICAL

ISSN 2224-5308

Volume 6, Number 330 (2018), 20 – 29

<https://doi.org/10.32014/2018.2518-1629.13>

UDC 341.29.25.21.15

A. A. Imanbayeva, I. F. Belozеров, M. Yu. Ishmuratova

Mangyshlak Experimental Botanical Garden, Aktau, Kazakhstan.
E-mail: imangarden@mail.ru; b.i.f@bk.ru; margarita.ishmur@mail.ru

**USING OF COMPUTER PROGRAMM «BD-PLANT-KZ»
FOR CADASTRAL REGISTRATION OF PLANTS
OF THE NATURAL FLORA OF KAZAKHSTAN**

Abstract. The description of the computer “BD-PLANT-KZ” program, intended for input and storage in memory of the computer of various botanical information on plants of natural flora of Kazakhstan is provided. 11 points of the program are a part of the Main menu: "File", "Editing", "Input", "Search", "Viewing", "Lists", "Herbarium", "Communities", "Databases", "Service" and "Reference". The program allows carrying out quick search of data, printing, exporting to various formats, drawing up reports and lists in the set taxonomical, bioecological, decorative and other parameters. “BD-PLANT-KZ” has undergone successful approbation in two botanical gardens of Kazakhstan (Altai and Mangyshlak). Now floristic the database of the program includes information on natural flora for 882 taxons from 4 departments, 6 classes, 12 subclasses, 26 suborders, 59 orders, 10 suborders, 80 families and 300 gena. Approbation of the program has allowed making the summary characteristic of natural flora of the Western Kazakhstan on the example of the Mangystau, Atyrau, Aktyubinsk and West-Kazakhstan regions. Lists of taxons are determined by geographical points and floristic areas, geographical novelties are revealed.

Key words: computer program, «BD-PLANT-KZ», cadastral, registration of plants, Data Base.

Introduction. During creation of the information databases (DB) which containing a large number of accounts and variables, such as the inventory of plants, development of the instrument of formation of DB - the special computer program adapted with modern operating systems, graphic and text editors has essential value. Storage and processing of botanical information is widely applied in the countries of CIS and beyond. However, in Kazakhstan researches in this direction weren't carried out earlier.

In 2011-2012 on the basis of Republic State Entertainment "Mangyshlak Experimental Botanical Garden" of Science Committee of the Ministry of Education and Science within implementation of the project "Development of Scientific-Methodical and Information Base for Creation of the Inventory of Plants of the Republic of Kazakhstan" the special computer program “BD-PLANT-KZ” has been developed. There are electron shells inside allowing entering into databases several information on taxonomical structure of vascular plants with the description of their morphology, ecology, economic and biological properties, geographical GPS coordinates, herbarium samples, vegetative communities, raw resources, geographical and floristic areas, illustration photos and maps of areas.

The purpose of this scientific work is assessment lies in possibility of application of computer program for accounting of plants of natural flora of Kazakhstan.

Materials and methodology. During construction of “BD-PLANT-KZ” four programming languages have been used: Microsoft Visual FoxPro 9 SP2, Visual Basic For Applications 7.0, HTML 4.0 and JavaScript API 2.1.

For simplification of input of taxonomical units in the DB program is used the list of plant gena according to R.K. Brummitt [1]. In the DB for systematization of information is used the phylogenetic system of A.L. Takhtadzhyan [2, 3].

At the description of vegetable communities in "BD-PLANT-KZ" the scheme of geobotanical inspection of the deserts of Mangyshlak is accepted according to I.N. Safronova [4]: vegetation type, group of formations, formation, association. The volume of information on each record of DB is 25-30 (with drawings and the map - to 150-200) kB.

The Install Shield 2012 Premier Edition SP1 program was applied to formation of an adjusting compact disk and the uniform distributive Setup.exe file.

Effective work of "BD-PLANT-KZ" is possible at implementation of the following system requirements to computers: the Microsoft Windows XP SP 2-3, Vista SP 1-2 operating system or 7, 8 and 10 (32-bit or 64-bit), existence of Microsoft Office 2007, 2010 or 2016, is also more modern than Adobe Reader 7 or more of the late version, Internet Explorer 9; processor: Intel Pentium 4 or above; The RAM of 512 MB and more, is recommended – 2048; free disk memory - 700 MB; minimum resolution of the monitor not less than 1024 x 768. For the maximum use of opportunities for hardware acceleration graphic video cards, compatible DirectX, with the built-in video memory not less than 128 MB are recommended.

Results and their discussion. The structure of the program is reflected by its Main Menu (MM) which included 11 points: "File", "Editing", "Input", "Search", "Viewing", "Lists", "Herbarium", "Communities", "Databases", "Service" and "Reference" (figure 1).

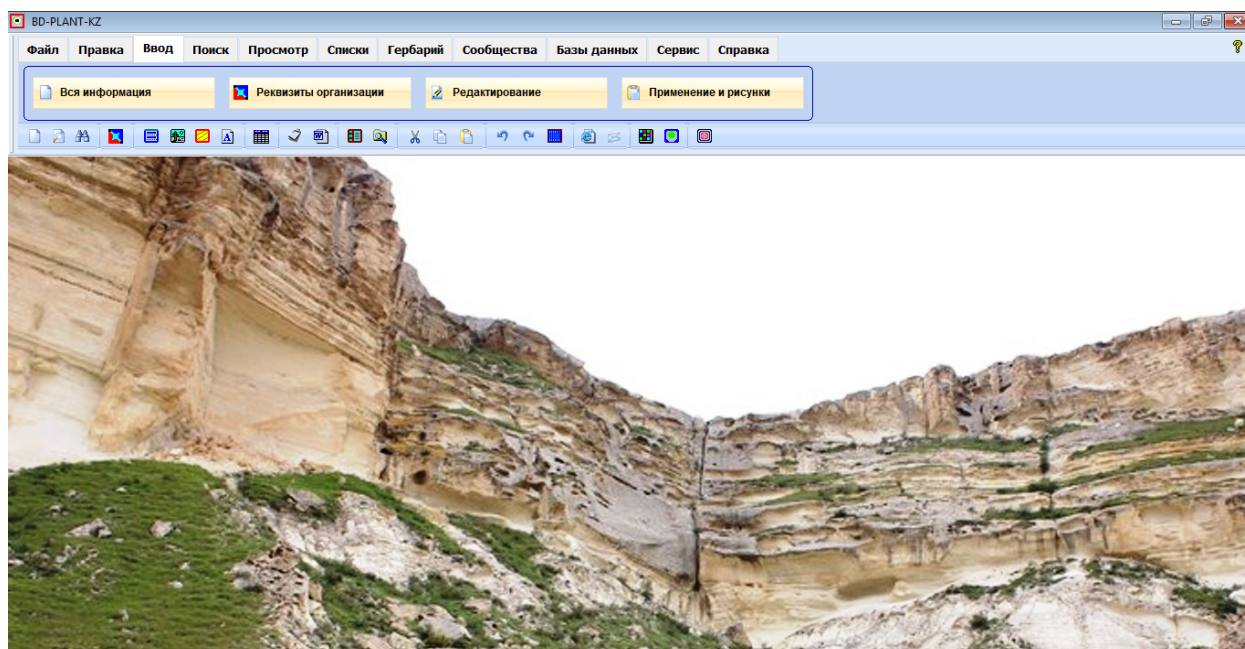


Figure 1 – The main menu of the Program

Point of MM "File" includes a standard set of sub points: "To open...", "My computer", "Press", "Filer", "Search of files", "Server", "Internet", "Mail" and "Exit" and intends for creation new and works with the available files, printings of information, contact with the server and Internet resources, for sending electronic messages and to make exit from the program. Point "Editing" is necessary for editing active text fields of forms of input and viewing of information, and also for searching and replacement of words and expressions, control of their font, color of letters and a background. From point "Input" is formed filling of new and changing earlier entered information. This point includes three sub points – "All information", "Requisites of the organization", "Editing" and "Application and figures".

Point "Search" allows to find plants in the DB using the following options: according to the identification number; according to the Latin name of taxon, according to the Russian name, according to the national name, family name, on floristic and geographical areas and by any word or a fragment of word from Latin, Russian and Kazakh names. In point "Advanced search" practically all above-mentioned ways are integrated. Point "Viewing" is used for work with already entered information with opportunities of its press and export in external editors and programs in various formats - doc, docx, rtf, txt, pdf, xml, etc.

Applying the point "Lists" it is possible to form the most various reports about plants according to taxonomical, morphological and other characteristics.

Three points "Input and viewing", "Reports" and "Export" of MM "Herbarium" realize a possibility of full work with information of Herbarium fund of botanical establishments.

Point "Communities" include only one sub points "Input and viewing" which is necessary for work with vegetation populations.

Point of MM of "Data base" is intended for implementation of the following commands: "Copying", "Restoration", "Export", "Import", "Re-indexation", "Repair of indexes" and "DB Information".

Under MM there is a system Push-button menu for a fast loading of the most often used forms of input, viewing, printing of information, etc.

After "BD-PLANT-KZ" installation at the first start of the program requisites of botanical establishment are without fail entered, using for this purpose the sub point "The main menu \Input \Requisites of the organization". It is required for a binding of all taxa at input of information to a certain organization.

All data on a plant are divided on forms of input and viewing into 11 groups (pages): Taxonomy, Names, Areas, Map, Morphology, Ecology, Application, Addition information, Herbarium, Figures and Text. On all pages are provided menus and buttons of the fast choice of the standard or already available in DB information for the purpose of its operating input (figure 2).

Figure 2 – Page «Taxonomy» – forms of entering and viewing

Forms "Input" and "Viewing" of plants' data differ only functionally and according to the lower push-button menu of commands. The push-button menu on a form "Input" includes 5 points: "To keep" - it is used for addition into DB new record after entering all information about plant; "Copy" - serves for copying from DB already entered data on taxa for further editing and preservation that facilitates input of information; "Check" is necessary for search of a plant in DB that exclude duplication; "Dumping" - removal of all information from a form of "Input" and "Exit" - for its closing. On form "Viewing" is located 11 command buttons which perform various functions of work with earlier entered data about plants, 4 of them are placed at the left and are included for navigation on a DB. On the page "Taxonomy" is entered or checked all systematic characteristic of a plant.

The program enters full "Names" of plants automatically, adding the name of species, a form, etc. through a gap to a sort. For authors certain fields are provided. The structure of fields of the section "Areas" has included old and new names of floristic areas, administrative and geographical regions in the explored territory, the general distribution, etc. Places of occurrence of plants can be displayed on the page "Card".

The description of morphological features of taxa is conducted on the page “Morphology” (figure 3) and used the following indicators: growth form, vital form according to A. Raunkier, classification by frequency of fructification, pollination type, data of blossoming and pollination, coloring of flowers, fruits and leaves, the characteristic of a morphological structure.

Malacosarpus crithmifolius (Retz.) C.A. Mey - Мягкоплодик критмолистный - РГП "Мангышлакский экспериментальный ботанический сад" ...

Таксономия Названия Ареалы Карта **Морфология** Экология Применение Дополнительно Гербарий Рисунки Текст

Форма роста: кустарник Дополнительно: сильно ветвистый с беловой корой

Листопадность: лиственное листопадное

Жизненная форма по Раункиеру: фанерофит

По плодonoшению: поликарпик

По типу опыления: самоопыляемое По способу распространения плодов:

Начало цветения: Декада: Месяц: апрель Конец цветения: Декада: Месяц:

Созревание плодов: 3 декада августа

Оттенок: Фон:

Окраска цветка: бледно- желтая

Окраска плодов: ярко- красная

Окраска листьев летом: светло- зеленая

Окраска листьев осенью: бледно- желтая

Описание морфологического строения: Растение до 1 м высоты, стебли тонкие, раскидистые; листья голые, суккулентные, очередные, дважды рассеченные на линейные, слегка изогнутые доли. Цветки одиночные, на цветоножках, расположены супротивно листьям; чашечка 5-раздельная, остающаяся при плодах; лепестки по 5, желтые, около 12 мм длины. Плоды - сочная 3-гнездная ягода, до 12 мм в диаметре, красного цвета.

Интернет WinWord

Figure 3 – Page «Morphology» – forms of entering and viewing

Ecological features are displayed on the page “Ecology” (a natural area, habitats, the phyto security status, an endemic, relicts and aboriginal status, classification in relation to light, water, fertility and salinity of the soil, etc.).

Malacosarpus crithmifolius (Retz.) C.A. Mey - Мягкоплодик критмолистный - РГП "Мангышлакский экспериментальный ботанический сад" ...

Таксономия Названия Ареалы Карта Морфология **Экология** Применение Дополнительно Гербарий Рисунки Текст

Выбор Главный В отчет

В горном Мангышлаке

Выбор Главный В отчет

В прибрежной зоне Каспия

Выбор Главный В отчет

Выбор Главный В отчет

Выбор Главный В отчет

Заменить/вставить Удалить Просмотр Редактирование Печать

Интернет WinWord

Figure 4 –Page «Figures» - forms of input and viewing

Economic and biological value and reproductive ability of plants is collected in fields of DB – "Application". On the page "Addition information" are placed references and data about user - organization. The section "Herbarium" is made for input and viewing of places and geographical coordinates of herbarium samples (until 3 samples). On the page "Figures" is possible to insert into DB until 6 files of plant images with their names (figure 4). The page "Text" is made for the purpose of input and storage of big text information on taxa (including of files).

The great value in "BD-PLANT-KZ" is given to quick search of taxa. The special form is made which allow to filter taxa by institutions, families and gena or to choose a concrete plant (figure 5).

Figure 5 – Form «Advances search»

Using of "BD-PLANT-KZ" it is possible to export plant information to 9 formats (txt, doc, docx, xls, xlsx, rtf, pdf, tif and xml) for the subsequent editing in external text and graphic editors. The call of a form of export (figure 6) is carried out through MM - "The main menu \Viewing \In WinWord". On completion of translation of data in the chosen format, the created file opens in the corresponding editor. The example of export to Microsoft Word is shown in the figure 7.

Access to the form of the list of taxonomical units is carried out by the button "Systematization" in point "Viewing" of MM (figure 8). At the choice of any unit of systematization in the right text field there is a list of the taxa of DB. Here it is possible to obtain also information, as about all taxonomy of organization, so inside DB in general.

Figure 6 – Form «Export information in WinWord and other formats»

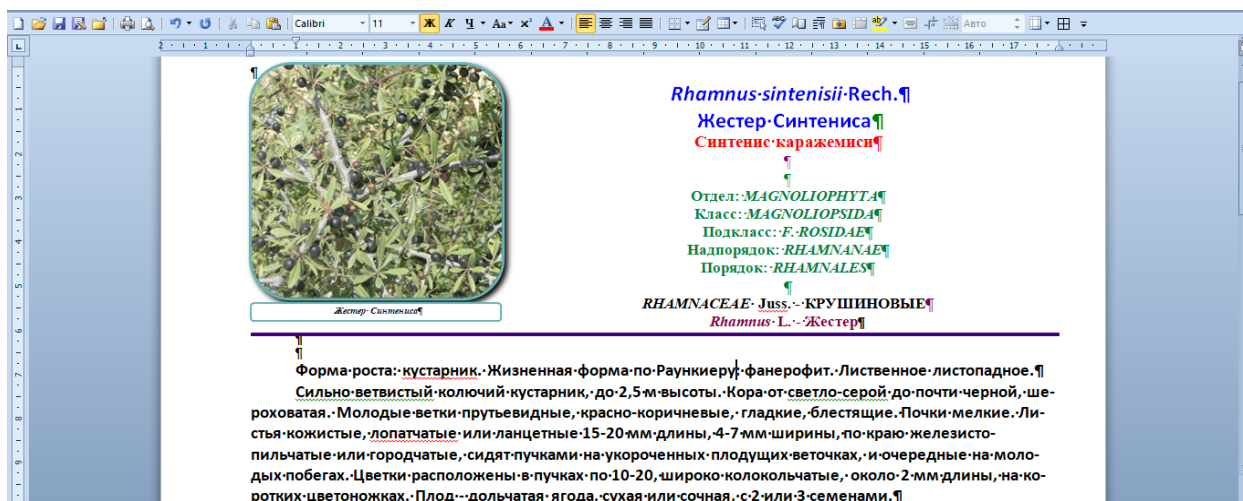


Figure 7 – Example of export of information in pdf – format

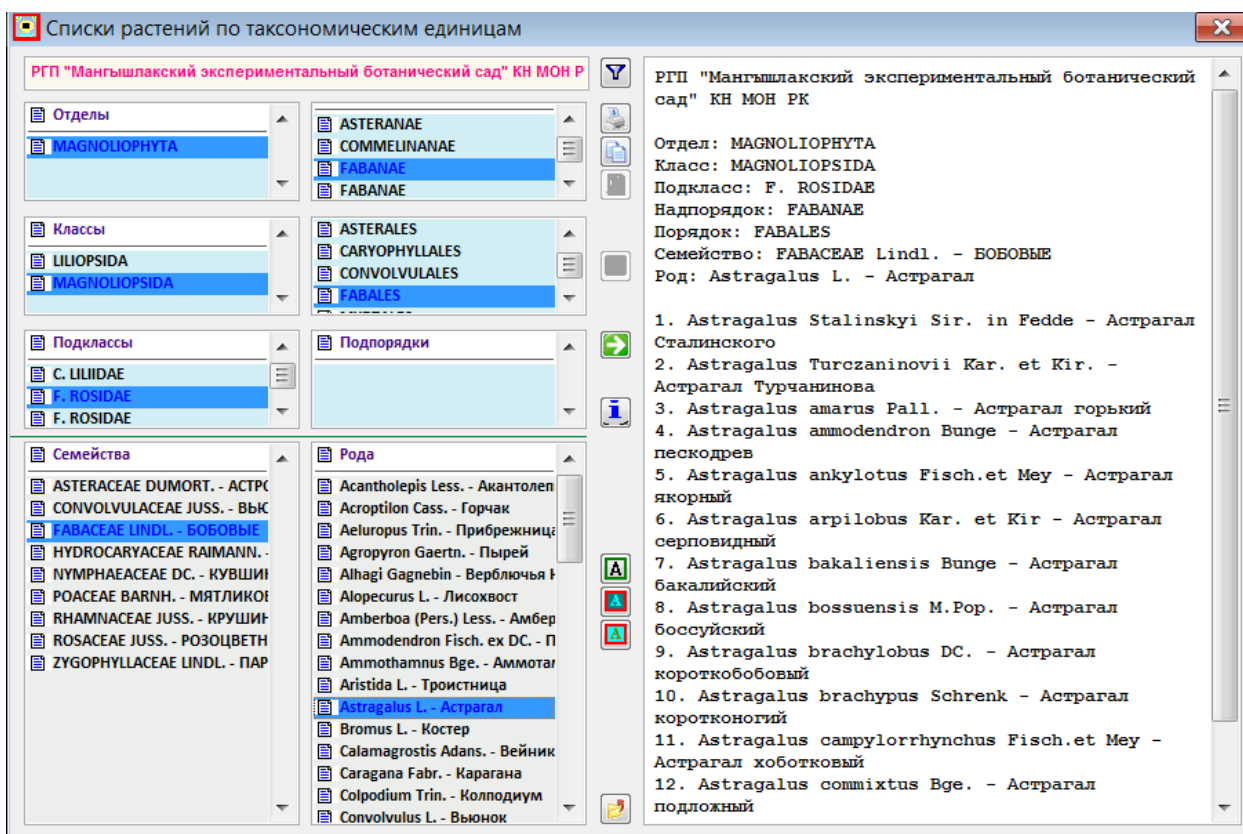


Figure 8 – Form of the list of taxonomical units

The program has provided formation of the most various lists of plants according to taxonomical, morphological and other characteristics.

More detailed task of parameters of creation lists is possible when using a form with the similar name which is started by command "Choice ..." of point of MM. Creation lists is carried out to Excel with use of the form which represented in the figure 9.

The command "Main Menu \Herbarium" is applied to work with Herbarium fund. At the same time on the screen there will be a special form on which all list of plants of botanical organization by default will be displayed. By using of the lower Push-button menu it is possible to execute search of the necessary

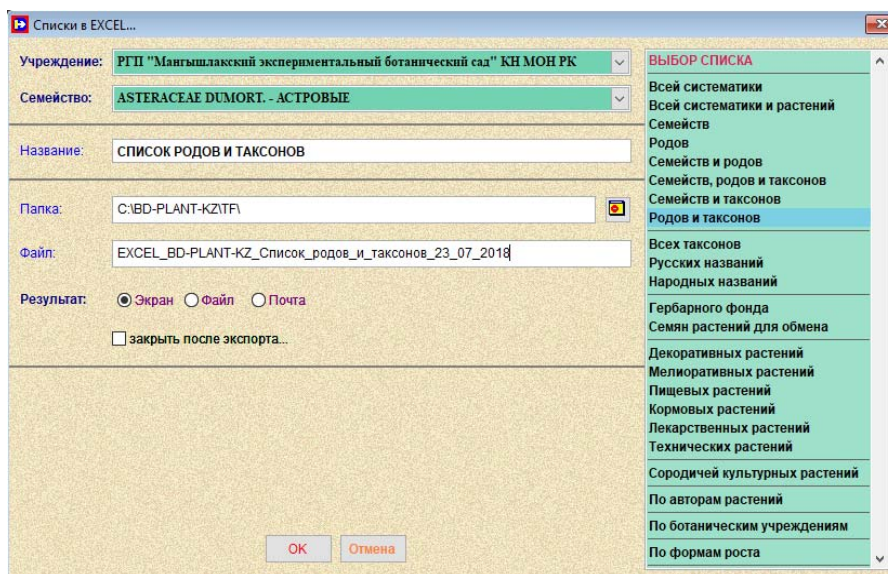


Figure 9 – Form «List in Excel...»

taxon, to view and print out all list, and also to edit it regarding inclusion or an exception of a plant of herbarium fund. If herbarium samples are available, the button “Samples” is activated by means of which the form intended directly for editing information is started. The Command “Editing” makes available for editing of the field DB. The current record of the Herbarium can be copied and removed. The modes “Reports” and “Export” gave the chance of a conclusion of herbarium data in two options: "All information" and "Labels".

For plant communities in "BD-PLANT-KZ" is provided the forms of input and viewing information included 5 pages (groups) of information: "Location", "Communities", "Tier", "In addition" and "Figures" (figure 10).

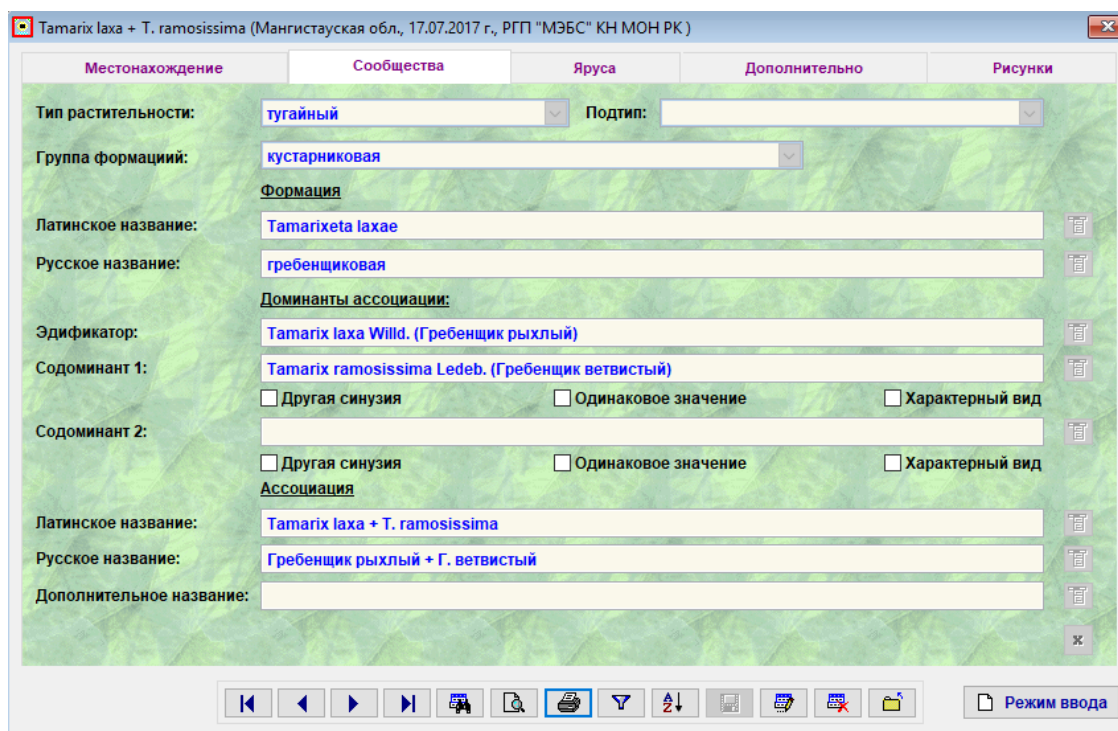


Figure 10 – Page «Community» - forms of input and viewing information

The page "Location" is concentrated fields of DB characterized administrative and geographical location of population, GPS coordinates, name of natural zone and conditions of growing. The group of variables "Community" is devoted to directly geo botanical units.

Many of them can be chosen or created from the lists revealing the corresponding buttons. The correct connection of dominant in the name of association can be executed automatically by means of a combination of installation or removal of a tick to the left of the words "Other sinuzia", "Identical Meaning" and "Characteristic Species".

By using of Latin names of communities, the name of edipicator is put on the first place, Russian – on the contrary [4]. Taxa of various sinuzia connect in population the sign of a hyphen "-", one – plus "+". In case plants have identical value and belong to one sinuzia, then they are listed through a comma. Species which are characteristic of community, consist in their names in square brackets "[...]".

The page "Tier" includes as the general list of the plants entering into structure of population, and their level accessory with the indication of a projective covering, abundance according Drudae, occurrences and heights. To group "Addition" are carried out geo botanical districts, areas and sub-districts, existence of raw resources, the note of a text format unlimited on length, botanical organization, a position, degree and Full name of the performer. "Figures" (page No. 5) are necessary for work with graphic material on communities which can be observed in three modes: "Clip", "Isometry" and "Stretched".

Thus, structurally three main databases are a part of the program: 1) floristic, 2) herbarium and 3) geo botanical, consisting, respectively, from 211, 60 and 131 fields of numerical, symbolical and logical types in the total length - 10602, 2703 and 8161 symbol.

Commands of point MM "Data Base" have the following functional purpose:

- 1) "Copying" - creation of the insurance copy of all DB, setting up the program and files of images on a case of loss of information;
- 2) "Restoration" - a complete recovery of a DB and settings;
- 3) "Export" - creation of the copy of a floristic, herbarium and geo botanical DB for transfer on other personal computer (PC) or in other botanical organizations;
- 4) "Import" - addition of records on plants, herbarium fund and communities from other personal computer;
- 5) "Re-indexation" - updating of the DB indexes and their packing;
- 6) "Repair of indexes" - creation of new indexes instead of spoiled in the process of work, if that happens;
- 7) "Information" - obtaining data on the maintenance of DB.

After using the first two sub points is also possible copying of DB on other personal computer. The folder created in the mode "Export" can be archived and sent at once to other botanical organization by e-mail or via the server for formation of a uniform DB according to the inventory of plants of natural flora of Kazakhstan.

Present days floristic DB includes the fullest taxonomical, geographical, ecological - biological and graphic information for 882 taxa from 4 departments, 6 classes, 12 subclasses, 26 above orders, 59 orders, 10 sub orders, 80 families and 300 gena is entered. More than a half (66,0%) of taxa (582) of DB is represented by representatives of 7 families (table 1); the most numerous are 4 families: Asteraceae Dumort. (124), Chenopodiaceae Vent. (152), Fabaceae Lindl. (111) and Poaceae Barnh. (138). Among taxa complexes in the database are considerably prevailed the following gena - Artemisia L. (53 - 6,0%), Astragalus L. (80 - 9,1%), Elymus L. (34 - 3,9%) and Salsola L. (20 - 2,3%). In the natural conditions plants grow in 37 floristic regions of Kazakhstan. 96 species meet on all territory of the republic. The greatest number of taxa is dated for the following floristic areas: "3. Tobolsk and Ishim (101), "4. Ural" (33), "5. Aktyubinsk" (45), "6. Turgai" 63), "16. Mangystau" (40) and "30. Altai" (119). At present in the DB there are 976 graphic files (figures, images and maps).

Now in herbarium database of program "BD-PLANT-KZ" is contained data recording for 765 samples of 281 species and a form of plants of natural flora from 53 families and 162 gena collected in 74 locations of 320 geographical regions (areas) of 14 administrative regions of 4 areas of Kazakhstan.

The greatest number of samples has been collected in Beyneu (99), Karakiyansky (150), Mangystau (170) and Tupkaragan areas (65) of the Mangystau Region; and also in Zhylyoy (53) and Kzylkoginsky areas (126) of the Atyrau regions (table 2). Amongfloristic areas on number of herbarium information

Table 1 – The most representative families and gena of plants of the floristic database

Family	Taxa	%	Gene	Taxa	%
<i>Asteraceae</i> Dumort.	124	14,1	<i>Artemisia</i> L.	53	6,0
<i>Brassicaceae</i> Burnett.	26	2,9	<i>Astragalus</i> L.	80	9,1
<i>Chenopodiaceae</i> Vent.	152	17,2	<i>Atriplex</i> L.	15	1,7
<i>Fabaceae</i> Lindl.	111	12,6	<i>Chenopodium</i> L.	16	1,8
<i>Lamiaceae</i> Lindl.	14	1,6	<i>Elymus</i> L.	34	3,9
<i>Poaceae</i> Barnh.	138	15,6	<i>Salsola</i> L.	20	2,3
<i>Scrophulariaceae</i> Juss.	17	1,9	<i>Suaeda</i> Forks.	14	1,6
Total:	582	66,0	Total:	232	26,3

Table 2 – Distribution of herbarium samples of the database by the administrative and floristic regions of Kazakhstan

Administrative region (oblast)	Taxa	%	Floristic region	Taxa	%
Beineu (Mangystau)	99	12,9	5. Aktobe	23	3,0
Bokeiorda (Western Kazakstan)	1	0,1	15. Bosaschy	6	0,8
Zhylyoy (Atyrau)	53	6,9	13a. Bekeev	1	0,1
Inder (Atyrau)	39	5,1	16. Mangystau	381	49,8
Isatai (Atyrau)	20	2,6	13. Caspian	1	0,1
Karakiyansky (Mangystau)	150	19,6	17. Northern Ustyurt	96	12,5
Kzylkoginsky (Atyrau)	126	16,5	6. Turgay	1	0,1
Makat (Atyrau)	14	1,8	4. Ural	256	33,5
Mangystau (Mangystau)	170	22,2			
Makhambet (Atyrau)	22	2,9			
Mugadzhary (Aktobe)	1	0,1			
Munailinskyi (Mangystau)	4	0,5			
Tubkaragan (Mangystau)	65	8,5			
Khobda (Atyrau)	1	0,1			
Total:	765	100,0	Total:	765	100,0

entered into a DB considerably dominate "16. Mangystau" (381 - 49,8%), "17. Northern Ustyurt" (96 - 12,5%) and "4. Ural" (256 - 33,5%). Herbarium samples of the database are illustrated by 465 photos.

Conclusion. The computer program has successfully approbated in two botanical gardens of Kazakhstan (Altai and Mangyshlak), and has shown high reliability and efficiency of work with floristic and herbarium information on plants of natural flora of Kazakhstan. Lists of taxa are revealed according to systematic accessory, ecological and biological properties, geographical points, floristic areas, etc. It is determined geographical novelties of plants.

"BD-PLANT-KZ" is registered in Committee on Intellectual Property Rights of the Ministry of Justice of the Republic of Kazakhstan (the certificate on the state registration No. 1408 of December 25, 2012, IS 0009258).

Introduction of the program into practice of the cadastral registration has considerably simplified creation information databases, has allowed carrying out quickly search of taxa and, in general, has expanded possibilities of work with information about plants and their communities

REFERENCES

- [1] Brummitt R.K. Vascular plant // Families and Genera. Royal Botanic Gardens. Kew, 1992. 804 p. ISBN 0-947643-43-5.
- [2] Takhtajan A.L. Systematic of Magnoliophytes. Leningrad: Publ. Science, 1987. 440 p. ISBN 5288002193.
- [3] Takhtajan A. Diversity and Classification of Flowering Plants. New York: Columbia University Press, 1997. 663 p. ISBN 0231100981.

[4] Safronova I.N. Deserts of Mangyshlak (Review of vegetation) // Proceedings of Botanical Institute named after V. L. Komarov of Russian Academy of Science. 1996. Vol. 18. 212 p. ISBN: 5-201-11092-4.

А. А. Иманбаева, И. Ф. Белозеров, М. Ю. Ишмуратова

Маңғышлақ экспериментальдық ботаникалық бағы, Ақтау, Қазақстан

ҚАЗАҚСТАННЫҢ ТАБИҒИ ФЛОРАСЫНЫҢ ӨСІМДІКТЕРІН КАДАСТРЛІК ЕСЕПКЕ АЛУ ҮШІН «BD-PLANT-KZ» КОМПЬЮТЕРЛІК БАҒДАРЛАМАСЫН ҚОЛДАНУ

Аннотация. Қазақстанның табиғи флорасының өсімдіктерінің ботаникалық алуан түрлігі жөнінде ақпаратты компьютер жадына енгізу және сақтау үшін арналған «BD-PLANT-KZ» компьютерлік бағдарламасының сипаттамасы берілген. Бағдарламаның негізгі құрылымының құрамы 11 мәтіннен тұрады: «Файл», «Өңдеу», «Енгізу», «Іздеу», «Қарау», «Тізім», «Кеппе шөп», «Қауымдастық», «Деректер базасы», «Сервис» және «Анықтама». Бағдарлама деректерді жылдам іздеуге, басып шығаруға, әртүрлі форматта экспорттауға, берілген таксономикалық, биоэкологиялық, сәндік және басқа параметрлер бойынша тізімдер мен есептерді жасауға мүмкіндік береді. «BD-PLANT-KZ» Қазақстанның екі ботаникалық бақтарында (Алтай және Маңғыстау) сынақтан сәтті өтті. Қазіргі уақытта бағдарламаның флористикалық деректер базасында табиғи флораның 4 бөлімдер, 6 класс, 12 класс асты, 26 қатарүсті, 59 қатар, 10 қатар асты, 80 тұқымдастан және 300 туыстан тұратын 882 таксон үшін ақпарат енгізілген. Бағдарламаның сынағы Батыс Қазақстанның мысалға Маңғыстау, Атырау Ақтөбе және Батыс Қазақстан облыстарының табиғи флорасының жиынтық сипаттамасын құрастыруға мүмкіндік берді. Географиялық нүктелер мен флористикалық аудандар бойынша таксондар мен географиялық жаңа тізімдер анықталды.

Түйін сөздер: компьютерлік бағдарлама, BD-PLANT-KZ, кадастр, өсімдік есебі, деректер базасы.

А. А. Иманбаева, И. Ф. Белозеров, М. Ю. Ишмуратова

Мангышлакский экспериментальный ботанический сад, Ақтау, Казахстан

ИСПОЛЬЗОВАНИЕ КОМПЬЮТЕРНОЙ ПРОГРАММЫ «BD-PLANT-KZ» ДЛЯ КАДАСТРОВОГО УЧЕТА РАСТЕНИЙ ПРИРОДНОЙ ФЛОРЫ КАЗАХСТАНА

Аннотация. Приводится описание компьютерной программы «BD-PLANT-KZ», предназначенная для ввода и хранение в памяти компьютера разнообразной ботанической информации о растениях природной флоры Казахстана. В состав Главного меню входят 11 пунктов программы: «Файл», «Правка», «Ввод», «Поиск», «Просмотр», «Списки», «Гербарий», «Сообщества», «Базы данных», «Сервис» и «Справка». Программа позволяет осуществлять оперативный поиск данных, вывод на печать, экспорт в различные форматы, составление отчетов и списков по заданным таксономическим, биоэкологическим, декоративным и иным параметрам. «BD-PLANT-KZ» прошла успешную апробацию в двух ботанических садах Казахстана (Алтайский и Мангышлакский). В настоящее время флористическая база данных программы включает информацию по природной флоре для 882 таксонов из 4 отделов, 6 классов, 12 подклассов, 26 надпорядков, 59 порядков, 10 подпорядков, 80 семейств и 300 родов. Апробация программы позволила составить сводную характеристику природной флоры Западного Казахстана на примере Мангистауской, Атырауской, Актюбинской и Западно-Казахстанской областей. Определены списки таксонов по географическим точкам и флористическим районам, выявлены географические новинки.

Ключевые слова: компьютерная программа, «BD-PLANT-KZ», кадастр, учет растений, базы данных.

Сведения об авторах:

Иманбаева Акжунис – Мангышлакский экспериментальный ботанический сад, Ақтау, Казахстан; imangarden@mail.ru; <https://orcid.org/0000-0003-0101-6840>

Белозеров Иван – Мангышлакский экспериментальный ботанический сад, Ақтау, Казахстан; b.i.f@bk.ru; <https://orcid.org/0000-0002-8111-2236>

Ишмуратова М.Ю. – Мангышлакский экспериментальный ботанический сад, Ақтау, Казахстан

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 2518-1629 (Online), ISSN 2224-5308 (Print)

<http://www.biological-medical.kz/index.php/ru/>

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

Подписано в печать 06.12.2018.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
4,5 п.л. Тираж 300. Заказ 5.