ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

2021 • 1

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

БАЯНДАМАЛАРЫ

ДОКЛАДЫ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

REPORTS

OF THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN

PUBLISHED SINCE 1944

ALMATY, NAS RK

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
БАЯНДАМАЛАРЫ **2021 • 1**

«Қазақстан Республикасы Ұлттық ғылым академиясының баяндамалары»
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» Республикалық қоғамдық бірлестігі (Алматы қ.).
Қазақстан Республикасының Ақпарат және қоғамдық даму министрлігінің Ақпарат комитетінде 29.07.2020 ж. берілген **№ KZ93VPY00025418** мерзімдік басылым тіркеуіне қойылу туралы куәлік.

Тақырыптық бағыты: ***наноматериалдар алу, биотехнология және экология саласындағы бірегей зерттеу нәтижелерін жариялау.***

Мерзімділігі: жылына 6 рет.
Тиражы: 500 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28; 219, 220 бөл.;
тел.: 272-13-19, 272-13-18,
http://reports-science.kz/index.php/en/archive

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

ДОКЛАДЫ **2021 • 1**
НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

Доклады Национальной академии наук Республики Казахстан»
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Собственник: Республиканское общественное объединение «Национальная академия наук Республики Казахстан» (г. Алматы).
Свидетельство о постановке на учет периодического печатного издания в Комитете информации Министерства информации и общественного развития Республики Казахстан **№ KZ93VPY00025418**, выданное 29.07.2020 г.

Тематическая направленность: ***публикация оригинальных результатов исследований в области получения наномате-риалов, биотехнологии и экологии.***

Периодичность: 6 раз в год.
Тираж: 500 экземпляров

Адрес редакции: 050010, г.Алматы, ул.Шевченко, 28; ком. 219, 220; тел. 272-13-19, 272-13-18,
http://reports-science.kz/index.php/en/archive

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

REPORTS **2021 • 1**
OF NATIONAL ACADEMY OF SCIENCES OF THE
REPUBLIC OF KAZAKHSTAN

Reports of the National Academy of Sciences of the Republic of Kazakhstan.
ISSN 2224-5227
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty).
The certificate of registration of a periodical printed publication in the Committee of information of the Ministry of Information and Social Development of the Republic of Kazakhstan **No. KZ93VPY00025418**, issued 29.07.2020.

Thematic scope: ***publication of original research results in the field of obtaining nanomaterials, biotechnology and ecology.***

Periodicity: 6 times a year.
Circulation: 500 copies.

Editorial address: 28, Shevchenko str., of. 219, 220, Almaty, 050010, tel. 272-13-19, 272-13-18,
http://reports-science.kz/index.php/en/archive

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

REPORTS OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
ISSN 2224-5227
Volume 1, Number 335 (2021), 47 – 52 **https://doi.org/10.32014/2021.2518-1483.7**

UDC 631.527

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GRAFTING A CUCUMBER HYBRID ON PUMPKIN ROOTSTOCKS RESISTANT TO THE PATHOGEN FUSARIUM

Abstract. Grafting of five varieties of pumpkin on a cucumber hybrid was carried out by the method of notch grafting. As rootstocks used the following varieties of pumpkin: domestic – Aphrodite, Mindalnaya, Karina, Mozoleevskaya 10 and Russian selection – Stofuntovaya and as the scion, a hybrid of cucumber Asylum, recommended for cultivation in protected ground conditions. The research topic is devoted to the study of the influence of pumpkin rootstocks resistant to the Fusarium pathogen on the productivity of the cucumber hybrid in protected ground conditions. Results of studies of the effect of vaccination on various domestic varieties of pumpkin for the growth, development and yield of the hybrid cucumber Asylum showed that when grafting cucumber on pumpkin, the best options compared to the root standard were the varieties of pumpkin Karina and Stofuntovaya.

Keywords: cucumber, pumpkin, rootstock, scion, grafting, Fusarium wilt.

Introduction. The priority direction of the development of vegetable growing at the present stage is to obtain high-quality, environmentally safe products based on the development and introduction of new cultivation technologies, while it should be emphasized the importance of expanding the range of cultivated crops that can diversify the diet of the population. The quality of human life largely depends on proper nutrition, the presence in the diet of a sufficient number of various vegetables. Therefore, providing the country's population with high-quality vegetables in the off-season and increasing their assortment is an important task to improve living standards.

Currently, biological methods of influence on the plant organism are becoming important, and the search for new highly effective and environmentally safe methods of plant protection is promising. One of these methods of vegetative propagation of plants is grafting, which is a connection and subsequent fusion of two plants. Grafting of cultivated plant varieties gives significant results in growth, flowering, and yield. Grafting of woody fruit plants is most common, grafting of herbaceous plants is less well known. For example, it is possible to vaccinate cucumbers on pumpkins. The cultivation of cucumbers in the protected ground is of great importance for vegetable growers [1].

If we take into account, the need to provide residents of the Almaty region with vegetables in the off-season period, then testing new, more productive varieties and hybrids of cucumber to increase their yield and economic efficiency is an urgent problem and has great scientific and practical importance.

When used as a pumpkin rootstock, cucumber plants receive enhanced nutrition. Grafted cucumber plants grow faster, develop better, and are more resistant to diseases and pests. The aim of the work was to select and study the effect of domestic pumpkin rootstocks resistant to the Fusarium pathogen on the growth, development and yield of cucumber scion in protected soil by grafting.

Fusarium wilt is widespread on vegetable crops in different countries of the world, especially in protected ground conditions. In greenhouses, fusarium wilt caused by Fusarium spp is one of the most common plant diseases that leads to serious crop losses. Chemical warfare is not always effective and can harm the environment. In greenhouses, the most common disease is Fusarium, the productivity of cucumber plants is reduced from 40 to 50% Fusarium wilt is widespread on vegetable crops in different countries of the world, especially in protected ground conditions. Fusarium wilt in greenhouses, caused by the causative agent Fusarium Oxus, is one of the most common plant diseases. These phytopathogenic

fungi can infect plants at any stage of the growing season. At cool soil temperatures (18-20ºC), pre-emergence rot and seedling maturation may occur [2].

This type of lesion leads to significant crop losses in greenhouses and open ground. When growing seedlings on rootstocks resistant to this disease, the harmfulness of root rot reduced to a minimum when growing seedlings on rootstocks.

There is a potential risk of new infections, which can lead to sharp drop in plant productivity with existing cultivation technologies. The appearance in Western Europe in the second half of the last century of the Pepino virus on the existing infectious background led to the unprofitability of growing cucumber, to increase the economic efficiency of production, enterprises switched to the use of the vaccination method. Grafting of vegetable crops sem. Pumpkin and nightshade are now widely used in Europe and Asia (Unvuskan, Yanmaz, 1991; Lim and ets., 1994; Ma and ets., 1997; Boonekamp, 1998). Studies on the use of the vaccination method in Israel have shown their effectiveness in solving the problem of reducing the use of pesticides and increasing the resistance of vegetable plants to diseases and spider mites (Edelstein and ets., 1999; Cohen and ets., 2000; Edelstem and ets., 2000).

In Russia, the main data on vaccinations of pumpkin vegetable crops appeared in the 20-30years of the last century. Currently, polymer materials, new varieties and technologies have appeared in vegetable growing, and physiologically active substances are widely used [3].

Studies in light of the newly changed conditions with grafted plants in Kazakhstan not conducted, and the biological characteristics of pumpkin species used as rootstocks and the influence of adaptive pumpkin rootstocks on the productivity of greenhouse cucumber hybrids in the climatic conditions of Kazakhstan not studied. Data on the use of rootstocks of species is contradictory. There is very little data on the features of the biology of the development of promising pumpkin rootstocks in the climatic conditions of Kazakhstan. Poorly studied issues of seed production of a number of rootstocks for pumpkin crops that deserve widespread use as rootstocks. In the scientific literature, the effect of vaccination on the intake of the main elements of mineral nutrition from the root xylem sap into the rootstocks is practically not covered

Vaccination can overcome many of these problems. In fact, in many parts of the world, grafting is a routine technique in continuous farming systems. The first grafting was used in Japan in the late 1920 when grafting watermelon [Citrulluslanatus (Thunb.) Matsum and Nakai] on the pumpkin [Cucurbita moschata Duchesneex. Poir] rootstocks. Shortly thereafter, watermelons grafted in the bottle pumpkin (Lagenaria siceraria (Molina) Standl.) [4]. This experience has helped to control the decline in yields due to soil diseases. China produces more than half of the world's watermelons and cucumbers (Cucumis sativus L.), and about 20% of them have been vaccinated.

The use of rootstocks can increase plant viability through intensive absorption of soil nutrients, avoidance of soil pathogens, and resistance to low soil temperatures, salinity, and wet soil conditions. This type of rootstock affects the growth, yield and quality of melon fruits. Grafting with resistant rootstocks offers one of the best methods to avoid soil diseases. In addition, grafting can affect vegetative growth, flowering, ripening time and fruit quality, as well as provide higher yields, especially in low-temperature conditions. Combination rootstock - Scion influences the pH, flavour, sugar, colour, carotenoid content. The main motive for grafting pumpkin crops is to avoid damage caused by soil pathogens when genetic or chemical approaches to disease control are not available [5].

There are various ways of grafting vegetable crops. O.V. Yurine describes six ways of grafting pumpkin. The following methods of grafting are most common in the greenhouse production of pumpkin crops: in a notch, in a cleft, by approaching the tongue. S.P. Lebedeva developed the technology for grafting of the notch in detail. In production conditions, the main requirements for the grafting method for growing plants are high productivity and ensuring good plant survival.

We conducted research in 2019 and the task of which was to select promising pumpkin rootstocks resistant to Fusarium spp. with subsequent grafting of a promising hybrid of cucumber of domestic selection, characterized by high adaptability to the conditions of greenhouses and high yield in conditions of protected soil from the grafting method.

Methods. The research was carried out at the stationary laboratory of vegetable and melon crops breeding of the Regional branch "Kainar" LLP «Kazakh Research Institute of Fruit and Vegetable Growing», located in the foothills of the south-east of Kazakhstan, on the northern slope of the Trans-Ili Alatau (1050 metres above sea level).

The research was carried out according to generally accepted classical methods: the method of experimental work in vegetable and melon production (edited by V. F. Belik, 1992); The method of State variety testing of agricultural crops (potatoes, vegetables and melons) (Moscow, 1975) [6].

Asylum is a common local salad variety. High yielding, precocious, bee-pollinated. It enters fruiting on the 55th day of germination. The bush is medium-sized. The cornichon is long, cylindrical, 15-20 cm long, weighing 205-210g, the ovary and fruit are smooth without downiness, and the yield depending on the growing period is on average 18.0-20.0 kg /m^2. In experiments on the study of cucumber grafting on pumpkins, seeds of pumpkin samples were sowing 5 days earlier than cucumber seeds. The seeds appearance up within 4-5 days. Grafting perform by the method of convergence of a notch, on 3-5 days after germination. The criterion for the period of grafting was the full disclosure of cotyledon leaves in seedlings [7].

In cucumbers and pumpkins, the first real leaf should be at the very beginning of growth. After grafting, the pots with the grafted plants were immediately placed in the rehabilitation chamber.

It is necessary to withstand a week of plants at high humidity-95-98% and a temperature of 25°C. After seven days after grafting, the cameras ventilated, opening the film for 5 minutes 3-4 times a day in the first few days, then increasing the time of ventilation. When airing, it is necessary to ensure that the plants do not lose turgor, otherwise, their death is possible.

When airing, it is necessary to ensure that the plants do not lose turgor, otherwise, their death is possible. In the rehabilitation chamber, the plants were kept for 12-14 days. The experiments were carried out in a four-fold repetition, randomized, according to the scheme 90+60x50 cm, 2.5 plants per one m^2. Planting of grafted cucumber plants in the greenhouse have been carrying out in a phase of 4-5 real leaves at the age of 30-35 days. Care for grafted cucumber plants have been carrying out according to the technology generally accepted for cucumber [8,9].

In the course of work performed using the following methods: grafting, phenological and biometrical observations. Morphological descriptions and accounting of individual components of the crop were carried out during the growing season. The dry matter content was determined by a refractometer, sugars-by Bertrand, vitamin C-by Murry. Setting up experiments, conducting accounting and observations were carried out according to the Methodology of field experience (with the basics of statistical processing of research results), The method of experimental work in vegetable and melon growing [10].

Conducting phenological observations of the studied varieties of pumpkin and cucumber allowed us to establish differences in the timing of their entry into the next phase of development.

Phenological observations and biometric measurements were carried out according to the method recommended for vegetable growing Research Institute of Vegetable Farming (V.F. Belik, 1979; 1981).

Nourishing plants common mode used for the protected ground. The soil moisture during the growing season maintained by the optimal parameters [11].

The object of research was the varieties of pumpkin Aphrodite, Karina, Mindalnaya, Mozoleevskaya 10, Stofuntovaya and cucumber hybrid Asylum.

Subject of research: as a scion-a hybrid of cucumber Asylum, as a rootstock – varieties of pumpkin Stofuntovaya, Mozoleevskaya 10, Mindalnaya, Aphrodite, Karina, standard-root-own hybrid of cucumber Asylum.

Conducting phenological observations of the studied varieties of pumpkin and cucumber allowed us to establish differences in the timing of their entry into the next phase of development.

Phenological observations and biometric measurements were to be carried out according to the method recommended for growing vegetables [12].

Results and discussion. The work on the evaluation of the material was carried out in the spring-summer turnover in the winter greenhouse of the Kazakh Research Institute of Fruit and Vegetable Production. The standard for comparing cucumbers grafted on different varieties of pumpkin was the zoned engrafted hybrid of cucumber Asylum. They were evaluated according to economically valuable characteristics: early and general yield, marketability of fruits. The experiments were carried out according to the "Methodology of the state variety testing of agricultural crops" [13].

Noted the start date and the passage of phenological phases more precisely, the phase of occurrence of single and mass escapes, the phase of beginning of flowering, date of fruiting, date of first and last collection. Plant height, internode length, number of leaves, flowers, and leaf diameter were determined.

Took into account the early harvest, general and marketable, according to the options of the experiment (table 1).

Table 1 – Dates of the passing of phenological phases by pumpkin and cucumber plants

samples	seeding	shoots 75%	date of grafting	date of planting	beginning of flowering	beginning of fruit maturation	from sowing to (days)		
							weight shoots	flowering of the main axis	1 fruit picking
Aphrodite	28.02	06.03	12.03	05.04	19.04	03.05	7	50	64
Karina	28.02	06.03	12.03	05.04	20.04	01.05	7	51	62
Mindalnaya	28.02	06.03	12.03	05.04	21.04	05.05	7	52	66
Stofuntovaya	28.02	06.03	12.03	05.04	19.04	05.05	7	50	66
Mozoleevskaya 10	28.02	06.03	12.03	05.04	20.04	01.05	7	51	62
Asylum	27.02	05.03	–	05.04	17.04	29.04	7	47	59

With the same date of sowing, grafting and planting in a permanent place of all samples, the early beginning of flowering, early laying of ovaries and earlier arrival of the crop at the standard where noted, these indicators in grafted plants were affected by the time of accretion of the grafting site.

Table 2 – Biometric indicators of grafted cucumber plants

№	hybrid	Height, cm		Number of pieces		The diameter of the sheet (see)
		plants	internodes	leaves	flowers.	
1	Aphrodite	131,3	15,7	21,7	3,9	9,0
2	Karina	134,6	20,0	23,3	8,3	9,7
3	Mindalnaya	122,0	17,7	21,3	2,7	10,3
4	Stofuntovaya	111,7	16,7	22,7	4,7	9,0
5	Mozoleevskaya 10	135,3	21,7	24,3	4,3	9,7
6	Asylum	128,4	18,4	24,6	4,8	8,9

When accounting for plant height noted on the rootstocks Mozolewskaya 10, Karina and Aphrodite plants develop better and the plant height exceeds the root rate of 5.3%, 4.8% and 2.2%, respectively.

In terms of the number of flowers on the plant, the root standard exceeded the variant grafted on the Karina pumpkin - by 72.9 %, in other variants this indicator was within the standard. There was an increase in the leaf blade in three variants - with grafting on pumpkin varieties Mindalnaya, Karina and Mozoleevskaya 10-15.7%, 8.9% and 8.9%, respectively, which indicates a well-developed root system of the rootstock in these variants and good fusion with the scion.

Table 3 – Productivity indicators of grafted cucumber plants

№	Variety. hybrid	Yield				Average fruit weight, g
		for 1 a month	For the growing season		in %	
			Total	Product		
1	Aphrodite	2,73	21,18	21,0	+9,89	110,8
2	Karina	3,46	27,56	27,21	+42,38	104,6
3	Mindalnaya	2,1	17,76	17,54	–	107,8
4	Stofuntovaya	3,39	26,65	26,12	+36,68	102,0
5	Mozoleevskaya 10	2,59	20,93	20,77	+8,68	115,2
6	Asylum (own-rooted)	2,53	19,45	19,11	–	111,0
	HCP(05)		1,46			

When evaluating the options for grafting on various pumpkin varieties, options identified with respect to a self-rooted hybrid - a standard both for early arrival of the crop and for overall productivity.

Thus, according to the early yield (for the first month), variants with grafting on the varieties of pumpkin Karina and Stofuntovaya were distinguished – the indicators were in the range of 3.46 and 3.39 kg/m^2, which exceeded the standard by 36.7% and 33.9%, respectively. In terms of total productivity, grafting options for pumpkin varieties Karina and Stofuntovaya showed yields of 27.56 kg/m^2 and

26.65 kg/m^2, which significantly exceeded the root standard by 42.38% and 36.68%, respectively. The remaining options were within the experience error or did not exceed the standard. The average fruit weight exceeded the variant of grafting for a variety of pumpkin Mozolevskaya 10 – 115g; the remaining options were within the standard.

Conclusion. Grafting is used to propagate valuable plants and produce seeds. The main condition for successful grafting is the compatibility of scion and rootstock tissues, which ensures better and faster fusion. The rootstock supplies nutrients to the scion through its root system. The scion feeds the entire plant with organic substances that are produced in the leaves during photosynthesis. Thus, the rootstock and the graft have a beneficial mutual effect on each other.

Grafting provides better use of soil moisture and fertilizers by plants due to a more developed root system and has a favorable effect on yield when re-growing the crop repeatedly in one place. When growing cucumbers, mineral fertilizers and growth regulators were not used. The increase in the yield of cucumber fruits was obtained through the use of a new cultivation technology - grafting cucumber plants on domestic varieties of pumpkin.

The results of studies of the effect of grafting on various domestic varieties of pumpkin on the growth, development and yield of the Asylum cucumber hybrid showed that when grafting cucumber on the pumpkin, the best options compared to the root standard were the varieties of pumpkin Karina and Stofuntovaya. Indicators for early yield in these varieties were in the range of 3.46 and 3.39 kg/m^2, which exceeded the standard by 36.7% and 33.9%, respectively.

In terms of total productivity, grafting options for pumpkin varieties Karina and Stofuntovaya also showed high yields - 27.56 kg/m^2 and 26.65 kg/m^2, which significantly exceeded the root standard by 42.38% and 36.68%, respectively.

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ФУЗАРИЙ ПАТОГЕНІНЕ ТӨЗІМДІ АСҚАБАҚҚА ҚИЯР ГИБРИДІН ЕГУ

Аннотация. Қазіргі уақытта өсімдіктерге биологиялық түрде әсер ету әдістерін қолдану жолдары қарастырылуда, оларды қорғаудың тиімді және экологиялық әдістерін анықтау өте маңызды саналады. Соның бірі – өсімдіктердің вегетативті көбеюіне ықпал ететін егу әдісі, яғни екі өсімдікті қосып, біріктіріп өсіру. Мәдени өсімдіктерді егу оның өсу, гүлдену және өнімділік жағдайын арттыруға септігін тигізеді..

Телінуші мен тамыр сабағын жылыжайда өсірілетін отандық асқабақтан алып, тамыр сабағын және қияр буданын қолдану үшін Афродита, Бадам, Карина, Мозолеевская 10 және орыс селекциясынан Стофунтовая түрін қолдандық; қиярдың телінуші гибриді ретінде Асылым алынды. Аталмыш егу әдісі қиярдың фотосинтездеу белсенділігінің ерекшелігіне әсер етеді. Бүйір кесіндісі арқылы егілген қияр жапырағының көрсеткіші өзгесінен жоғары.

Отандық асқабақ сорттарына Асылым қияр гибридін егу, оның өсу және өнімділік жағдайына әсерін зерттеу нәтижелері көрсеткендей, асқабаққа қиярды қосып еккенде Карина және Стофунтовая асқабақ сорттары өздігінен тамырланған стандартпен салыстырғанда жақсырақ болып шықты.

Түйін сөздер: қияр, асқабақ, қор, телу, егу, фузариоз ауруы.

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ПРИВИВКА ГИБРИДА ОГУРЦА НА ПОДВОЙ ТЫКВЫ, УСТОЙЧИВЫЙ К ПАТОГЕНУ FUSARIUM

Аннотация. В настоящее время биологические методы воздействия на растительный организм приобретают важное значение. Перспективным является поиск новых высокоэффективных и экологически безопасных методов защиты растений. Одним из таких методов, способов вегетативного размножения растений является прививка, представляющая собой соединение и последующее сращение двух растений. Прививка культурных сортов растения дает значительные результаты в росте, цветении, урожайности.

В качестве привоев и подвоев мы использовали следующие виды отечественной подвои тыквы и гибрид огурца, рекомендуемые для возделывания в условиях защищенного грунта: Афродита, Миндальная, Карина, Мозолеевская 10 и российской селекции – Стофунтовая; в качестве привоя – гибрид огурца Асылым. Способ прививки влияет на особенности фотосинтетической деятельности растений огурца. Растение огурца, привитое способом в боковой разрез, отличалось наибольшим индексом листовой поверхности.

Результаты исследований влияния прививки на различные отечественные сорта тыквы на рост, развитие и урожайность гибрида огурца Асылым показали, что при прививке огурца на тыкву лучшими вариантами по сравнению с корнесобственным стандартом оказались сорта тыквы Карина и Стофунтовая.

***Ключевые слова*:** огурец, тыква, подвой, привой, прививка, фузариозное увядание.

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REFERENCES

[1] Agriculture in Kazakhstan: https://www.kazportal.kz/selskoe-hozyaystvo-v-kazahstane/

[2] Kokenova A.T., Abylkasym A.B., Shalbaeva A.R., Abdurazakov N.S., Bekmanova N.M. Innovation in agriculture: digitization as a factor of new opportunities // News of the National Academy of Sciences of the Republic of Kazakhstan. Series of social sciences and humanities. ISSN 2224-5294, Volume 6, Number 328 (2019), 226–236. https://doi.org/10.32014/2019.2224-5294.236

[3] Mamaeva A. S., Shemshura O. N., Sadanov A. K., Khidirov K. R. //Antagonism of fungi of the genus *trichoderma* as a basis for the fight against fungal diseases of cucumbers in Kazakhstan // Izdenister, natizheler - Research, results. №1 (81). Almaty, 2019 – 224 p.

[4] Boughalleb N., Tarchoun N., El Mbarki A., and El Mahjoub M. 2007. Resistance evaluation of nine cucurbit rootstocks and graftedwatermelon (Citrullus lanatusL.) varieties against Fusarium wilt and Fusarium crown and root rot. *Journal Plant Science*. 2: 102–107p. Year: 2007 | Volume:2 Issue: 1 |. DOI: 10.3923/jps.2007.102.107

[5] Koptaeva G.P., Shinet G.G., Agabekova G.N. Agricultural economy: development of crop production and its competitiveness // News of the National Academy of Sciences of the Republic of Kazakhstan. Series of social sciences and humanities, ISSN 2224-5294. 170 Volume 5, Number 327 (2019), 91 – 102. https://doi.org/10.32014/2019.2224-5294.

[6] Oda M., Tsuji K., and Sasaki H. 1993. Effects of hypocotyl morphology on survival rate and growth of cucumber seedlings grafted on *Cucurbita* spp. *Japan Agric. Res*. Quart. 26: 259–263.

[7] Bekhradi A. Kashi M. Delshad Effect of three cucurbits rootstocks on vegetative and yield of 'Charleston Gray' watermelon F. // International Journal of Plant Production 5 (2), April 2011 ISSN: 1735-6814 (Print), 1735-8043 (Online) www.ijpp.info

[8] Yegizbayeva T.K., Yausheva T.V., Oleichenko S.N., Licea-Moreno R.J. // Influence of nutrition compositions on microclonal propagation different genotypes of the walnut *Juglans regia L.* Bulletin of National Academy of sciences of the Republic of Kazakhstan, 383 (2020), 105 – 112 (in Eng.). //ISSN 1991-3494 // https://doi.org/10.32014/2020.2518-1467.13

[9] Lebedev S. P. Alteration of the nature of plants by transplantation. M.: State Agricultural publishing house, 1937.44 (in Russ.).

[10] Ahn S.J., Im Y.J., Chung G.C., Cho B.H., Suh S.R. (1999) Physiological responses of graftedcucumber leaves and rootstock roots affected by low root temperature. SciHortic 81:397–408

[11] Salehi R., Kashi A. & Lesani H. (2004). Effects of different cucurbit rootstocks on growth and yield of Greenhouse cucumber cv. Sultan. *Iranian Journal of Horticultural Science and Technology*, 5 (1), 59-66. (In Farsi).

[12] Nusipzhanov N. S., Oleichenko S. N., Shoybekova A. Zh. Improvement of methods for increasing the germination of walnut seeds (juglans regia) // "Izdenister,natizheler – Research, results". No. 3 (87). Almaty., 2020-.291 p. ISSN 2304-3334-03

[13] Shadenova E.A., Mamirova A.A., Sembekov M.T., Kaigermazova M.A. Restoration of perspective wood-brush genotypes. News of the National Academy of Sciences of the Republic of Kazakhstan. Series of agrarian sciences ISSN 2224-526X, Vol. 1, N 49 (2019), 46–50. https://doi.org/10.32014/2019. 2224-526X.6

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www:nauka-nanrk.kz

ISSN 2518-1483 (Online), ISSN 2224-5227 (Print)

http://reports-science.kz/index.php/en/archive

Редакторы: *М. С. Ахметова, Д. С. Аленов, А. Ахметова*

Верстка на компьютере *А. М. Кульгинбаевой*

Подписано в печать 12.02.2021.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
10,25 п.л. Тираж 500. Заказ 1.

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