

The project title: «Adaptation of Kazakhstan phytofixtures with automated spectrum change control for cultivation of greenhouse vegetables in various light zones of Kazakhstan»

Актуальность:

The lack of ready-to-use technologies for growing vegetable crops using LED lamps adapted to the conditions of cultivation facilities in Kazakhstan are the main deterrents in vegetable production of greenhouse. The solution of the strategic task for the development of this area requires scientifically sound technological and economic for the production of competitive vegetable products. Closing gaps in knowledge and skills will contribute to the development of this industry and will increase the sustainability of agricultural formations through the production of competitive, export-oriented vegetable products with high market value.

The project goal is to adapt domestic high-performance led irradiators for indoor vegetable crops on experimental hydroponic installations in various light zones of Kazakhstan.

As a result of the implementation of the scientific project, the following results will be obtained:

- at least 1 (one) article or review published in a peer-reviewed scientific publication included in the 4 (fourth) quartiles in the Web of Science database or having a CiteScore percentile in the Scopus database of at least 35 (thirty-five) or in print in the specified publications;

- as well as at least 1 (one) article in a domestic edition with a non-zero impact factor (recommended by COXON), or at least 1 (one) title of protection.

The implementation of the project provides an opportunity for the commercialization of the obtained scientific results. LLP "Led System" is a Kazakh company that acts as a private partner in the project, has the necessary equipment and means for the manufacture of LED lighting devices for industrial enterprises. He is the holder of several patents in the field of LED lighting technology, including the tested lamps of this project. In case of obtaining positive results, the company is ready to start the serial production of the same lamps in the amount of 12 million pieces per year. The advantage of this company is its modern technological equipment, which can expand the functionality and increase the share of Kazakhstani content of finished products.

Research team members:

1. Turbekova Arysgul: (ScopusAuthorID- [57192069561](#); Researcher ID- P-4907-2017)

1. Yuri Shavrukov, Aibek Zhumalin, Dauren Serikbay, Makpal Botayeva, Ainur Otemisova, Aiman Absattarova, Grigoriy Sereda, Sergey Sereda, Arysgul Turbekova, Vladimir Shvidchenko, Satyvaldy Jatayev, Sergiy Lopato, Kathleen Soole и Peter Langridge. "Expression Level of the *DREB2*-Type Gene, Identified with Amplifluor SNP Markers, Correlates with Performance, and Tolerance to Dehydration in Bread Wheat Cultivars from Northern Kazakhstan", Журнал Frontiers in Plant Science (18 ноября 2016 года, № 7, страница 1-9, Швейцария), CiteScore 2018 – 4.47, Percentile 95; Количество цитирования: WebofScience - 12, Scopus - 10; (DOI: 10.3389/fpls.2016.01736).

2. Satyvaldy Jatayev, Akhylybek Kurishbayev, Lyudmila Zotova, Gulmira Khasanova, Dauren Serikbay, Askar Zhubatkanov, Makpal Botayeva, Aibek Zhumalin, Arysgul Turbekova, Kathleen Soole, Peter Langridge, Yuri Shavrukov. "Advantages of Amplifluor-like SNP markers over KASP in plant genotyping", BMC Plant Biology. ноябрь, 2017. Великобритания CiteScore 2018 – 4.03, Percentile 92. Количество цитирования: WebofScience - 16, Scopus - 15; (DOI: 10.1186/s12870-017-1197-x).

3. Gulmira Khasanova, Akhylybek Kurishbayev, Satyvaldy Jatayev, Askar Zhubatkanov, Aybek Zhumalin, Arysgul Turbekova, Bekzak Amantaev, Sergiy Lopato, Carly Schramm, Colin Jenkins, Kathleen Soole, Peter Langridge, Yuri Shavrukov. Intracellular Vesicle Trafficking Genes, RabC-GTP, Are Highly Expressed Under Salinity and Rapid Dehydration but Down-

Regulated by Drought in Leaves of Chickpea (*Cicer arietinum* L.). *Frontiers in Genetics*, 07.02.2019. ISSN1664-8021, Швейцария (CiteScore 2018 – 3.60 Percentile 77; Количество цитирования: Web of Science - 1, Scopus - 2; (DOI: 10.3389/fgene.2019.00040).

2. Zhantasov Serik: [57202818801](#) iD Scopus author:

1. Gulzhan Kussainova, Mirjana Vasić, Dina Smagulova, [Serik Jantassov](#) and Aigul Nussupova, Productivity of lettuce varieties in conveyor cultivation in the open and protected soil of the southeast of Kazakhstan, <http://thescipub.com/pdf/10.3844/ofsp.11899>, OJBS-SciPub - OnLine Journal of Biological Sciences (ISSN16084217-USA-Scopus), 851834 (DOI: 10.3844/ojbsci.2018.186.196).

2. Patent No. 648, 2016, MJ RK, Common Tomato Heart of Astana, Jantasov S.K., Nusupova A.O., Aitbaev T.E., Kiseleva N.A., Mirmanova E.M., Hansen Peter

3. Patent No. 3637, 2017, MJ RK. Common tomato Raspberry miracle, Bryuzgina V.V., Nurbaeva E.A., Dzhanasov S.K., Aitbaev T.E.

4. Patent No. 3668, 2017, MJ RK, Keremet ordinary tomato, Jantasov S.K., Nusupova A.O., Mirmanova E.M., Aitbaev T.E., Hansen Peter

3. Itkinson Grigory:

1. Patent No. 191120, 2019, RF, Linear LED phyto-lamp, A.E. Suetov, Yu.N. Zeldin, D.I. Demin, G.V. Itkinson.

2. Patent No. 122675, 2019, RF, Multi-level rack for growing plants, V. V. Matychenkov, Yu. N. Zeldin, D. I. Demin, G. V. Itkinson.

4. Stolyarov Valery:

Patent No. 4763 For a useful model, 2019, MJ RK, Method of manufacturing LED filament lamps with nanophosphorus filling, Taukenov A.S., Stolyarov V.A., Nayfeh Munir Hasan.

5. Serik Aytkhozhin: 1st year doctoral student.

List of publications and patents published in the framework of this project: (with links to them):

One article was published in a peer-reviewed scientific journal (*Sustainability*, Switzerland), which is included in the 1st (1st) quartile in the Web of Science database and has a CiteScore percentile in the Scopus database of 84 (eighty-four). Authors: Kulyash Meiramkulova, Zhanar Tanybayeva, Assel Kydyrbekova, Arysgul Turbekova *, Serik Aytkhozhin, Serik Zhantasov and Aman Taukenov. The Efficiency of LED Irradiation for Cultivating High-Quality Tomato Seedlings (*Sustainability*, 22 August 2021, 13, 9426. p.1-11. <https://doi.org/10.3390/su13169426>. (IF Web of Science - 3.251, Percentile -84, Q1);

By the decision of the RSE "National Institute of Intellectual Property" of the Ministry of Justice of the Republic of Kazakhstan, a patent was issued for a useful model "Method for stimulating the growth of tomato seedlings" No. 6593 dated October 29, 2021. Authors: Turbekova A.S., Taukenov A.S., Itkinson G.I., Stolyarov V.A., Dzhanasov S.K.

Information for potential users: As a result of the implementation of the proposed scientific project, the overall level of profitability of the vegetable industry in the field of small and medium-sized businesses will significantly increase, the export potential of Kazakhstani products and the self-sufficiency of the population of the republic in the domestic market will increase.

Additional information: The sales markets for the development can be economic entities of any type engaged in the cultivation, sale and logistics of vegetable products in all regions of Kazakhstan.