

ISSN 2412-0324 (English ed. Online)
ISSN 0131-6397 (Russian ed. Print)
ISSN 2313-4836 (Russian ed. Online)

AGRICULTURAL **BIOLOGY**

Since January, 1966

PLANT **BIOLOGY**

Vol. 57, Issue 3
May-June

2022 Moscow

EDITORIAL BOARD

I.V. SAVCHENKO (Moscow, Russia) — Chairman (plant biology)

- | | |
|--|---|
| BESPALOVA L.A. (Krasnodar, Russia) | LUGTENBERG E.J.J. (Leiden,
The Netherlands) |
| DRAGAVTSEV V.A. (St. Petersburg, Russia) | LUKOMETS V.M. (Krasnodar, Russia) |
| DZYUBENKO N.I. (St. Petersburg, Russia) | PIVOVAROV V.F. (Moscow, Russia) |
| FEDOROVA L.M. (editor-in-chief)
(Moscow, Russia) | SANDUKHADZE B.I. (Moscow, Russia) |
| GONCHARENKO A.A. (Moscow, Russia) | SEDOV E.N. (Orel, Russia) |
| KHARITONOV E.M. (Krasnodar, Russia) | SHABALA S. (Tasmania, Australia) |
| KHOTYLEVA L.V. (Minsk, Belorussia) | TIGERSTEDT P.M.A. (Esbo, Finland) |
| | TIKHONOVICH I.A. (St. Petersburg, Russia) |

A peer-reviewed academic journal for delivering current original research results and reviews on classic and modern biology of agricultural plants, animals and microorganisms

Covered in Scopus, Web of Science (BIOSIS Previews, Biological Abstracts, CAB Abstracts, Russian Science Citation Index), Agris

Science editors: E.V. Karaseva, L.M. Fedorova

Publisher: Agricultural Biology Editorial Office NPO

Address: build. 16/1, office 36, pr. Polesskii, Moscow, 125367 Russia

Tel: + 7 (916) 027-09-12

E-mail: felami@mail.ru, elein-k@yandex.ru **Internet:** <http://www.agrobiology.ru>



For citation: Agricultural Biology,

Сельскохозяйственная биология, Sel'skokhozyaistvennaya biologiya

ISSN 0131-6397 (Russian ed. Print)

ISSN 2313-4836 (Russian ed. Online)

ISSN 2412-0324 (English ed. Online)

© Agricultural Biology Editorial Office (Редакция журнала

«Сельскохозяйственная биология»), 2022

CONTENTS

AGROPHYSICAL RESEARCH INSTITUTE: INTERDISCIPLINARY AND MULTIDISCIPLINARY STUDIES FOR THE PRACTICE OF AGRICULTURE AND PLANT PRODUCTION (1932-2022)

<i>Uskov I.B., Yakushev V.P., Chesnokov Yu.V.</i> 90 years of Agrophysical institute as a history of priority achievements in Russian and world agrophysical science	403
<i>Kuleshova T.E., Galushko A.S., Panova G.G. et al.</i> Bioelectrochemical systems based on the electroactivity of plants and microorganisms in the root environment (review)	425
<i>Shpanev A.M., Denisyuk E.S., Shilova O.A et al.</i> Carbon and silica nanostructures in the protection of spring barley from diseases in the North-West Russia	441
<i>Danilova T.N., Tabynbaeva L.K.</i> The formation of productivity of grain crops with introducing hydrogels under model soil drought and in field conditions	460
<i>Rizhiya E.Ya., Boitsova L.V., Vertebniy V.E. et al.</i> Effect of biochar application on variability of the polyphenoloxidase and peroxidase activity of sod-podzolic soil under low and high fertility	476
<i>Ivanov A.I., Rak M.V., Ivanova Zh.A. et al.</i> Biological features of the response of fodder grasses to the use of iodine on agrosod-podzolic soils of various cultivation levels	486
<i>Mikhailenko I.M., Timoshin V.N.</i> Program level of agrocenosis management, taking into account the impact of weeds on crops	500

REVIEWS, CHALLENGES

<i>Mikhel I.M., Khaliluev M.R.</i> Transgenic tomato plants (<i>Solanum lycopersicum</i> L.): direct methods of gene transfer and factors affecting transformation efficiency (review)	518
<i>Karpun N.N., Borisov B.A., Zhuravleva E.N. et al.</i> Range expansion and increasing damage potential of phytophagous shield bugs (Heteroptera: Pentatomidae) (review)	542

AGRICULTURAL MICROBIOLOGY

<i>Ulianich P.S., Belimov A.A., Kuznetsova I.G. et al.</i> Effectiveness of nitrogen-fixing symbiosis of guar (<i>Cyamopsis tetragonoloba</i>) with strains <i>Bradyrhizobium retamae</i> RCAM05275 and <i>Ensifer aridi</i> RCAM05276 in pot experiment	555
<i>Michail G., Reizopoulou A., Vagelas I.</i> Evaluation of the biocontrol efficacy of <i>Serratia proteamaculans</i> and <i>S. liquefaciens</i> isolated from bats guano pile from a subterrestrial cave (Greece)	566

CLONAL MICROPROPAGATION

<i>Vasilyeva O.Yu., Ambros E.V., Kozlova M.V.</i> The adaptive potential of the <i>Rosa canina</i> L. rootstock obtained in vitro in the conditions of the south of Western Siberia	579
---	-----

MODELING FOR PRECISION AGRICULTURE

<i>Rodimtsev S.A., Pavlovskaya N.E., Vershinin S.V. et al.</i> Simulation of vegetation conditions using differences of current NDVI values from average long-term indicators	591
---	-----