

# HELIA

## **EDITOR IN CHIEF**

*Dragan Škorić, Serbia*

## **MANAGING EDITOR**

*Zvonimir Sakač, Serbia*

## **EDITORIAL BOARD**

*Walter Anyanga, Uganda*

*Yakov Demurin, Russia*

*Maria Duca, Moldova*

*Valentina Entcheva, Bulgaria*

*Jose Fernández-Martinez, Spain*

*Wolfgang Friedt, Germany*

*Oleg Gorbachenko, Russia*

*Antonio Hall, Argentina*

*Renate Horn, Germany*

*Brent Hulke, USA*

*Yalcin Kaya, Turkey*

*Nataliya Kutishcheva, Ukraine*

*Nicolas Langlade, France*

*Maria Pacureanu-Joita, Romania*

*Begoña Pérez-Vich, Spain*

*Monica Poverene, Argentina*

*Lili Qi, USA*

*Mulpuri Sujatha, India*

*Gian Paolo Vannozzi, Italy*

*Kirichenko Victor Vasylyovich, Ukraine*

*Felicity Vear, France*

*Abelardo de la Vega, Argentina-Spain*

*Jovan Crnobarac, Serbia*

*Ferenc Viranyi, Hungary*

*Jun Zhao, China*

**DE GRUYTER**

HELIA is published by the Serbian Academy of Sciences and Arts (SASA), Branch in Novi Sad in cooperation with De Gruyter. HELIA publishes original theoretical, experimental and technical contributions arising from the scientific study of sunflower crops and farming systems. The subject fields covered include crop agronomy; sunflower genetic resources; sunflower improvement and breeding; phytopathology and plant protection; sunflower physiology, biochemistry, metabolism, structure, genetics, at diverse levels of integration; ecology; soil, water and mineral nutrition management and farming systems.

**ABSTRACTED/INDEXED IN** AGRICOLA (National Agricultural Library) · Baidu Scholar · CABI (over 50 subsections) · CNKI Scholar (China National Knowledge Infrastructure) · CNPIEC: cnpLINKer · Dimensions · EBSCO (relevant databases) · EBSCO Discovery Service · Genamics JournalSeek · Google Scholar · Japan Science and Technology Agency (JST) · J-Gate · Journal-Guide · JournalTOCs · KESLI-NDSL (Korean National Discovery for Science Leaders) · Microsoft Academic · MyScienceWork · Naver Academic · Naviga (Softweco) · Primo Central (ExLibris) · ProQuest (relevant databases) · Publons · QOAM (Quality Open Access Market) · ReadCube · SCImago (SJR) · SCOPUS · Semantic Scholar · Sherpa/RoMEO · Summon (ProQuest) · TDNet · Ulrich's Periodicals Directory/ulrichsweb · WanFang Data · WorldCat (OCLC)

ISSN 1018-1806 · e-ISSN 2197-0483

All information regarding notes for contributors, subscriptions, Open Access, back volumes and orders is available online at <http://www.degruyter.com/journals/helia>.

**EDITOR IN CHIEF** Prof. Dr. Dragan Škorić, Serbian Academy of Sciences and Arts (SASA), Branch in Novi Sad, Nikole Pašića 6, 21000 Novi Sad, Serbia, e-mail: [draganskoric@sbb.rs](mailto:draganskoric@sbb.rs)

**MANAGING EDITOR** Zvonimir Sakač, MSc., Institute of Field and Vegetable Crops, Industrial Crops Department, Maksima Gorkog 30, 21000 Novi Sad, Serbia, e-mail: [zvonimir17@sbb.rs](mailto:zvonimir17@sbb.rs); [maritimus17@gmail.com](mailto:maritimus17@gmail.com)

**PUBLISHER** Walter de Gruyter GmbH, Berlin/Boston, Genthiner Straße 13, 10785 Berlin, Germany

**JOURNAL MANAGER** Theresa Haney, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany, Tel.: +49 (0)30 260 05-375, Fax: +49 (0)30 260 05-250, e-mail: [theresa.haney@degruyter.com](mailto:theresa.haney@degruyter.com)

**RESPONSIBLE FOR ADVERTISEMENTS** Markus Kügel, De Gruyter, Rosenheimer Str. 143, 81671 München, Germany, Tel.: +49 89 76 902-424, e-mail: [anzeigen@degruyter.com](mailto:anzeigen@degruyter.com)

**TYPESETTING** TNQ Technologies, Chennai, India

© 2021 Walter de Gruyter GmbH, Berlin/Boston and SASA, Branch in Novi Sad, Serbia

**PRINTING** Franz X. Stückle Druck und Verlag e.K., Ettenheim



# Contents

## Research Articles

Sergey V. Gontcharov, Tatyana S. Korotkova, Natalya N. Goloschapova and Alexander P. Nesmyslenov

**Shuttle breeding in sunflower lines development — 125**

Viktoriya Babych, Mykola Kuchuk, Yaroslava Sharipina, Miroslav Parii, Yaroslav Parii, Irina Borovska and Yuri V. Symonenko

**Efficiency of selection–biotechnological system of selection for creation of breeding source material of sunflower resistant to herbicides and broomrape — 131**

Nina Araslanova, Tatiana Antonova, Ekaterina Lepeshko, Tatiana Usatenko, Svetlana Saukova, Maria Iwebor and Yulya Pitinova

**New races of rust pathogen on sunflower in Russia — 147**

Luis Carlos Alonso

**Phylogeny in sunflowers; 44 years to explain the appearance of aberrant flowers — 155**

Sheikh Hasna Habib, Md. Abdul Latif Akanda, Pryanka Roy and Hossain Kausar

**Effect of different dosage of EMS on germination, survivability and morpho-physiological characteristics of sunflower seedling — 167**

Natalia Kostyuchenko, Viktor Lyakh and Anatoliy Soroka

**The state of soil microbiotes during sunflower growing with an herbicide of imidazolinone group — 181**