

**GOCE DELCEV UNIVERSITY - STIP
FACULTY OF AGRICULTURE**



JOURNAL OF AGRICULTURE AND PLANT SCIENCES

YEAR 2017

VOLUME 15, Number1/2

EDITOR IN CHIEF

Liljana Koleva Gudeva, Faculty of Agriculture, Goce Delcev University, Stip, Macedonia,
liljana.gudeva@ugd.edu.mk

Editors

Ljupco Mihajlov, Faculty of Agriculture, Goce Delcev University, Stip, Macedonia,
ljupco.mihajlov@ugd.edu.mk

Fidanka Trajkova, Faculty of Agriculture, Goce Delcev University, Stip, Macedonia,
fidanka.trajkova@ugd.edu.mk

Administrator

Biljana Atanasova, Faculty of Agriculture, Goce Delcev University, Stip, Macedonia,
biljana.atanasova@ugd.edu.mk

Technical Editing

Slave Dimitrov, Publishing Department, Goce Delcev University, Stip, Macedonia,
slave.dimitrov@ugd.edu.mk

Language Editors

Biljana Ivanova, MA, Senior lecturer, Faculty of Philology, Goce Delcev University, Stip, Macedonia,
biljana.petkovska@ugd.edu.mk – English language Editor

Danica Gavrilovska Atanasovska, Goce Delcev University, Stip, Macedonia,
danica.gavrilovska@ugd.edu.mk – Macedonian language Editor

Editorial Office

Faculty of Agriculture,
Goce Delcev University, Stip,
Krstev Misirkov Str., No.10-A, P.O. Box 201, 2000 Stip, Macedonia
japs@ugd.edu.mk
<http://js.ugd.edu.mk/index.php/YFA>

Journal of Agriculture and Plant Sciences, JAPS, Vol 15
Successor of the Yearbook of Faculty of Agriculture of GDU, Vol 14

ISSN 2545-4447 print
ISSN 2545-4455 on line
Vol. 15, No. 1/2, Year 2017

**GOCE DELCEV UNIVERSITY - STIP, REPUBLIC OF MACEDONIA
FACULTY OF AGRICULTURE**

UDC 63(058)
ISSN 2545-4447 print
ISSN 2545-4455 on line



**Journal of Agriculture and Plant Sciences, JAPS, Vol 15
Successor of the Yearbook of Faculty of Agriculture of GDU, Vol 14**

YEAR 2017

VOLUME XV, Number 1/2

EDITORIAL BOARD

Aco Kuzelov,

Faculty of Agriculture, Goce Delcev University, Stip, Macedonia, aco.kuzelov@ugd.edu.mk

Danijela Raičević,

Biotechnical Faculty, University of Montenegro, Mihaila Lalica bb., Podgorica, Montenegro, nelar@mail.com

Dragan Skorić,

Serbian Academy of Sciences and Arts, Knez Mihajlova 35, 11000 Belgrade, Serbia, draganskoric@sbb.rs

Dragomir Vlcev,

Institute of Agriculture – Karnobat, Bulgaria, vulchevd@abv.bg

Hatice Gülen,

Istanbul Bilgi University, Faculty of Engineering and Natural Sciences, Department of Genetics and Bioengineering, Istanbul, Turkey, hatice.gulen@bilgi.edu.tr

Jovica Vasin,

Institute of Field and Vegetable Crops, Novi Sad, Serbia, jovica.vasin@ifvcns.ns.ac.rs

Kiril Bahcevandziev,

Coimbra Agricultural School, 3045-601 Coimbra, Portugal, kiril@esac.pt

Klemen Lisjak,

Agricultural Institute of Slovenia, Hacquetova ulica 17, Ljubljana, Slovenia, Klemen.Lisjak@kis.si

Marijan Bubola,

Institute of Agriculture and Tourism, Karla Huguesa 8, 52440 Poreč, Croatia, marijan@iptpo.hr

Maryna Mardar,

Odessa National Academy of Food Technologies, Odessa, 65039, Kanatnaya Str., Ukraine, marinamardar2003@gmail.com

Rubin Gulaboski,

Faculty of Agriculture, Goce Delcev University, Stip, Macedonia, rubin.gulaboski@ugd.edu.mk

Sanja Radeka,

Institute of Agriculture and Tourism, Karla Huguesa 8, 52440 Poreč, Croatia, sanja@iptpo.hr

Sasa Mitrev,

Faculty of Agriculture, Goce Delcev University, Stip, Macedonia, sasa.mitrev@ugd.edu.mk

Shuhe Wei,

Institute of Applied Ecology, Chinese Academy of Sciences, China, shuhewei@iae.ac.cn

Velichka Nikolova Rodeva,

Maritsa Vegetable Crops Research Institute, 32 Brezovsko shosse St. Plovdiv 4003, Bulgaria, velirod@yahoo.com

Violeta Dimovska,

Faculty of Agriculture, Goce Delcev University, Stip, Macedonia, violeta.dimovska@ugd.edu.mk

Wolfram Schnäckel,

Anhalt University of Applied Sciences, Bernburger Straße 55, 06366 Köthen, Germany, Wolfram.Schnaekkel@hs-anhalt.de

CONTENT

Emilija Arsov, Galina Ivanova, Sasa Mitrev, Multigene characterization of ' <i>Candidatus phytoplasma solani</i> ' in pepper and tomato plants in the Republic of Macedonia	7
Biljana Balabanova, Trajče Stafilov, Robert Šajn, Claudiu Tănăselia Bioindication ability of <i>Hypnum cupressiforme</i> and <i>Homolothecium lutescens</i> for determination of arsenic distribution in environment	15
Olivera Bicikliski, Krste Tashev, Fidanka Trajkova, Ljupco Mihajlov, Liljana Koleva Gudeva Comparative analysis of capsaicin content in peppers (<i>Capsicum annum</i> L.) grown in conventional and organic agricultural systems	27
Zoran Dimitrovski Inspection of pesticide application equipment	37
Zoran Dimitrovski, Dimitrov Sasko, Kukutanov Risto Condition of air assisted sprayers in Shtip region and possibility of applying European standard EN 13790	45
Violeta Dimovska, Fidanka Ilieva, Sanja Kostadinovic, Ljupco Mihajlov Physical and chemical characteristics of pomegranate fruit (<i>Punica granatum</i> L.), of cv. Karamustafa	53
Sanja Filipovska, Darko Andronikov, Aco Kuzelov Chemical and fatty acid composition in meat of young chickens different hybrid lines	61
Natasa Gunova, Dusan Spasov, Biljana Atanasova, Dragica Spasova, Mite Ilievski Correlation between population dynamics of <i>Tuta absoluta</i> (Lepidoptera: Gelechiidae) and climate, at tomato in protected area	69
Verica Ilieva, Natalija Markova Ruzdik, Ilija Karov, Ljupco Mihajlov, Mite Ilievski, Biljana Kovacevik Genetic variability for yield and some yield-related traits in rice (<i>Oryza sativa</i> L.)	75
Dijana Indzhelieva, Katja Velkova-Jorgova, Darko Andronikov, Aco Kuzelov The influence of starter culture of lactic- acid bacteria and bifid bacteria over the sanitary- hygienic, sensor and physical – chemical indicators on the re – boiled – smoked durable sausage	81
Viktorija Maksimova, Liljana Koleva Gudeva, Rubin Gulaboski, Maja Shishovska, Zorica Arsova Sarafinovska Capsaicin and dihydrocapsaicin variability in <i>Capsicum</i> sp. cultivars from Republic of Macedonia revealed by validated HPLC method	89
Ivana Velesanova, Fidanka Trajkova, Liljana Koleva Gudeva Micropropagation of ornamental species <i>Brassica oleracea</i> cv. Kyoto red given and <i>Ageratum</i> sp.	97

INTRODUCTION

Journal of Agriculture and Plant Sciences (JAPS) is a successor of the national journal **Yearbook of Faculty of Agriculture of Goce Delcev University**. Starting from 2001, with the first edition of the Yearbook of the JNU Institute of Southern Crops (Vol. 1-5), since 2006 with the editions of the Yearbooks of Faculty of Agriculture (Vol. 6-14), we continue with our publishing activity through publication of the **Journal of Agriculture and Plant Sciences, Vol. 15 (JAPS)** as an international journal.

Science is the primary factor for the constructive development of each area of a modern society. The involvement of science in agriculture is one of our leading priorities. By doing this we promote the production of healthy food, we contribute to the development of the processing industry for agricultural products, we influence the management of our natural resources, and therefore, we influence directly in the development of the rural and urban environment. **Journal of Agriculture and Plant Sciences (JAPS)** is a semi-annual journal devoted to the advancement and dissemination of scientific knowledge concerning all basic and allied sciences to Agriculture.

Journal of Agriculture and Plant Sciences (JAPS) publishes original research papers, review articles, short communications, professional and technical papers and book reviews in broader research area of agriculture and plant sciences: plant and animal production, plant genetics and breeding, plant protection, field crops, horticulture, viticulture, plant and animal biotechnology, animal husbandry, animal genetics and breeding, food control, oenology, soil science, environmental protection, landscape architecture, agribusiness, agricultural technology and other reach fields in agriculture and plant sciences.

Linking the scientific research with the modern agricultural production methods is a challenge for our team, and our orientation is affirmation of modern agriculture, based on concrete scientific research, professional applications and educational programmes.

**Editorial Board,
December, 2017**

**Editor in chief,
Prof. Liljana Koleva Gudeva, PhD**