

# BOOK OF PROCEEDINGS



*XIV International Scientific Agriculture Symposium  
"Agrosym 2023"  
Jahorina, October 05-08, 2023*



# **BOOK OF PROCEEDINGS**

**XIV International Scientific Agriculture Symposium  
“AGROSYM 2023”**



**Jahorina, October 05 - 08, 2023**

## Impressum

XIV International Scientific Agriculture Symposium „AGROSYM 2023“

### Book of Proceedings Published by

University of East Sarajevo, Faculty of Agriculture, Republic of Srpska, Bosnia  
University of Belgrade, Faculty of Agriculture, Serbia  
Mediterranean Agronomic Institute of Bari (CIHEAM - IAMB) Italy

International Society of Environment and Rural Development, Japan  
Balkan Environmental Association (B.EN.A), Greece  
Centre for Development Research, University of Natural Resources and Life Sciences  
(BOKU), Austria  
Perm State Agro-Technological University, Russia  
Voronezh State Agricultural University named after Peter The Great, Russia  
Tokyo University of Agriculture  
Shinshu University, Japan  
Faculty of Agriculture, University of Western Macedonia, Greece  
Enterprise Europe Network (EEN)  
Faculty of Agriculture, University of Akdeniz - Antalya, Turkey  
Selçuk University, Turkey

University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania  
Slovak University of Agriculture in Nitra, Slovakia  
Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine  
National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine  
Valahia University of Targoviste, Romania  
National Scientific Center „Institute of Agriculture of NAAS“, Kyiv, Ukraine  
Saint Petersburg State Forest Technical University, Russia  
University of Valencia, Spain  
Faculty of Agriculture, Cairo University, Egypt  
Tarbiat Modares University, Iran  
Chapingo Autonomous University, Mexico

Department of Agricultural, Food and Environmental Sciences, University of Perugia, Italy  
Higher Institute of Agronomy, Chott Mariem-Sousse, Tunisia  
Watershed Management Society of Iran  
Institute of Animal Science- Kostinbrod, Bulgaria  
SEASN- South Eastern Advisory Service Network, Croatia  
Faculty of Economics Brcko, University of East Sarajevo, Bosnia and Herzegovina  
Biotechnical Faculty, University of Montenegro, Montenegro  
Institute of Field and Vegetable Crops, Serbia  
Institute of Lowland Forestry and Environment, Serbia  
Institute for Science Application in Agriculture, Serbia  
Agricultural Institute of Republic of Srpska - Banja Luka, Bosnia and Herzegovina  
Maize Research Institute “Zemun Polje”, Serbia  
Faculty of Agriculture, University of Novi Sad, Serbia  
Institute for Animal Science, Ss. Cyril and Methodius University in Skopje, Macedonia  
Academy of Engineering Sciences of Serbia, Serbia  
Balkan Scientific Association of Agricultural Economics, Serbia  
Institute of Agricultural Economics, Serbia

**Editor in Chief**

Dusan Kovacevic

**Technical editors**

Sinisa Berjan  
Milan Jugovic  
Rosanna Quagliariello

**Website:**

<http://agrosym.ues.rs.ba>

CIP - Каталогизacija у публикацији  
Народна и универзитетска библиотека  
Републике Српске, Бања Лука

631(082)(0.034.2)

INTERNATIONAL Scientific Agriculture Symposium "AGROSYM"  
(14 ; 2023 ; Jahorina)

Book of Proceedings [Електронски извор] / XIV International  
Scientific Agriculture Symposium "AGROSYM 2023", Jahorina,  
October 05 - 08, 2023 ; [editor in chief Dusan Kovacevic]. - Onlajn  
izd. - El. zbornik. - East Sarajevo : Faculty of Agriculture, 2023. -  
Ilustr.

Sistemski zahtjevi: Nisu navedeni. - Način pristupa (URL):  
[https://agrosym.ues.rs.ba/article/showpdf/BOOK\\_OF\\_PROCEEDINGS\\_2023\\_FINAL.pdf](https://agrosym.ues.rs.ba/article/showpdf/BOOK_OF_PROCEEDINGS_2023_FINAL.pdf). - El. publikacija u PDF formatu opsega  
1377 str. - Nasl. sa naslovnog ekrana. - Opis izvora dana 15.12.2023.  
- Bibliografija uz svaki rad. - Registar.

ISBN 978-99976-816-1-4

COBISS.RS-ID 139524097

**XIV International Scientific Agricultural Symposium “Agrosym 2023”  
Jahorina, October 05-08, 2023, Bosnia and Herzegovina**

**HONORARY COMMITTEE**

- Mr. Savo Minic**, Minister of Agriculture, Water Management and Forestry of Republic of Srpska, Bosnia and Herzegovina
- Dr. Zeljko Budimir**, Minister of Scientific-Technological Development, Higher Education and Information Society of Republic of Srpska, Bosnia and Herzegovina
- Prof. dr Mario T. Tabucanon**, President of the International Society of Environment and Rural Development, Japan
- Prof. dr Milan Kulic**, Rector of the University of East Sarajevo, Bosnia and Herzegovina
- Prof. dr Dusan Zivkovic**, Dean of the Faculty of Agriculture, University of Belgrade, Serbia
- Dr. Maurizio Raeli**, Director of the Mediterranean Agronomic Institute of Bari, Italy
- Prof. dr Metin Aksoy**, Rector of the Selcuk University, Turkey
- Prof. dr Aleksey Andreev**, Rector of the Perm State Agro-Technological University, Russia
- Prof. dr Alexey Yu. Popov**, Rector of the Voronezh State Agricultural University named after Peter The Great, Russia
- Prof. dr Barbara Hinterstoisser**, Vice-Rector of the University of Natural Resources and Life Sciences (BOKU), Austria
- Prof. dr Sorin Mihai Cimpeanu**, Rector of the University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania
- Doc. Ing. Klaudia Halászová**, Rector of the Slovak University of Agriculture in Nitra, Slovakia
- Prof. dr Calin D. Oros**, Rector of the Valahia University of Targoviste, Romania
- Prof. Dr Katerina Melfou**, Dean of the Faculty of Agriculture, University of Western Macedonia, Greece
- Prof. dr Amr Ahmed Mostafa**, Dean of the Faculty of Agriculture, Cairo University, Egypt
- Prof. dr José Sergio Barrales Domínguez**, Rector of the Chapingo Autonomous University, Mexico
- Prof. dr Davut Karayel**, Dean of Faculty of Agriculture, University of Akdeniz - Antalya, Turkey
- Prof. Dr EGUCHI Fumio**, Rector of the Tokyo University of Agriculture, Japan
- Prof Dr Sait Gezgin**, Dean of Faculty of Agriculture, University of Selçuk- Konya, Turkey
- Dr Chokri Thabet**, the General Director of the High Agronomic Institute of Chott Mariem, Sousse, Tunisia
- Prof. dr Ivan Yanchev**, Director of the Institute of Animal Science- Kostinbrod, Bulgaria
- Prof. dr Seyed Hamidreza Sadeghi**, Professor at Tarbiat Modares University and the President of the Watershed Management Society of Iran, Iran
- Prof. dr Francesco Tei**, Director of the Department of Agricultural, Food and Environmental Sciences, University of Perugia, Italy
- Prof. dr Viktor Kaminskyi**, Director of National Scientific Center „Institute of Agriculture of NAAS“, Kyiv, Ukraine
- Dr. Igor Hrovatič**, President of South Eastern Advisory Service Network, Croatia
- Prof. dr Mirza Dautbasic**, Dean of the Faculty of Forestry, University of Sarajevo, Bosnia and Herzegovina
- Prof. dr Bozidarka Markovic**, Dean of the Biotechnical Faculty, University of Podgorica, Montenegro
- Prof. dr Rade Jovanovic**, Director of the Institute for Science Application in Agriculture, Serbia
- Prof. dr Lazar Radovanovic**, Dean of the Faculty of Economics Brcko, University of East Sarajevo, Bosnia and Herzegovina
- Prof. dr Vojislav Trkulja**, Director of Agricultural Institute of Republic of Srpska - Banja Luka, Bosnia and Herzegovina
- Dr. Miodrag Tolimir**, Director of the Maize Research Institute “Zemun Polje”, Serbia
- Prof. Dr. Jegor Miladinović**, Director of the Institute of Field and Vegetable Crops, Serbia
- Prof. dr Nedeljko Tica**, Dean of the Faculty of Agriculture, University of Novi Sad, Serbia
- Prof. dr Rodne Nastova**, Director of the Institute for Animal Science, Skoplje, Macedonia
- Prof. dr Sasa Orlovic**, Director of the Institute of Lowland Forestry and Environment, Serbia
- Prof. dr Jonel Subic**, Director of the Institute of Agricultural Economics, Serbia
- Prof. dr Branko Kovacevic**, President of the Academy of Engineering Sciences of Serbia, Serbia
- Prof. dr Radovan Pejanovic**, President of Balkan Scientific Association of Agricultural Economics, Serbia

**SCIENTIFIC COMMITTEE**

- Chairman: Academician Prof. dr Dusan Kovacevic**, Faculty of Agriculture, University of Belgrade, Serbia
- Prof. dr Machito Mihara**, Tokyo University of Agriculture, Japan



**Prof. dr John Brayden**, Norwegian Agricultural Economics Research Institute (NILF), Norway  
**Prof. dr Steve Quarie**, Visiting Professor, School of Biology, Newcastle University, United Kingdom  
**Prof. dr Andreas Melcher**, CDR, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria  
**Prof. dr Dieter Trautz**, University of Applied Science, Germany  
**Prof. dr Sergei Eliseev**, Vice-Rector for Research and Innovations, Perm State Agro-Technological University, Russia  
**Prof. dr Dani Shtienberg**, full professor, Department of Plant pathology and Weed Research, ARO, the Volcani Center, Bet Dagan, Israel  
**Prof. dr William Meyers**, Howard Cowden Professor of Agricultural and Applied Economics, University of Missouri, USA  
**Prof. dr Markus Schermer**, Department of Sociology, University of Innsbruck, Austria  
**Prof. dr Thomas G. Johnson**, University of Missouri – Columbia, USA  
**Prof. dr Fokion Papathanasiou**, School of Agricultural Sciences, University of Western Macedonia, Greece  
**Prof. dr Sabahudin Bajramovic**, Faculty of Agriculture and Food Sciences, University of Sarajevo, Bosnia and Herzegovina  
**Prof. dr Hiromu Okazawa**, Faculty of Regional Environment Science, Tokyo University of Agriculture, Japan  
**Prof. dr Tatiana Sivkova**, Faculty for Veterinarian Medicine and Zootechny, Perm State Agro-Technological University, Russia  
**Prof. dr Aleksej Lukin**, Voronezh State Agricultural University named after Peter The Great, Russia  
**Prof. dr Matteo Vittuari**, Faculty of Agriculture, University of Bologna, Italy  
**Prof. dr Seyed Mohsen Hosseini**, Faculty of Natural Resources, Tarbiat Modares University, Iran  
**Prof. dr Ardian Maci**, Faculty of Agriculture and Environment, Agricultural University of Tirana, Albania  
**Prof. dr Regucivilla A. Pobar**, Bohol Island State University, Philippines  
**Prof. dr Sudheer Kundukulangara Pulisery**, Kerala Agricultural University, India  
**Prof. dr EPN Udayakumara**, Faculty of Applied Sciences, Sabaragamuwa University, Sri Lanka  
**Prof. dr Vladimir Smutný**, full professor, Mendel University, Faculty of agronomy, Czech Republic  
**Prof. dr Franc Bavec**, full professor, Faculty of Agriculture and Life Sciences, Maribor, Slovenia  
**Prof. dr Jan Moudrý**, full professor, Faculty of Agriculture, South Bohemia University, Czech Republic  
**Prof. dr Stefan Tyr**, full professor, Faculty of Agro-biology and Food Resources, Slovakia  
**Prof. dr Natalija Bogdanov**, Faculty of Agriculture, University of Belgrade, Serbia  
**Prof. dr Richard Barichello**, Faculty of Land and Food Systems, University of British Columbia, Canada  
**Prof. dr Francesco Porcelli**, University of Bari Aldo Moro, Italy  
**Prof. dr Vasilije Isajev**, Faculty of Forestry, University of Belgrade, Serbia  
**Prof. dr Elazar Fallik**, Agricultural Research Organization (ARO), Volcani, Israel  
**Prof. dr Junaid Alam Memon**, Pakistan Institute of Development Economics, Pakistan  
**Prof. dr. Jorge Batlle-Sales**, Department of Biology, University of Valencia, Spain  
**Prof. dr Pandi Zdruli**, Land and Water Resources Department; IAMB, Italy  
**Prof. dr Mladen Todorovic**, Land and Water Resources Department; IAMB, Italy  
**Dr. Hamid El Bilali**, Mediterranean Agronomic Institute of Bari, Italy  
**Prof. dr Maksym Melnychuk**, National Academy of Agricultural Science of Ukraine, Ukraine  
**Prof. dr Borys Sorochynskyi**, Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine  
**Dr. Lorenz Probst**, CDR, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria  
**Prof. Dragana Sunjka**, Faculty of Agriculture, University of Novi Sad, Serbia  
**Prof.dr Miodrag Dimitrijevic**, Faculty of Agriculture, University of Novi Sad, Serbia  
**Prof. dr Mohsen Boubaker**, High Institute of Agronomy of Chott Meriem, Sousse, Tunisia  
**Dr. Noureddin Driouech**, Coordinator of MAIB Alumni Network (FTN), Mediterranean Agronomic Institute of Bari, Italy  
**Prof. dr Ion Viorel**, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania  
**Prof. dr. Chuleemas Boonthai Iwai**, Faculty of Agriculture, Khon Kaen University, Thailand  
**Prof. dr Wathuge T.P.S.K. Senarath**, Department of Botany, University of Sri Jayewardenepura, Colombo, Sri Lanka  
**Dr. Hamada Abdelrahman**, Soil Science Dept., Faculty of Agriculture, Cairo University, Egypt  
**Prof. dr Maya Ignatova**, Agricultural Academy – Sofia, Bulgaria  
**Prof. dr Ioannis N. Xynias**, School of Agricultural Technology & Food Technology and Nutrition, Western Macedonia University of Applied Sciences, Greece  
**PhD ing. Artur Rutkiewicz**, Department of Forest Protection, Forest Research Institute - IBL, Poland  
**Prof. dr Mohammad Sadegh Allahyari**, Islamic Azad University, Rasht Branch, Iran  
**Dr. Lalita Siri wattananon**, Faculty of Agricultural Technology, Rajamangala University of Technology Thanyaburi (RMUTT), Thailand  
**Prof. dr Konstantin Korlyakov**, Perm Agricultural Research Institute, Russia

**Dr. Mohammad Farooque Hassan**, Shaheed Benazir Bhutto University of Veterinary & Animal Sciences Sakrand, Sindh, Pakistan

**Dr. Larysa Prysiashniuk**, Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine

**Prof. dr Oksana Kliachenko**, National University of Life and Environmental Science of Ukraine, Ukraine

**Prof. dr Ivan Simunic**, Department of amelioration, Faculty of agriculture, University of Zagreb, Croatia

**Dr. Abid Hussain**, International Centre for Integrated Mountain Development (ICIMOD), Nepal

**Dr. Amrita Ghatak**, Gujarat Institute of Development Research (GIDR), India

**Prof. dr Naser Sabaghnia**, University of Maragheh, Iran

**Dr. Karol Wajszczuk**, Poznan University of Life Sciences, Poland

**Prof. dr Penka Moneva**, Institute of Animal Science - Kostinbrod, Bulgaria

**Prof. dr Mostafa K. Nassar**, Animal husbandry Dept., Faculty of Agriculture, Cairo University, Egypt

**Prof. dr Márta Birkás**, full professor, St. Istvan University, Godollo - Hungary

**Prof. dr Andrzej Kowalski**, Director of the Institute for Agricultural and Food Economy, Warszawa-Poland

**Prof. dr Yalcin Kaya**, The Director of the Plant Breeding Research Center, University of Trakya, Turkey

**Prof. dr Sanja Radonjic**, Biotechnical Faculty, University of Montenegro, Montenegro

**Prof. dr Ionela Dobrin**, Department for Plant Protection, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania

**Prof. dr Inocencio Buot Jr.**, Institute of Biological Sciences, College of Arts and Sciences, University of the Philippines Los Banos, Philippines

**Prof. dr Monica Paula Marin**, Department for Animal Husbandry, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania

**Prof. dr Nedeljka Nikolova**, Institute for Animal Science, Ss. Cyril and Methodius University in Skopje, Republic of Macedonia

**Prof. dr Mohammad Al-Mamun**, Department of Animal Nutrition, Bangladesh Agricultural University, Bangladesh

**Prof. dr Anucha Wittayakorn-Puripunpinyoo**, School of Agriculture and Co-operatives, Sukhothai Thammathirat Open University, Nonthaburi, Thailand

**Dr. Redouane Choukr-Allah**, International Center for Biosaline Agriculture (ICBA), United Arab Emirates

**Prof. dr Ignacio J. Díaz-Maroto**, High School Polytechnic, University of Santiago de Compostela, Spain

**Prof. dr Nidal Shaban**, University of Forestry Sofia, Bulgaria

**Prof. dr Mehdi Shafaghati**, Faculty of Geography, Tarbiat Moalem (kharazmi) University, Iran

**Prof. dr Youssif Sassine**, Lebanese University Beirut, Lebanon

**Prof. dr Cafer Topaloglu**, Faculty of Tourism, Mugla Sitki Kocman University, Turkey

**Prof. dr Seyed Hamidreza Sadeghi**, Faculty of Natural Resources, Tarbiat Modares University, Iran

**Prof. dr Mohsen Mohseni Saravi**, University of Teheran and Member of WMSI Management Board, Iran

**Prof. dr Branislav Draskovic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina

**Prof. dr Mahmood Arabkhedri**, Soil Conservation and Watershed Management Research Institute and Member of WMSI Management Board, Iran

**Prof. dr Ataollah Kavian**, Sari Agricultural Science and Natural Resources University and Member of WMSI Management Board, Iran

**Prof. dr Tugay Ayasan**, Department of Organic Farming Business Management, Osmaniye, Applied Science School of Kadirli, Osmaniye Korkut Ata University, Turkey

**Prof. dr Sakine Özpınar**, Department of Farm Machinery and Technologies Engineering, Faculty of Agriculture, Çanakkale Onsekiz Mart University, Çanakkale, Turkey

**Prof. dr Sherein Saeide Abdelgayed**, Faculty of Veterinary Medicine, Cairo University, Cairo, Egypt

**Prof. dr Zohreh Mashak**, Islamic Azad University, Karaj Branch, Iran

**Dr. Khalid Azim**, National Institute of Agriculture Research, Morocco

**Dr. Mario Licata**, Department of Agricultural, Food and Forest Sciences, University of Palermo, Italy

**Prof. dr Srdjan Lalic**, University of East Sarajevo, Bosnia and Herzegovina

**Prof. dr Muhammad Ovais Omer**, Faculty of Bio-Sciences, University of Veterinary & Animal Sciences, Lahore, Pakistan

**Dr. Edouard Musabanganji**, School of Economics/CBE, University of Rwanda, Rwanda

**Prof. dr Kubilay Baştaş**, Department of Plant Protection, Faculty of Agriculture, Selçuk University, Turkey

**Dr. Branka Kresovic**, Director of the Maize Research Institute “Zemun Polje”, Serbia

**Dr. Nenad Delic**, Maize Research Institute “Zemun Polje”, Serbia

**Dr. Milan Stevanovic**, Maize Research Institute “Zemun Polje”, Serbia

**Prof. Violeta Babic**, Faculty of Forestry, University of Belgrade, Serbia

**Dr. Svetlana Balesevic-Tubic**, Institute of Field and Vegetable Crops Novi Sad, Serbia

**Dr. Ana Marjanovic Jeromela**, Institute of Field and Vegetable Crops Novi Sad, Serbia

**Prof. dr Tatjana Krajisnik**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina

**Prof. dr Aleksandra Govedarica-Lucic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Prof. dr Desimir Knezevic**, University of Pristina, Faculty of Agriculture, Kosovska Mitrovica - Lesak, Kosovo i Metohija, Serbia  
**Dr. Snezana Mladenovic-Drinic**, Maize Research Institute “Zemun Polje”, Serbia  
**Prof. dr Nebojsa Momirovic**, Faculty of Agriculture, University of Belgrade, Serbia  
**Prof. dr Osman Mujezinovic**, Faculty of Forestry, University of Sarajevo, Bosnia and Herzegovina  
**Prof. dr Dalibor Ballian**, Faculty of Forestry, University of Sarajevo, Bosnia and Herzegovina  
**Prof. dr Zoran Jovovic**, Biotechnical Faculty, University of Montenegro, Montenegro  
**Prof. dr Danijel Jug**, Faculty of Agriculture, University of Osijek, Croatia  
**Prof. dr Milan Markovic**, Biotechnical Faculty, University of Montenegro, Montenegro  
**Prof. dr Dejana Stanic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Prof. dr Zeljko Dolijanovic**, Faculty of Agriculture, University of Belgrade, Serbia  
**Prof. Mirjana Jovovic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Prof. Goran Marinkovic**, Faculty of Technical Sciences, University of Novi Sad, Serbia  
**Dr Dejan Stojanovic**, Institute of Lowland Forestry and Environment, Serbia  
**Dr Dobrivoj Postic**, Institute for plant protection and environment, Belgrade, Serbia  
**Dr Srdjan Stojnic**, Institute of Lowland Forestry and Environment, Serbia  
**Dunja Demirović Bajrami**, Research Associate, Geographical Institute “Jovan Cvijić,” Serbian Academy of Sciences and Arts, Belgrade, Serbia

### **ORGANIZING COMMITTEE**

**Chairperson: Prof. dr Vesna Milic**, Dean of the Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Dr Marko Gutalj**, Vice rector of the University of East Sarajevo, Bosnia and Herzegovina  
**Dr Jelena Kronic**, Vice rector of the University of East Sarajevo, Bosnia and Herzegovina  
**Dr. Maroun El Moujabber**, Mediterranean Agronomic Institute of Bari, Italy  
**Mrs. Rosanna Quagliariello**, Mediterranean Agronomic Institute of Bari, Italy  
**Dr. Noureddin Driouech**, Coordinator of MAIB Alumni Network (FTN), Mediterranean Agronomic Institute of Bari, Italy  
**Dr Milic Curovic**, The journal “Agriculture and Forestry”, Biotechnical Faculty Podgorica, University of Montenegro, Montenegro  
**Dr. Tatiana Lysak**, International Relations Office, Voronezh State Agricultural University named after Peter The Great, Russia  
**Dr. Oksana Fotina**, International Relations Center, Perm State Agro-Technological University, Russia  
**Prof. dr Fokion Papathanasiou**, School of Agricultural Sciences, University of Western Macedonia, Greece  
**Dr Ana Marjanović Jeromela**, Institute of Field and Vegetable Crops, Serbia  
**Dr. Anastasija Novikova**, Faculty of Bioeconomy Development, Vytautas Magnus University, Lithuania  
**Prof. dr Engr. Teodora Popova**, Institute of Animal Science - Kostinbrod, Bulgaria  
**Prof. dr Mehmet Musa Ozcan**, Faculty of Agriculture, Selçuk University, Turkey  
**Dr. Abdulvahed Khaledi Darvishan**, Faculty of Natural Resources, Tarbiat Modares University, Iran  
**Prof. dr Nikola Pacinovski**, Institute for Animal Science, Ss. Cyril and Methodius University in Skopje, N. Macedonia  
**MSc. Erasmo Velázquez Cigarroa**, Department of Rural Sociology, Chapingo Autonomous University, Mexico  
**Dr. Ecaterina Stefan**, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania  
**Dr. Jeeranuch Sakkhamduang**, The International Society of Environmental and Rural Development, Japan  
**Dr. Raoudha Khanfir Ben Jenana**, High Institute of Agronomy of Chott Meriem, Sousse, Tunisia  
**Dr. Hamada Abdelrahman**, Soil Science Dept., Faculty of Agriculture, Cairo University, Egypt  
**Prof. Dragana Sunjka**, Faculty of Agriculture, University of Novi Sad, Serbia  
**Dr. Antonije Zunic**, Faculty of Agriculture, University of Novi Sad, Serbia  
**Dr. Vedran Tomic**, Institute for Science Application in Agriculture, Serbia  
**MSc. Vojin Cvijanovic**, Institute for Science Application in Agriculture, Serbia  
**MSc. Mladen Petrovic**, Institute for Science Application in Agriculture, Serbia  
**Dr. Milan Stevanovic**, Maize Research Institute “Zemun Polje”, Serbia  
**Dr. Andrej Pilipovic**, Institute of Lowland Forestry and Environment, Serbia  
**Dr. Sc. Morteza Behzadfar**, Tarbiat Modares University, Tehran, Iran  
**Dr. Larysa Prysiazhniuk**, Ukrainian Institute for Plant Variety Examination, Kyiv, Ukraine  
**Doc. dr Sead Ivojevic**, Faculty of Forestry, University of Sarajevo, Bosnia and Herzegovina



**Dr. Nenad Markovic**, Enterprise E. N. (EEN) Coordinator, University of East Sarajevo, Bosnia and Herzegovina  
**Domagoj Group**, SEASN - South Eastern Advisory Service Network, Croatia  
**Prof. dr Zeljko Lakic**, Agricultural Institute of Republic of Srpska - Banja Luka, Bosnia and Herzegovina  
**Doc. dr Zoran Maletic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Prof. dr Dejana Stanic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**MSc. Milan Jugovic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Prof. dr Sinisa Berjan**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**MSc. Milena Stankovic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Dr. Stefan Stjepanovic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**MSc. Stefan Bojic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Dr. Tanja Jakisic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Dr. Boban Miletic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**MSc. Todor Djorem**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**MSc. Selena Cevriz**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina  
**Dr. Igor Djurdjic**, Faculty of Agriculture, University of East Sarajevo, Bosnia and Herzegovina, **General Secretary**

## PREFACE

Dear colleagues,

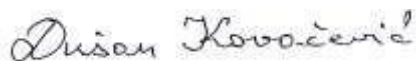
I am pleased to introduce the Book of Proceedings of the 14<sup>th</sup> International Scientific Agricultural Symposium “AGROSYM 2023”, which I hope you will find useful in your work. Almost 700 contributions have been accepted for the Book of Abstracts. The themes of AGROSYM 2023 cover all branches of agriculture and are divided into seven sessions: 1) Plant production, 2) Plant protection and food safety, 3) Organic agriculture, 4) Environmental protection and natural resources management, 5) Animal husbandry, 6) Rural development and agro-economy, and 7) Forestry and agroforestry.

Many scholars and practitioners argue that technology can increase production and feed more people while increasing supply stability and reducing the environmental impacts of agricultural production. Technology has been particularly important for improving production in annual crops such as maize, rice, soybean, wheat and cotton. Because trees have longer cycles, their breeding programs take longer. New plant breeding techniques can improve productivity, but there is a lively academic debate about their pros and cons.

While attention has been paid in the past mainly to the production side (cf. productivity, efficiency), more attention is nowadays paid to the consumption side as well as the intermediate stages (e.g. processing, distribution) of the food chain thus moving towards a ‘farm to fork’ approach. Globally, consumers are sending clearer signals about what they want on their tables i.e. higher quality as well as healthier, safer, and tastier products. Therefore, most agri-food companies have been exploring new, innovative ways to ensure more control over the production processes as well as final products quality and safety. Changes in investment strategy also have the potential to reduce the environmental and social costs of agriculture. It is now clear to most investors that companies paying more attention to sustainability and social responsibility, will have better returns on investments.

Agri-food systems have been central in the global debate on sustainable development and the achievement of the Sustainable Development Goals (SDGs) by 2030. Indeed, agri-food systems are at the center of various global challenges such as climate change, poverty, vulnerability, food insecurity, biodiversity loss, resource scarcity and ecosystem degradation. In this context, one of the goals of the sustainable agriculture movement is to develop farming systems that mitigate or eliminate environmental harms associated with industrial agriculture. It is also crucial to improve the resilience of food systems to crises, shocks and pandemics.

Many thanks to all the authors, reviewers and colleagues for their assistance in editing the Book of Abstracts. Special thanks go to all co-organizers and partners for their unselfish collaboration and comprehensive support.



East Sarajevo, 07 October 2023

Prof. Dušan Kovačević, PhD

Editor in Chief, President of the Scientific Committee of AGROSYM 2023

## CONTENT

<b>PLANT PRODUCTION</b> .....	<b>28</b>
<b>EFFECTS OF SOIL COVERAGE ON KIWIFRUIT (ACTINIDIA DELICIOSA CV. HAYWARD) PRODUCTION</b> Peter A. ROUSSOS, Athanasios TSAFOUROS, Efstathios NTANOS, Nikoleta-Kleio DENAXA .....	29
<b>EVALUATION OF THE TOLERANCE OF GRAPEVINE ROOTSTOCKS TO HIGH NACL SALT CONTENT IN THE SOIL, BASED ON THE CALCULATED VALUE OF THE TOLERANCE INDEX</b> Fatbardha SHPATI .....	34
<b>EFFECT OF THE COVID-19 PANDEMIC ON THE IMPORT AND EXPORT OF MINT (<i>MENTHA PIPERITA</i> L.) IN SERBIA</b> Marija MARKOVIĆ, Milan UGRINOVIĆ .....	41
<b>EFFECTS OF STRESS-ALLEVIATING PRODUCTS ON OLIVE PRODUCTIVITY AND OLIVE OIL QUALITY</b> Peter A. ROUSSOS, Asimina-Georgia KARYDA, Vicky CHRISTOPOULOU .....	46
<b>INFLUENCE OF BIOFERTILIZERS ON YIELD AND QUALITY OF LETTUCE GROWN IN THE OPEN FIELD</b> Aleksandra GOVEDARICA-LUČIĆ, Dragana KNEŽEVIĆ, Dragica GAGOVIĆ, Milica GRUBAČIĆ, Milica STOJANOVIĆ.....	51
<b>GROWTH PARAMETERS OF PEPPER TRANSPLANTS CULTIVATED BY THE FLOATING CONTAINERS TECHNOLOGY</b> Elma SEFO, Zrinka KNEZOVIĆ, Lutvija KARIĆ .....	56
<b>THE INFLUENCE OF VARIETY AND ENVIRONMENTAL CONDITIONS ON THE FORMATION OF PODS AND SEEDS AND YIELD OF FORAGE PEAS</b> Igor ĐURĐIĆ, Vesna MILIĆ, Branka GOVEDARICA, Tanja JAKIŠIĆ, Nevena RISTIČEVIĆ, Jovana KOVAČEVIĆ, Slađana JANKOVIĆ .....	63
<b>ORGANOLEPTIC, CHEMICAL AND MICROBIOLOGICAL PROPERTIES OF PEA SILAGE FROM THE JUGOVIĆ FARM</b> Ivana BOŠKOVIĆ, Milan JUGOVIĆ, Tanja JAKIŠIĆ, Selena ČEVRIZ, Zoranka MALEŠEVIĆ .....	69
<b>INFLUENCE OF CULTIVAR ON PHENOLOGICAL TRAITS, FRUIT CHARACTERISTICS AND YIELD OF PLUM</b> Mirjana RADOVIC, Ivana MILETIC, Mirko KULINA, Dejan ZEJAK, Mihajlo LIZDEK .....	75
<b>THE EFFECT OF SET SIZE AND PLANTING TIME ON THE ONION BULBS PRODUCTION</b> Nikolina ĐEKIĆ, Milica BOSNIĆ, Vida TODOROVIĆ, Mirjana ŽABIĆ .....	82
<b>THE INFLUENCE OF GENOTYPE AND AGRO-ECOLOGICAL CONDITIONS ON THE CONTENT OF STARCH IN TUBERS</b>	

Branka GOVEDARICA, Vesna MILIC, Tanja JAKISIC, Selena CEVRIZ, Milan JUGOVIC .....	89
<b>COMPARATIVE ANALYSIS OF GRAPE AND WINE QUALITY BETWEEN VRANAC AND CABERNET SAUVIGNON VARIETIES (<i>VITIS VINIFERA</i> L.)</b>	
Tijana BANJANIN, Tatjana JOVANOVIĆ-CVETKOVIĆ, Zorica RANKOVIĆ-VASIĆ, Milenko BLESIC .....	94
<b>ANALYSIS OF AGREEMENT OF RATERS DURING SENSORY ASSESSMENT OF WINES BABICA I CRLJENJAK KAŠTELANSKI</b>	
Zrinka KNEZOVIĆ, Živko SKRAČIĆ, Danijela SKROZA, Mara BANOVIĆ .....	101
<b>EFFECT OF THE COVID-19 PANDEMIC ON THE IMPORT AND EXPORT OF CHAMOMILE (<i>MATRICARIA CHAMOMILLA</i> L.) IN SERBIA</b>	
Marija MARKOVIĆ, Milan UGRINOVIĆ .....	107
<b>ARTA KIWIFRUIT: A CLONE OF HAYWARD WITH INTERESTING QUALITY CHARACTERISTICS</b>	
Peter A. ROUSSOS, Anna KOSTA, Efthalia STATHI, Nikoleta-Kleio DENAXA, Athanasios TSAFOUROS, Efstathios NTANOS, Eleni TANI.....	112
<b>COMPARATIVE EVALUATION OF SELECTION INDEXES FOR IDENTIFYING SUPERIOR WINTER BARLEY GENOTYPES</b>	
Nikolay DYULGEROV, Boryana DYULGEROVA .....	118
<b>THE IMPACT OF BIOSTIMULATOR ON WHEAT PROPERTIES: A CASE STUDY ON WELL-SUPPLIED SOIL IN THE 2021/2022 GROWING SEASON</b>	
Dario ILJKIĆ, Marina MARINIĆ, Mirta RASTIJA, Ivana VARGA, Zvonko ZEKO, Josip STANIĆ, Luka DRENJANČEVIĆ .....	124
<b>EFFECT OF DIFFERENT FERTILIZERS ON SEED GERMINATION AND DEVELOPMENT OF SEEDLINGS OF ANNUAL DAHLIA</b>	
Marija MARKOVIĆ, Dragana SKOČAJIĆ, Danijela ĐUNISIJEVIĆ-BOJOVIĆ, Marija NEŠIĆ, Neda ORAŠANIN MILAKOVIĆ.....	130
<b>EFFECT OF <i>AILANTHUS ALTISSIMA</i> ON PHOTOSYNTHETIC ACTIVITY, YIELD AND OLIVE OIL QUALITY CHARACTERISTICS UNDER TWO IRRIGATION REGIMES</b>	
Asimina-Georgia KARYDA, Peter A. ROUSSOS .....	134
<b>BIOSTIMULANTS EFFECT ON BALSAM CROP DURING ITS FIRST YEAR OF ESTABLISHMENT</b>	
Athina TEGOU, Dimitrios BARTZIALIS, Ilias MICHALAKIS, Kyriakos D. GIANNOULIS, Nicholas G. DANALATOS, Eleni WOGIATZI.....	140
<b>GROWTH AND FIBER YIELD OF HEMP UNDER DIFFERENT LEVELS OF IRRIGATION AND N-FERTILIZATION</b>	
Ippolitos GINTSIODIS, Dimitrios BARTZIALIS, Andromachi ROUMELIOTI, Konstantina-Maria KOTSARINI, Natalia-Maria METAXA, Stylianos GIANNOULIS, Kyriakos D. GIANNOULIS, Nicholas G. DANALATOS.....	145
<b>IRRIGATION AND FERTILIZATION EFFECT ON THE GROWTH OF A 2009 ESTABLISHED PERENNIAL CARDOON CROP</b>	

Dimitrios BARTZIALIS, Ippolitos GINTSIODIS, Kyriakos D. GIANNOULIS, Nikolaos G. DANALATOS.....	150
<b>EFFECT OF IRRIGATION AND FERTILIZATION ON GROWTH OF A BEYOND 10 YEARS OLD SWITCHGRASS CROP</b>	
Kyriakos D. GIANNOULIS, Thalia BATRA, Dimitrios BARTZIALIS, Ippolitos GINTSIODIS, Nikolaos G. DANALATOS .....	157
<b>OLIVE OIL QUALITY CHARACTERISTICS UNDER ORGANIC AND INTEGRATED MANAGEMENT IN MESSINIA COUNTY GREECE</b>	
Peter A. ROUSSOS, Asimina-Georgia KARIDA, Vassilios KAIBALIS.....	165
<b>INVOLVEMENT OF EXOGENOUS COMPOUNDS APPLICATION ON OLIVE CUTTINGS ADVENTITIOUS ROOT FORMATION</b>	
Petros A. ROUSSOS, Nikoleta-Kleio DENAXA .....	172
<b>GERMINATION OF SEEDS OF CALLISTEPHUS CHINENSIS, CELOSIA ARGENTEA AND ZINNIA ELEGANS AFTER TREATMENT WITH DIFFERENT FERTILIZERS</b>	
Marija MARKOVIĆ, Dragana SKOČAJIĆ, Danijela ĐUNISIJEVIĆ-BOJOVIĆ, Marija NEŠIĆ, Neda ORAŠANIN MILAKOVIĆ.....	178
<b>GRAPHIC ANALYSIS OF SEED YIELD AND AGRONOMIC TRAITS IN CHICKPEA</b>	
Naser SABAGHNIA, Mohsen JANMOHAMMADI.....	182
<b>OPTIMIZING GERMINATION OF NEGLECTED AND UNDERUTILIZED VOANDZOU (VIGNA SUBTERRANEA) SEEDS: A COMPARATIVE STUDY OF PRE-TREATMENT METHODS AND MORPHOTYPES</b>	
Abdel Kader NAINO JIKA, Hamissou AMADOU MOUNKAILA, Abdourahamane AMADOU BOUBACAR , Mahaman Rabiou HACHIMOU SABO, Grace NELKAM KILABÉ DJIMADOUM, Alhassane Gousmane AHMED .....	187
<b>CORRELATION, HERITABILITY AND PATH ANALYSIS OF GRAIN YIELD COMPONENTS IN SOME MAIZE GENOTYPES (<i>Zea Mays</i> L.)</b>	
Aleksandar KOVAČEVIĆ, Jovan PAVLOV, Milan STEVANOVIĆ, Nenad DELIĆ, Marko MLADENOVIĆ, Sanja PERIĆ.....	195
<b>THE INFLUENCE OF COVER CROPS AND MICROBIOLOGICAL FERTILIZER ON YIELD AND YIELD COMPONENTS OF SWEET MAIZE (<i>Zea Mays</i> L. <i>sacharata</i> Sturt)</b>	
Zeljko DOLIJANOVIC, Biljana SEVIC, Milena SIMIC, Vesna DRAGICEVIC, Snezana DJORDJEVIC, Nenad DJURIC .....	203
<b>EFFECT OF CALCIUM CHLORIDE AND DURATION OF STORAGE ON THE QUALITY OF THE APPLE CULTIVAR 'GLOSTER'</b>	
Boris RILAK, Jelena TOMIĆ, Ivan GLIŠIĆ, Milan LUKIĆ, Žaklina KARAKLAJIĆ-STAJIĆ, Svetlana M. PAUNOVIĆ, Marijana PEŠAKOVIĆ .....	212
<b>NEWLY CREATED ČAČAK'S SOUR CHERRY VARIETIES AS A RAW MATERIAL FOR SPIRIT PRODUCTION</b>	
Branko POPOVIĆ, Sanja RADIČEVIĆ, Olga MITROVIĆ, Aleksandra KORICANAC, Ninoslav NIKIĆEVIĆ, Vele TEŠEVIĆ, Ivan UROŠEVIĆ .....	220



**VARIABILITY OF SEED PROTEIN CONTENT AND SEDIMENTATION VOLUME IN WHEAT (*Triticum aestivum* L.)**

Desimir KNEŽEVIĆ, Aleksandra Yu. NOVOSELSKAYA-DRAGOVICH, Alexander M. KUDRYAVTSEV, Mirela MATKOVIĆ STOJŠIN, Miodrag DIMITRIJEVIĆ, Sofija PETROVIĆ, Aleksandar PAUNOVIĆ, Danijela KONDIĆ, Veselinka ZEČEVIĆ ..... 226

**EVALUATION OF PEACH CULTIVARS OF EARLY AND MEDIUM-EARLY SEASON IN A HIGH DENSITY PLANTING**

Dragan MILATOVIĆ, Đorđe BOŠKOV, Gordan ZEC, Aleksandar RADOVIĆ, Nemanja TEŠIĆ, Milana STOJANOSKI..... 234

**NUTRITIONAL AND ECONOMIC BENEFITS OF TRITICALE CULTIVATION IN CURRENT GLOBAL CONDITIONS**

Dragana LALEVIĆ, Milan BIBERDŽIĆ, Zoran S. ILIĆ, Lidija MILENKOVIĆ, Saša BARAĆ, Aleksandar VUKOVIĆ, Olivera ŠUŠA ..... 240

**PHENOTYPIC VARIABILITY AND SIMILARITY OF NUMBER OF SPIKELETS IN PRIMARY SPIKE IN WHEAT VARIETIES (*Triticum aestivum* L.)**

Dušan UROŠEVIĆ, Desimir KNEŽEVIĆ, Mirela MATKOVIĆ STOJŠIN, Jelica ŽIVIĆ, Danica MIĆANOVIĆ, Adriana RADOSAVAC, Vesna KANDIĆ ..... 247

**THE EFFECTS OF EARLY AND LATE DEFOLIATION ON GRAPE YIELD AND GRAPE QUALITY OF PROKUPAC VARIETY**

Dušica ĆIRKOVIĆ, Zoran BEŠLIĆ, Saša MATIJAŠEVIĆ, Bratislav ĆIRKOVIĆ, Dragana STANISAVLJEVIĆ, Zoran JOVANOVIĆ, Saša PETROVIĆ, Veroslava KOCIĆ ..... 255

**BIOLOGICAL PROPERTIES OF SWEET CHERRY CULTIVARS ON 'OBLAČINSKA' SOUR CHERRY ROOTSTOCK**

Gordan ZEC, Dragan MILATOVIĆ, Ivana BAKIĆ, Đorđe BOŠKOV, Dejan ĐUROVIĆ, Boban ĐORĐEVIĆ, Milana STOJANOSKI..... 262

**PREDICTING THE IMPACT OF CLIMATE CHANGE ON WATER AVAILABILITY FOR MAIZE CULTIVATION IN TOPLICA DISTRICT IN SERBIA**

Dženita KOCA, Gordana MATOVIĆ, Enika GREGORIĆ, Vesna POČUČA, Mirjam VUJADINOVIĆ MANDIĆ ..... 268

**NUTRITIVE VALUE OF ITALIAN RYEGRASS-RED CLOVER MIXTURES DEPENDING ON THE SEEDING RATE IN THE MIXTURES**

Jordan MARKOVIĆ, Tanja VASIĆ, Vladimir ZORNIĆ, Nedeljko RACIĆ, Filip BEKČIĆ, Marija STEPIĆ, Ivica KOSTIĆ ..... 274

**STATE OF EQUIPMENT WITH COMBINES IN AGRICULTURAL COOPERATIVE "AGROPROM"**

Marija GAVRILOVIĆ, Miloš ZELIĆ, Biljana VELJKOVIĆ, Ranko KOPRIVICA 280

**TRYPTOPHAN CONTENT INCREASE IN MAIZE INBRED LINES IMPROVED THROUGH MARKER ASSISTED BREEDING**

Marija KOSTADINOVIĆ, Danijela RISTIĆ, Vesna PERIĆ, Dragana IGNJATOVIĆ-MIČIĆ, Jelena VANČETOVIĆ ..... 287

**INFLUENCE OF THE COVID-19 PANDEMIC ON THE IMPORT AND EXPORT OF CHRYSANTHEMUMS IN SERBIA**

Marija MARKOVIĆ ..... 294

**CHARACTERISATION OF MUNG BEAN (*VIGNA RADIATA* L.) SEEDS USING FLUORESCENCE SPECTROSCOPY AND MULTIVARIATE ANALYSIS**

Miloš PROKOPIJEVIĆ, Dragana BARTOLIĆ, Mira STANKOVIĆ, Ksenija RADOTIĆ ..... 299

**PROTEIN CONTENT IN SEED OF TRITICALE GROWN IN PURE CROP AND MIXTURE WITH PEAS**

Milosav GRČAK, Dragan GRČAK, Desimir KNEŽEVIĆ, Radivoje JEVTIĆ, Vesna ŽUPANSKI, Dragan ŽIVANČEV, Vera RAJIČIĆ, Ivana JASNIĆ ..... 304

**EFFECTS OF IRRIGATION RATE AND PLANTING DENSITY ON MAIZE YIELD AND WATER USE EFFICIENCY IN THE TEMPERATE CLIMATE OF SERBIA**

Miodrag TOLIMIR, Branka KRESOVIĆ, Željko KAITOVIĆ, Ljubomir ŽIVOTIĆ, Katarina GAJIĆ, Boško GAJIĆ ..... 310

**STRESS RESISTANCE INDICATORS AS THE TOOL FOR SELECTING DROUGHT-TOLERANT WHEAT GENOTYPES**

Mirela MATKOVIĆ STOJŠIN, Veselinka ZEČEVIĆ, Dušan UROŠEVIĆ, Dragan BOŽOVIĆ, Jasmina BAČIĆ, Kamenko BRATKOVIĆ, Desimir KNEŽEVIĆ ..... 318

**ORGANIC FARMING: EXPLORING THE PROS AND CONS FOR SUSTAINABLE AGRICULTURE**

Mirela TOMAŠ SIMIN, Marica PETROVIĆ, Bojana KOMAROMI ..... 324

**QUALITY OF OPERATION OF TECHNOLOGICAL-TECHNICAL SYSTEMS WITH DIFFERENT COMPRESSION CHAMBERS IN PREPARING ALFALFA HAY**

Saša BARAĆ, Milan BIBERDŽIĆ, Aleksandar ĐIKIĆ, Dragana LALEVIĆ, Aleksandar VUKOVIĆ ..... 333

**EFFECT OF AZOTOBACTER SPP. ON INITIAL GROWTH OF GRASSES**

Snežana ANĐELKOVIĆ, Dejan SOKOLOVIĆ, Zoran LUGIĆ, Goran JEVTIĆ, Jasmina RADOVIĆ, Jasmina MILENKOVIĆ, Snežana BABIĆ ..... 340

**GENETIC VARIABILITY AND HETEROSIS FOR MICRONUTRIENTS CONTENT IN MAIZE GENOTYPES**

Snežana MLADENOVIĆ DRINIĆ, Danijela RISTIĆ, Milica NIKOLIĆ, Milomir FILIPOVIĆ, Željko KAITOVIĆ, Ana NIKOLIĆ, Violeta ANĐELKOVIĆ ..... 346

**PHYSICAL AND CHEMICAL CHARACTERISTICS OF SOUR CHERRY (*PRUNUS CERASUS* L.) CULTIVARS**

Svetlana M. PAUNOVIĆ, Žaklina KARAKLAJIĆ-STAJIĆ, Jelena TOMIĆ, Boris RILAK ..... 353

**RESPONSE OF DIFFERENT WHEAT GENOTYPES TO DROUGHT IN SEMI-ARID CLIMATE CONDITIONS**

Veselinka ZEČEVIĆ, Vojislav STOJŠIN, Desimir KNEŽEVIĆ, Mirela MATKOVIĆ STOJŠIN, Slađana SAVIĆ, Dušan UROŠEVIĆ, Danica MIĆANOVIĆ ..... 359

**EFFECTS OF THE USE OF DIFFERENT FERTILIZATION RATES AND MICROBIOLOGICAL PRODUCTS ON WHEAT YIELDS**

Vojin CVIJANOVIĆ, Marija BAJAGIĆ, Mladen PETROVIĆ, Nenad ĐURIĆ, Igor ĐURĐIĆ, Miloš STANKOVIĆ ..... 365

**QUALITY CHARACTERIZATION OF BLACKBERRY FRUITS (*Rubus* subg. *Rubus Watson*) IN DIFFERENT MATURITY STAGES**

Žaklina KARAKLAJIĆ-STAJIĆ, Jelena TOMIĆ, Marijana PEŠAKOVIĆ, Svetlana M. PAUNOVIĆ, Boris RILAK..... 371

**THE EFFECT OF DIFFERENT MICROBIAL FERTILIZERS ON THE WEEDINESS OF SOYBEAN**

Željko DOLIJANOVIĆ, Milena SIMIĆ, Snežana OLJAČA, Dobrivoj POŠTIĆ, Snežana ĐORĐEVIĆ, Srđan ŠEREMEŠIĆ ..... 378

**EVALUATING THE ROLE OF PHENOLIC COMPOUNDS IN OLIVE BUD DIFFERENTIATION**

Peter A. ROUSSOS, Dimitrios ZARIFOPOULOS, Asimina-Georgia KARYDA..... 383

**EVALUATION OF YIELD COMPONENTS OF LETTUCE (*Lactuca sativa* L.) GROWN IN NUTRIENT FILM TECHNIQUE**

Dragan ŽNIDARČIĆ..... 390

**A NEW PROMISING LATE MATURING CLEMENTINE MANDARIN 'MARTIATIKI'**

Peter A. ROUSSOS, Nikoleta-Kleio DENAXA, Athanasios TSAFOUROS, Efstathios NTANOS ..... 397

**EFFECT OF DIFFERENT FERTILIZERS ON SEED GERMINATION AND EARLY SEEDLING DEVELOPMENT OF TAGETES PATULA L.**

Marija MARKOVIĆ, Dragana SKOČAJIĆ, Danijela ĐUNISIJEVIĆ-BOJOVIĆ, Marija NEŠIĆ, Neda ORAŠANIN MILAKOVIĆ ..... 403

**COMPARED AGRICULTURAL MACHINE SIZE MEASUREMENT WITH A CAD AND AN IMAGE ANALYSIS SOFTWARE**

Abdullah BEYAZ..... 408

**THE ROLE OF ADDITIVE MANUFACTURING COMPOSITE SHEETS FOR MECHANICAL PROPERTIES IN AGRICULTURAL MACHINERY PRODUCTION**

Abdullah BEYAZ, Metehan KAZANCI.....415

**THE EFFICACY OF GLUTAMINE PRIMING ON GERMINATION AND SEEDLING DEVELOPMENT OF ROCKET IN SALT STRESS**

Ayşe Gul NASIRCILAR Kamile ULUKAPI..... 423

**PEAR BREEDING FOR THE FUTURE**

Fatma Pınar ÖZTÜRK, Gökhan ÖZTÜRK, Emel KAÇAL, Dilek KARAMÜRSEL, Ayşegül SARISU, Melih AYDINLI, Ömer Faruk KARAMÜRSEL, İrfan NAZLI, Atakan GÜNEYLİ ..... 430

**CHARACTERIZATION OF HWM-GS AND EVALUATION OF QUALITY CHARACTERS IN ELITE SYNTHETIC WHEAT LINES**

Ismet BAŞER, Feyza Tahan ÇAY, Damla Balaban GÖÇMEN, Alpay BALKAN, Oğuz BILGIN.....	436
<b>THE EFFECT OF SOIL CONDITIONERS APPLIED TO SEED ON GRAIN YIELD AND YIELD TRAITS IN WHEAT</b>	
Alpay BALKAN, Damla BALABAN GÖÇMEN, Oğuz BİLGİN, İsmet BAŞER.....	444
<b>GERMINATION AND EARLY SEEDLING DEVELOPMENT OF PURPLE CARROT TREATED WITH AMINO ACIDS</b>	
Selin ŞİMŞEK, Oğulcan KARA, Ayşe Gul NASIRCILAR, Kamile ULUKAPI.....	452
<b>EFFECTS OF DIFFERENT ORGANIC MATERIALS ON PLANT WEIGHT AND DEHYDROGENASE ACTIVITY IN THE RHIZOSPHERE OF STRAWBERRY PLANTS</b>	
Mohammed Gamal ABDELAZIZ ALI, Rıdvan KIZILKAYA.....	458
<b>SEED PRIMING AGAINST TO DROUGHT STRESS</b>	
Osman AYDENİZ, Sevinç BAŞAY.....	464
<b>POSSIBILITY OF USING BANANA WASTE AS A SUBSTRATE FOR SUSTAINABLE AGRICULTURE UNDER SALT STRESS</b>	
Ozlem SAHIN, Ayşe Gul NASIRCILAR, Kamile ULUKAPI.....	470
<b>INFLUENCE OF INTERCROPPING MAIZE WITH CLIMBING BEAN ON QUALITY AND YIELD OF FRESH FODDER</b>	
Darko UHER, Zlatko SVEČNJAK, Martina KOVAČEVIĆ, Ivan HORVATIĆ.....	475
<b>PhytoTester: PORTABLE INSTRUMENT FOR ASSESSMENT OF VITAL ACTIVITY OF THE VEGETABLE ORGANISMS</b>	
Tamaz BICHIASHVILI, Shalva BICHIASHVILI.....	481
<b>INFLUENCE OF MOWING HEIGHT AND PHENOLOGICAL STAGE OF MATURITY ON NUTRITIONAL VALUE OF ALFALFA HAY</b>	
Aleksandar VUKOVIĆ, Dragana LALEVIĆ, Saša BARAĆ, Milan BIBERDŽIĆ, Rade STANISAVLJEVIĆ, Dragoslav ĐOKIĆ.....	487
<b>IMPACT OF POLYETHYLENE MULCH AND LOW TUNNEL ON YIELD AND WATERMELON FRUIT CHARACTERISTICS</b>	
Boris ADAMOVIĆ, Dušan PAROŠKI, Đorđe VOJNOVIĆ, Žarko ILIN.....	494
<b>INDOOR SMART GARDEN: A NEW ERA IN PLANT PRODUCTION</b>	
Branko MIHAILOVIĆ, Vesna POPOVIĆ, Katica RADOSAVLJEVIĆ.....	500
<b>YIELDS OF NEW ONION CULTIVARS UNDER TWO SOWING METHODS</b>	
Đorđe VOJNOVIĆ, Boris ADAMOVIĆ, Žarko ILIN.....	507
<b>WEEDNESS AND FORAGE YIELD OF FIELD PEAS AND OATS MIXTURE CROP</b>	
Vladeta STEVOVIĆ, Dalibor TOMIĆ, Miloš MARJANOVIĆ, Branka TRIFUNOVIĆ, Đorđe LAZAREVIĆ, Nenad PAVLOVIĆ, Milomirka MADIĆ.....	513
<b>RESEARCH OF PHOSPHORUS (P) CONTENT IN AGRICULTURAL LAND</b>	
Vladimir SABADOŠ, Danijela ŽUNIĆ.....	519

<b>ANALYSIS OF PHYLOGENETIC VARIATION THE DOMINANT MICROORGANISMS GENUS OF <i>STENOTROPHOMONAS MALTOPHILIAREVEALED FROM MUSHROOM</i></b>	
Tetiana IVANOVA.....	528
<b>PLOIDY STUDY OF FESTUCA TAXA IN CARPATHIAN BASIN</b>	
Dániel BALOGH, Attila FÚRÉSZ, Károly PENKSZA, Antal SZÓKE, Csaba LANTOS	536
<b>CONTROLLED-ENVIRONMENT VERTICAL FARMING IN ORNAMENTAL PLANT PRODUCTION AND APPLICATION OF A DECISION SUPPORT SYSTEM: THE EXAMPLE OF HYBRID AFRICAN VIOLET</b>	
Hamid Asım ÇÖKREN, Baran KAYNAK, Bahadır ŞİN, Numan ÇELEBİ.....	542
<b>PLANT PROTECTION AND FOOD SAFETY .....</b>	<b>549</b>
<b><i>SCLEROTINIA MINOR</i> AS A NEW PATHOGEN OF LETTUCE IN SERBIA</b>	
Milica MIHAJLOVIĆ, Maja ŽIVANOVIĆ, Jovana HRUSTIĆ, Brankica PEŠIĆ.....	550
<b>INSECTICIDES FLONICAMID AND PYRIPROXYFEN IN THE CONTROL OF GREENHOUSE WHITEFLY IN TOMATOES</b>	
Sanja LAZIĆ, Dragana ŠUNJKA, Slavica VUKOVIĆ, Jelena EĆIMOVIĆ, Dragana BOŠKOVIĆ, Aleksandra ŠUŠNJAR, Antonije ŽUNIĆ .....	556
<b>INFLUENCE OF INSECTICIDES APPLICATION ON CHANNEL LENGTH IN STEM OF MAIZE PLANTS CAUSED BY FEEDING OF LARVAE OF EUROPEAN CORN BORER (<i>Ostrinia nubilalis</i> Hbn.)</b>	
Dragan GRČAK , Milosav GRČAK , Snežana GOŠIĆ-DONDO, Željko D. POPOVIĆ, Vanja TATIĆ, Iva UZELAC, Danijela KONDIĆ, Desimir KNEŽEVIĆ .....	563
<b>EFFECTS OF PLANTS ESSENTIAL OIL AND PLANT POWDER ON THE MORTALITY OF SITOPHILUS GRANARIUS L.</b>	
Jana RAMMAL, Abdel KADER EL HAJJ.....	570
<b>GLYPHOSATE RESIDUES IN GROUNDWATER IN SLOVAKIA</b>	
Erika REMEŠICOVÁ, Lucia MIŠUROVÁ, Adriana KUŠNIER PALUGOVÁ, Suzana TREŠNJIĆ IVANOVIĆ .....	576
<b>SUSTAINABILITY IN OLIVE OIL PACKAGING</b>	
Turkan MUTLU KECELI .....	582
<b>MICROBIOLOGICAL PURITY IN PRODUCTION, PROCESSING AND FOOD DISTRIBUTION</b>	
Bojan GOLIC, Biljana PEĆANAC, Dragan KNEŽEVIĆ.....	586
<b>VARIABILITY OF TWO-YEAR-OLD SEEDLINGS OF <i>GINKGO BILOBA</i> L. GROWN FROM SEED COLLECTED IN THE CITY AREA OF BELGRADE (SERBIA)</b>	
Filip JOVANOVIĆ, Sonja BRAUNOVIĆ, Natalija MOMIROVIĆ, Ljubinko RAKONJAC, Ivana ŽIVANOVIĆ.....	594
<b>OVERVIEW OF THE FACTORS THAT INFLUENCE FEED SAFETY AND QUALITY</b>	



Aleksandra ANGELESKA, Radmila CRCEVA NIKOLOVSKA, Elizabeta DIMITRIESKA STOJKOVIC, Sandra MOJSOVA, Igor ESMEROV, Ljupco ANGELOVSKI .....	600
<b>ANTIFUNGAL ACTIVITY OF RHIZOBIA AGAINST RED CLOVER PATHOGENS FROM GENUS FUSARIUM</b>	
Filip BEKČIĆ, Nataša DUDUK, Zoran LUGIĆ, Jasmina RADOVIĆ, Snežana BABIĆ, Marija STEPIĆ, Snežana ANDJELKOVIĆ.....	607
<b>ENTOMOFAUNA ON WHEAT AND BARLEY IN BIJELJINA AREA (BOSNIA AND HERZEGOVINA)</b>	
Dejana STANIĆ, Slađan TRIŠIĆ .....	613
<b>A SAMPLE PREPARATION METHODOLOGY USING DIFFERENT d-SPE SORBENT FOR AMITRAZ ANALYSIS IN HONEY</b>	
Aleksandra TASIĆ, Ivan PAVLOVIĆ, Tanja BIJELIĆ.....	622
<b>CONTROL OF <i>CYDIA POMONELLA</i> L. IN APPLE ORCHARDS USING A MIXTURE OF INSECTICIDES</b>	
Slavica VUKOVIĆ, Dragana ŠUNJKA, Sanja LAZIĆ, Antonije ŽUNIĆ, Aleksandra ŠUŠNJAR, Miloš PETROVIĆ, Dragana BOŠKOVIĆ .....	630
<b>SURVEY OF THE POSSIBLE PRESENCE OF <i>Xylella fastidiosa</i>, THE CAUSAL AGENT OF PIERCE'S DISEASE OF GRAPEVINE AND OTHER PLANT DISEASES IN REPUBLIC OF SRPSKA</b>	
Vojislav TRKULJA, Gordana BABIĆ, Bojana VUKOVIĆ, Bojana ĆURKOVIĆ, Jovana PRIJIĆ, Bogdan NEDIĆ.....	635
<b>DETERMINATION OF CONTENT AND COMPOSITION OF ESSENTIAL OIL OF <i>ORIGANUM VULGARE</i> L. FROM THE REGION OF HERZEGOVINA</b>	
Zoranka MALEŠEVIĆ, Selena ČEVRIZ, Đorđe ILIĆ, Mirjana JOVOVIĆ, Dragana VUKOVIĆ, Aleksandra GOVEDARICA-LUČIĆ.....	642
<b>ANTIFUNGAL ACTIVITY OF THREE CHEMOTYPES OF <i>SATUREJA MONTANA</i> ESSENTIAL OIL AGAINST <i>ALTERNARIA ALTERNATA</i></b>	
Sara MIKIĆ, Tatjana STEVIĆ, Snežana MRĐAN, Željana PRIJIĆ, Stefan GORDANIĆ, Vladimir FILIPOVIĆ, Ana DRAGUMILO, Tatjana MARKOVIĆ.....	648
<b>THE IMPACT OF <i>BOTRYTIS CINEREA</i> ON INDIVIDUAL PHENOLIC COMPOUNDS IN CABERNET SAUVIGNON WINE</b>	
Nikolina ŽIVKOVIĆ, Danka MITROVIĆ, Ivana PLAVŠIĆ JANJATOVIĆ, Aleksandar PETROVIĆ.....	653
<b>THE SITE AND TEMPERATURE EFFECT ON <i>IN VITRO</i> POLLEN PERFORMANCE OF SOME CHERRY CULTIVARS</b>	
Slavica ČOLIĆ, Vera RAKONJAC, Radosav CEROVIĆ, Milena ĐORĐEVIĆ, Ivana GLIŠIĆ, Sanja RADIČEVIĆ.....	657
<b>MELISSOPALYNOLOGICAL ANALYSIS OF HONEY SAMPLES FROM BOSNIA AND HERZEGOVINA</b>	
Danijela PETROVIĆ, Helena BREKALO, Antonela MUSA, Sandra MEDIĆ .....	666

<b>DIVERSITY OF SOIL-DWELLING INSECTS THAT ATTACK MAIZE AND SUNFLOWER CROPS FROM SOUTH AND SOUTHEASTERN ROMANIA</b> Maria IAMANDEI, Andrei CHIRILOAIE-PALADE, Raluca GEORGESCU, Mădălina RĂDULEA, Ionuț-Cristian POPA .....	672
<b>SUSTAINABILITY IN OLIVE LEAVES FOR FUNCTIONAL FOOD INGREDIENTS PRODUCTION</b> Turkan MUTLU KECELI .....	678
<b>FOOD SAFETY FOR OLIVE OIL</b> Turkan MUTLU KECELI .....	682
<b>COMBINING OF TWO PREDATOR, <i>ORIOUS LAEVIGATUS</i> (FIEBER) (HEMIPTERA: ANTHOCORIDAE) AND <i>SERANGIUM PARCESETOSUM</i> SICARD (COLEOPTERA: COCCINELLIDAE) IN PROTECTED EGGPLANT GROWING</b> Mehmet KEÇEÇİ, Ali ÖZTOP .....	686
<b>INVESTIGATION OF THE COMBINED HARMFUL EFFECTS OF CHLORPYRIPHOS AND CYPRODINIL ON PHEASANT EMBRYOS</b> Rita SZABÓ, László MAJOR, József LEHEL, Bence BALÁZS, Nadhirah Binti SAIDON, Péter BUDAI .....	697
<b>TROPHIC INTERACTIONS AND DYNAMICS OF <i>APHIS SPIRAECOLA</i> PATCH ON CITRUS TREES IN PROXIMATE PLOTS, MOSTAGANEM, ALGERIA</b> Zine Eddine LABDAOUI, Abd El Basset BOUKHOUNA, Mohamed MAHMOUDI, Yamina GUENAOUI .....	704
<b>FIRST FINDING IN EUROPE OF <i>COLLETOTRICHUM SCOVILLEI</i>, A NEW AGENT OF PEPPER ANTHRACNOSE AND ASSESSMENT OF POTENTIAL BACTERIAL BIOCONTROL AGENTS</b> Bekri XHEMALI, Marina CORTIELLO, Gazmend GJINOVCI, Betim BRESILLA, Francesco MODICA, Emilio STEFANI, Davide GIOVANARDI .....	712
<b>FUMONISIN LEVELS IN CORN AND CORN PRODUCTS IN SERBIA IN 2022</b> Anja VUKSAN, Danka MITROVIĆ, Marko JAUKOVIĆ .....	718
<b>BASIC CHARACTERISTICS, APPLICATION AND SAFETY OF STEVIA REBAUDIANA BERTONI – A LOW-CALORIE NATURAL SWEETENER IN FOOD</b> Višnja SIKIMIĆ, Slavica ČABRILO, Milica ALEKSIĆ, Jovanka POPOV – RALJIĆ .....	722
<b>FIELD DIGITIZATION AND DECISION SUPPORT SYSTEM (DSS) IN PEACH CULTIVATION TO MANAGE THE MEDITERRANEAN FRUITFLY, <i>CERATITIS CAPITATA</i> IN TUNISIA</b> Mohamed BRAHAM, Hassib BEN KHEDHER, Ahmed MOUSSA .....	730
<b>ORGANIC AGRICULTURE.....</b>	<b>739</b>
<b>ANTIOXIDANT PROPERTIES OF BLACK CURRANT BERRIES (<i>Ribes nigrum</i> `Titania`)</b> Ladislav VASILIŠIN, Goran VUČIĆ, Srdjan LJUBOJEVIĆ, Ana VELEMIR .....	740

**ATTITUDES OF PRODUCERS' TOWARDS DISTRIBUTION CHANNELS OF ORGANIC PRODUCTS IN THE REPUBLIC OF CROATIA**

Irena PUGELNIK ..... 746

**CO-CULTIVATION AS A PLANTING STRATEGY FOR QUALITATIVE AND QUANTITATIVE PLANT GROWTH AND ENVIRONMENTAL PROTECTION**

Kristina Ilektra MAKNEA, Violeta Alexandra ION, Adrian ASANICA ..... 752

**ENVIRONMENT PROTECTION AND NATURAL RESOURCES MANAGEMENT ..... 760**

**RELATIONSHIPS BETWEEN WILD FLORA, CROPS, APHIDS (HEMIPTERA, APHIDIDAE) AND THEIR NATURAL ENEMIES IN CITRUS ORCHARDS**

Samir ALI-AROUS, Malika MEZIANE, Khaled DJELOUAH ..... 761

**SOIL WETNESS AND VEGETATION TYPES OF SEMBERIJA REGION (BOSNIA AND HERZEGOVINA) ACCORDING TO COPERNICUS DATABASE**

Branislav DRAŠKOVIĆ Goran SRDIJA, Zoran SRDIJA ..... 769

**POLLINATION AND SEASONAL DYNAMICS OF ANEMOPHILIC FLORA IN THE AREA OF THE CITY OF MOSTAR IN BOSNIA AND HERZEGOVINA**

Danijela PETROVIĆ, Toni GALIĆ, Mate BOBAN, Helena BREKALO ..... 774

**STATE OF VASCULAR FLORA IN THE ENVIRONMENT OF BORAČKO LAKE IN BOSNIA AND HERZEGOVINA AND SUSTAINABLE DEVELOPMENT**

Emina ADEMOVIĆ, Ana KNEŽEVIĆ ..... 780

**ADVANCEMENTS IN ROBOTICS, SMART FARMING, AND COMPUTER VISION: REVOLUTIONIZING AGRICULTURE**

Vesna RADOJČIĆ, Aleksandar Sandro CVETKOVIĆ ..... 787

**THE CALCULATION OF GHG EMISSIONS OF CULTIVATED CROPS AND USAGE OF THESE CROPS IN FEED MIXTURES IN ANIMAL NUTRITION**

Pavel ČERMÁK, Eva WEISBAUEROVÁ, Martin DĚDINA, Petr JEVIČ, Tomáš LOŠÁK ..... 795

**IMPROVING LANDSCAPE RESILIENCE IN THE MEDITERRANEAN AGAINST CLIMATE CHANGE THREATS: THE "RESALLIANCE" PROJECT**

Gavriil XANTHOPOULOS, Eduard MAURI, Eduard PLANA, Evangelia AVRAMIDOU ..... 800

**"ON EITHER SIDE OF THE ELECTRIC FENCE" (A BOTANICAL STUDY OF THE AUTUMNAL ASPECT OF THE DRAINED LAKE BED OF A DOMESTIC WATER BUFFALO PASTURE IN THE ZÁMOLYI BASIN)**

Dániel BALOGH, Károly PENKSZA, Levente VISZLÓ, Gabriella KEMÉNY, Attila FÜRÉSZ ..... 807

**EFFECT OF DIFFERENT SHRUB SPECIES ON SOIL: SEED BANKS CHEMICAL AND BIOLOGICAL PROPERTIES**

Reza ERFANZADEH, Shadi HAZHIR, Alireza MOHEBALI ..... 813

**THE COLLECTION OF *HOSTA* Tratt FROM "AL. CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE)**

Irina SFECLA.....	820
<b>REMOVAL OF THE WATER FROM FENAMIPHOS PESTICIDE IN THE SOIL USING MORINGA OLEIFERA</b>	
Ashraf KABAR, Iman IBRAHIM, Zaainaldeen NASSAR, Nasser Abu GALWA, Fawzi KODIH .....	827
<b>PURIFICATION OF WATER FROM CHLORPYRIFOS IN THE SOIL BY USING MORINGA OLEIFERA</b>	
Ashraf KABAR , Iman IBRAHIM, Nasser Abu GHALWA, Fawzi KODIH.....	836
<b>SEASONAL VARIATIONS OF FLOWERING OF <i>Amorpha fruticosa</i> L. AS AN INDICATOR OF GLOBAL WARMING IN BLUE-GREEN INFRASTRUCTURE</b>	
Mirjana OCOKOLJIĆ, Đurđa PETROV, Dragan VUJIČIĆ, Nevenka GALEČIĆ.....	846
<b>EFFECTS OF CLIMATE PARAMETERS ON BLACKTHORN IN AGROFORESTRY ECOTONES AS GREEN ROAD INFRASTRUCTURE ELEMENTS</b>	
Mirjana OCOKOLJIĆ, Đurđa PETROV, Dragan VUJIČIĆ, Nevenka GALEČIĆ	853
<b>PHYSICAL, CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF DRINKING WATER ON THE TERRITORY OF PROKUPLJE (SERBIA)</b>	
Svetlana BOGDANOVIĆ, Moma DENIĆ, Ivana ZLATKOVIĆ, Dobrila RANĐELOVIĆ, Dragana STANISAVLJEVIĆ.....	859
<b>CHARACTERIZATION OF DIFFUSE PHOTOSYNTHETICALLY ACTIVE RADIATION IN BURGOS (SPAIN)</b>	
Ana GARCIA-RODRIGUEZ, Sol. GARCIA-RODRIGUEZ, Elena GARRACHON-GOMEZ, Diego. GRANADOS-LOPEZ, Cristian TERRADOS-LOPEZ.....	864
<b>CHARACTERIZATION OF ERYTHEMAL ULTRAVIOLET RADIATION IN BURGOS, SPAIN</b>	
Sol GARCIA-RODRIGUEZ, Ana GARCIA-RODRIGUEZ, Elena GARRACHON-GOMEZ, Ignacio GARCIA, David GONZALEZ-PEÑA.....	869
<b>INFLUENCE OF COVER CROPS ON SOIL BIOLOGICAL QUALITY</b>	
Mário DUARTE, Elsa VALÉRIO, Rosa Santos COELHO, Maria GODINHO .....	876
<b>STATUS OF RADIONUCLIDES IN THE SOILS FROM VOJVODINA PROVINCE, NORTHERN SERBIA</b>	
Željko MIHALJEV, Milica ŽIVKOV BALOŠ, Sandra JAKŠIĆ, Marija MIHALJEV, Nenad POPOV.....	883
<b>SHEEP FARMERS' PERCEPTION OF CLIMATE CHANGE: CASE OF KONYA PROVINCE, TÜRKİYE</b>	
Cennet OĞUZ, Aykut ÖRS, Aysun YENER ÖĞÜR, Yusuf ÇELİK.....	888
<b>RESEARCH ON RECREATIONAL VALUE OF FOREST PARKS BASED ON CHOICE EXPERIMENT METHOD: A CASE STUDY OF WUYI MOUNTAIN IN CHINA</b>	
Yimeng ZHANG, Yuanyuan YI.....	894
<b>PREDICTIVE CLASSIFICATION OF AQUACULTURE FISH MORTALITY USING DATA MINING CLASSIFIERS</b>	

Dimitris C. GKIKAS, Marios C. GKIKAS, John A. THEODOROU .....	900
<b>A MONTHLY STUDY OF INTERCEPTED PHOTOSYNTHETICALLY ACTIVE RADIATION (IPAR) FOR VINEYARDS IN CASTILLA Y LEÓN</b>	
Elena GARRACHÓN-GÓMEZ , Ana GARCÍA-RODRÍGUEZ, Sol GARCÍA-RODRÍGUEZ, Manuel GARCÍA-FUENTE .....	908
<b>ANIMAL HUSBANDRY .....</b>	<b>914</b>
<b>CHARACTERIZATION AND IDENTIFICATION OF POTENTIAL PROBIOTIC LACTIC ACID BACTERIA ISOLATED FROM EGYPTIAN TRADITIONAL FERMENTED DAIRY PRODUCTS</b>	
Nesreen M. NASR, Walaa M. BAHNAS, Khaled A. ABBAS .....	915
<b>HIPPOTHERAPY IN THE CONTEXT OF MODERN METHODS OF REHABILITATION</b>	
Igor V. GONCHARENKO .....	926
<b>EFFECT OF DIFFERENT STOCKING DENSITIES IN THE OUTDOOR AREA ON BROILER PERFORMANCE CHARACTERISTICS</b>	
Omer EREN, Ali AYGUN, Dogan NARINC .....	931
<b>COMPARISON OF THREE DIFFERENT LAYER GENOTYPES RAISED IN A FREE-RANGE SYSTEM FOR EGG QUALITY</b>	
Ali AYGUN, Dogan NARINC, Hasan ARISOY .....	936
<b>MICROBIOLOGICAL STATUS AND MOLD CONTENT IN MILK AND FEED MIXTURES WITH THE ADDITION OF ADDITIVES</b>	
Aleksandra JEVTIĆ, Saša PEŠEV, Nikola STOLIĆ, Bratislav PEŠIĆ, Nebojša ZLATKOVIĆ .....	941
<b>REFERENCE INTERVALS OF HEAVY METALS IN THE MUSCLE TISSUE OF CATTLE CONSIDERING PARATYPIC FACTORS</b>	
Kirill NAROZHNYKH .....	948
<b>STUDY ABOUT THE MODE OF IMPLEMENTATION OF THE BREEDING PROGRAM ON ABERDEEN ANGUS BREED IN ROMANIA</b>	
Dragoş Florin MANEA, Vasile MACIUC .....	955
<b>ASSESSMENT OF THE ECONOMIC VIABILITY OF SUCKLER COW BREEDING MODEL</b>	
Luis SANTA MARIA .....	962
<b>SENSORS DATA IN AUTOMATIC MILKING SYSTEM AND MASTITIS</b>	
Katarina PANDŽIĆ, Zrinko MIKIĆ, Zdenko IVKIĆ, Drago BEŠLO, Pero MIJIĆ, Tina BOBIĆ .....	968
<b>TOP-DOWN AND BOTTOM-UP REGULATIONS AT THE ALGERIAN COASTS (1°W – 8°E): MODELING OF COPEPODA - MEDUSOZOA RELATIONSHIPS</b>	
Lilia MELLAK, Aldjia KHERCHOUCHE, Selman CHABANI, Aziz HAFFERSSAS ..	976
<b>THE HUMAN ANIMAL RELATIONSHIP IN DAIRY FARMING</b>	
Nassima BOUHROUM, Belmehel BENS AHLI .....	984
<b>PERIPHERAL INDICATORS OF ACIDOSIS IN DAIRY COWS</b>	



Nassima BOUHROUM, Belmehel BENSALHI .....	988
<b>EVOLUTION OF BIOCHEMICAL PARAMETERS IN POST PARTUM COWS AFFECTED WITH BRUCELLA</b>	
Nassima BOUHROUM, Belmehel BENSALHI, Abdellatif NIAR .....	993
<b>INFLUENCE OF ULTRASONIC TREATMENT ON THE FERMENTATION OF GOAT'S MILK SUPPLEMENTED WITH MILK PROTEIN ISOLATES</b>	
Tanja VUCIC, Snezana JOVANOVIC, Marija MILETIC GLISIC .....	999
<b>TWO GENETIC VARIANTS IN <i>EBF1</i> GENE EFFECT ON LIVE WEIGHT IN SHEEP</b>	
Varvara SHEVTSOVA, Lyubov GETMANTSEVA, Yuri KOLOSOV, Alexander USATOV .....	1006
<b><i>IN OVO</i> <math>\alpha</math>-TOCOPHEROL MODIFIES SERUM LIPID PROFILE BY GENDER OF BROILER CHICKS AT 72TH-HOUR OF POST-HATCHING STAGE</b>	
Elif BABACANOĞLU ÇAKIR, Mehmet Reşit KARAGEÇİLİ .....	1010
<b>CURRENT SITUATION OF CATTLE HUSBANDRY AND BREEDING POSSIBILITIES IN BİNGÖL PROVINCE OF TÜRKİYE</b>	
Turgut AYGÜN .....	1015
<b>OCCUPATIONAL AND ZONOTIC DISEASES IN LIVESTOCK SECTOR</b>	
Turgut AYGÜN .....	1021
<b>USE OF SERUM LEVELS OF FSH AND LH AS INDIRECT SELECTION CRITERION IN GENETIC IMPROVEMENT OF REPRODUCTION IN SHEEP</b>	
Turgut AYGÜN .....	1027
<b>THE INFLUENCE OF THE NUTRITIONAL STATUS OF DAIRY COWS ON THEIR WELL-BEING</b>	
Zrinko MIKIĆ , Katarina PANDŽIĆ, Zdenko IVKIĆ, Drago BEŠLO, Pero MIJIĆ, Tina BOBIĆ .....	1033
<b>EVALUATION OF BIRTH WEIGHT BY BANDED MEASURE IN SELECTED BREEDING HERD OF SLOVAK SPOTTED BREED</b>	
Jozef BUJKO, Juraj CANDRÁK, Peter STRAPÁK, Cyril HRNČÁR, Mariusz BOGUCKI, Dariusz KOKOSZYŃSKI .....	1039
<b>TICK FAUNA OF SHEEP IN EAST SERBIA</b>	
Ivan PAVLOVIĆ, Jovan BOJKOVSKI, Violeta CARAO PETROVIĆ, Milan P.PETROVIĆ, Aleksandra TASIĆ, Marija PAVLOVIĆ, Dragica VOJINOVIĆ .....	1045
<b>PHENOTYPE EVALUATION OF GATACKO CATTLE FROM THE TERRITORY OF GACKO MUNICIPALITY IN BOSNIA AND HERZEGOVINA</b>	
Jelena NIKITOVIC, Dusan ANDRIJASEVIC, Tatjana KRAJISNIK, Zoran MALETIC, Milan PUZIGACA .....	1051
<b>THE EFFECT OF POTASSIUM HUMATE ON THE PRODUCTIVITY, HAEMATOLOGICAL AND BIOCHEMICAL BLOOD PARAMETERS OF DAIRY COWS</b>	
Aiga NOLBERGA-TRŪPA, Aija MĀLNIECE, Aivars POĻAKOVŠ .....	1057
<b>THE IMPACT OF BREEDING HONEYBEES IN DIFFERENT REGIONS OF</b>	

<b>SERBIA AND BOSNIA AND HERZEGOVINA ON THEIR MORPHOMETRIC PARAMETERS</b>	
Aleksandar IGNJATOVIĆ, Nebojša NEDIĆ, Goran MIRJANIĆ, Predrag PERIŠIĆ, Goran JEVTIĆ.....	1065
<b>POPULATION STRUCTURE OF THE ENDEMIC MAKAL DACE (SQUALIUS MICROLEPIS HECKEL, 1843) FROM THE MATICA RIVER</b>	
Predrag IVANKOVIĆ, Leona PULJIĆ, Zrinka KNEZOVIĆ .....	1071
<b>STATUS OF THE MIGRATORY BEEKEEPING IN LATVIA</b>	
Aleksejs ZACEPINS, Valters BRUSBARDIS, Oļvija KOMASILOVA, Armands KVIESIS, Vitalijs KOMASILOVS .....	1076
<b>ASSESSMENT OF THE MICROBIOLOGICAL STATUS OF DRINKING WATER ON ANIMAL FARMS</b>	
Bojan GOLIC, Dragan KNEŽEVIĆ, Biljana PEĆANAC.....	1086
<b>NUTRITIONAL VALUES OF DOMINANT FESTUCA SPECIES IN SANDY GRASSLANDS ALONG THE DANUBE BASED ON A SYSTEMATIC SAMPLING</b>	
Attila FÜRÉSZ, László SIPOS, Ferenc PAJOR, Péter PENKSZA, Károly PENKSZA	1094
<b>THE INFLUENCE OF AGE ON REPRODUCTIVE CHARACTERISTIC IN SIMMENTAL COWS</b>	
Jelena NIKITOVIC, Tatjana KRAJISNIK, Stevan RAJIC.....	1102
<b>THE INFLUENCE OF ALTITUDE ON THE QUALITY OF HONEY IN CENTRAL SERBIA</b>	
Goran JEVTIĆ, Snežana BABIĆ, Snežana ANĐELKOVIĆ, Đorđe LAZAREVIĆ, Mirjana PETROVIĆ, Kazimir MATOVIĆ, Nebojša NEDIĆ.....	1109
<b>EFFECTS OF BREEDER AGE ON EGG QUALITY TRAITS IN JAPANESE QUAILS</b>	
Medine KAYA, Ali AYGÜN, Doğan NARİNÇ .....	1115
<b>HOLSTEIN BREED LIVESTOCK IN GEORGIA</b>	
Tamar QACHASHVILI, Amrosi CHKUASELI, Giorgi KHATIASHVILI, Jemal KHATIASHVILI.....	1120
<b>AN OVERVIEW OF THE CURRENT STATE OF GRASSLANDS IN THE PODRINJE REGION AS A SOURCE OF HEALTHY ANIMAL FEED</b>	
Mirjana PETROVIĆ, Vladimir ZORNIĆ, Jasmina RADOVIĆ, Nedeljko RACIĆ, Dejan SOKOLOVIĆ, Svetlana JERINIĆ, Zoran LUGIĆ.....	1127
<b>IMPROVING POSSIBILITIES OF INDIGENOUS HAIR GOAT BREEDING IN BİNGÖL PROVINCE IN TÜRKIYE</b>	
Emre ALARSLAN, Turgut AYGÜN .....	1132
<b>BREEDING TECHNOLOGIES FOR HIGH LAMB CARCASS QUALITY</b>	
Angela CIVIDINI.....	1139
<b>RURAL DEVELOPMENT AND AGRO-ECONOMY.....</b>	<b>1145</b>

**DIVERSIFICATION OF AGRICULTURAL VALUE CHAINS AND RURAL DEVELOPMENT IN MALI: CASE OF KITA CERCLE**

Innocent MUMARARUNGU, Bisetsa ERICKSON, Gisaro Ca- Madeberi Ya BITITI, Philippe BURNY ..... 1146

**THE ECONOMIC IMPORTANCE OF AGRICULTURE AND TOURISM FOR THE ECONOMIC DEVELOPMENT OF BOSNIA AND HERZEGOVINA**

Adriana RADOSAVAC, Ružica ĐERVIDA, Gordana PETROVIĆ, Tatjana IVANOVIĆ, Desimir KNEŽEVIĆ ..... 1154

**AGRICROWDFUNDING AS AN INNOVATIVE AGRI-FINANCING MODEL**

Zorica GOLIĆ, Nedeljka ELEZ ..... 1163

**REGIONAL SOCIO-ECONOMIC IMBALANCES IN BULGARIA**

Angel SAROV ..... 1172

**EFFECT OF THE TRANSITION TOWARDS CIRCULAR ECONOMY**

Monika SABEVA ..... 1180

**YOUNG CONSUMERS AND ETHICAL MEAT CONSUMPTION**

Martina SALOVA, Zbynek ULCAK ..... 1186

**VITALITY OF EDUCATION ORGANIZATIONS IN QALIUBIYA RURAL AREAS (CASE STUDY IN SHEBIN DISTRICT IN EGYPT)**

Mazen MOHAMED BARAKAT ..... 1193

**APPLYING CATEGORICAL REGRESSION FOR EXPLORING VETERINARY STUDENTS' ATTITUDES TOWARDS CAREER PERSPECTIVES**

Athanasios BATZIOS, Vagis SAMATHRAKIS, Alexandros THEODORIDIS, Georgia KOUTOUZIDOU, Alexandros KAKOURIS ..... 1200

**A SOCIAL NETWORK ANALYSIS ON THE COLLABORATIVE CONSERVATION OF RANGELANDS IN LOCAL COMMUNITIES OF IRAN**

Fatemeh BORNA, Iman ISLAMI, Hossein AZADI ..... 1207

**MODELING THE TIME SERIES OF RASPBERRY YIELDS IN THE REPUBLIC OF SERBIA USING THE ARIMA MODEL**

Angelina PETKOVIĆ, Sveltana JANKOVIĆ-ŠOJA ..... 1213

**IMPORTANT PARTNERS OF SERBIA IN THE FOREIGN TRADE EXCHANGE OF FOOD**

Biljana VELJKOVIĆ, Ranko KOPRIVICA, Marija GAVRILOVIĆ, Milun D. PETROVIĆ, Simeon RAKONJAC ..... 1218

**FORECAST OF AND TRENDS IN THE SERBIAN RASPBERRY PRODUCTION**

Mirjana LUKAČ BULATOVIĆ, Katarina ĐURIĆ ..... 1225

**THE INFLUENCE OF CORN AND FATTENING PIGS PRICE FROM CURRENT YEAR ON THE NUMBER OF FATTENING PIGS IN FOLLOWING YEAR**

Nebojša NOVKOVIĆ, Ljiljana DRINIĆ, Nataša VUKELIĆ, Veljko ŠARAC ..... 1232

**DISTRIBUTION AND EFFICIENCY OF ECONOMIC SUBSIDIES FOR SOIL CONSERVATION ALONG TWO DECADES IN SPAIN**

Mistral VAN OUDENHOVE, Pedro PÉREZ CUTILLAS, Carolina BOIX FAYOS ..... 1238

**GREEN BONDS AS A FINANCIAL TOOL TO SUPPORT AGRICULTURAL SECTOR – OPPORTUNITIES AND CHALLENGES**

Zorica GOLJIĆ, Saša LALIĆ ..... 1245

**EXPANSION AND DECLINE OF NATURAL RUBBER EXPORTATIONS IN THE BRAZILIAN AMAZON REGION**

José de Jesus Sousa LEMOS ..... 1255

**THE INFLUENCE OF INTERNATIONAL MARKETS ON BARLEY PRICES IN THE REPUBLIC OF NORTH MACEDONIA**

Lazo DIMITROV, Marija GJOSHEVA KOVACHEVIKJ, Despina POPOVSKA STOJANOV, Sreten ANDONOV, Sasho KJOSEV, Bodan ANDONOV ..... 1265

**THE LAND CONSOLIDATION INFLUENCE ON DEMOGRAPHY: CASE STUDY ON VOJVODINA IN SERBIA**

Goran MARINKOVIĆ, Žarko NESTOROVIĆ, Zoran ILIĆ, Marko BOŽIĆ..... 1272

**FORESTRY AND AGRO-FORESTRY ..... 1277**

**STRUCTURAL AND FUNCTIONAL RESPONSES OF *ALNUS GLUTINOSA* [L.] GAERTN. TREES ON DIFFERENT SITE TYPES IN CENTRAL BOSNIA**

Mirsada STARČEVIĆ, Azra ČABARAVDIĆ ..... 1278

**SEASONAL CHANGES OF FUNCTIONAL RESPONSES ON *ALNUS GLUTINOSA* (L.) GAERTN. SITES**

Mirsada STARČEVIĆ, Azra ČABARAVDIĆ ..... 1285

**POSSIBILITIES AND DIFFICULTIES OF MEASURING CARBON SEQUESTRATION IN AGROFORESTRY SYSTEMS IN HUNGARY**

Orsolya SZABÓ, Tamás MOLNÁR, Éva Ilona KIRÁLY, Attila BOROVIKS, Zsolt KESERŰ..... 1292

**MACHINE LEARNING METHODS FOR LAND COVER AND TREE SPECIES CLASSIFICATION USING GOOGLE EARTH ENGINE**

Tamás MOLNÁR, Géza KIRÁLY ..... 1299

**TAXONOMY AND PHYTOGEOGRAPHY ANALYSIS OF MEDICINAL PLANTS AT THE AREA OF NATURE MONUMENT “ŠUMA KOŠUTNJAK”**

Dušan JOKANOVIĆ, Vesna NIKOLIĆ JOKANOVIĆ, Kristina ŽIVANOVIĆ, Ivan DESIMIROVIĆ, Jovana DEVETAKOVIĆ, Marina NONIĆ ..... 1305

**PREVIEW OF MEDICINAL PLANTS WITHIN LOWLAND PEDUNCULATE OAK FORESTS AND THEIR USEFUL PROPERTIES**

Dušan JOKANOVIĆ, Vesna NIKOLIĆ JOKANOVIĆ, Kristina ŽIVANOVIĆ, Ivan DESIMIROVIĆ, Radoslav LOZJANIN, Tihomir ŠOŠKIĆ..... 1311

**SEASONAL DYNAMICS OF INSECT COMMUNITIES AND THREE MAJOR PESTS IN FRUŠKA GORA NATIONAL PARK (SERBIA)**

Dušanka VUJANOVIĆ, Jelena JOVIĆ, Maja AROK, Marija MILIČIĆ, Andrijana ANDRIĆ..... 1317

**FLORISTIC AND ECOLOGICAL ANALYSIS OF BLACK PINE FORESTS (*Pinus nigra* Arn.) ON WESTERN BALKAN SERPENTINITES**

Marijana NOVAKOVIĆ-VUKOVIĆ .....	1324
<b>SYSTEM MONITORING OF THE CROWN CONDITION ON ICP FORESTS SAMPLE PLOTS LEVEL I IN SERBIA WITH A SPECIAL VIEW OF BIOTIC DAMAGE ON PLOTS WITH OAK AS THE EDIFIER</b>	
Miroslava MARKOVIĆ, Renata GAGIĆ-SERDAR, Goran ČEŠLJAR, Snežana STAJIĆ, Natalija MOMIROVIĆ .....	1333
<b>EDAPHIC CHARACTERISTICS OF THE PARK IN THE ŠARENGRAD AREA IN NOVI SAD IN SERBIA</b>	
Saša PEKEČ, Miroslav MARKOVIĆ , Predrag PAP, Saša KOSTIĆ, Marina MILOVIĆ, Andrej PILIPOVIĆ, Milutin ĐILAS .....	1339
<b>DEMOGRAPHIC OF EMPLOYEES IN PUBLIC FOREST ENTERPRISES AS FACTOR FOR IMPROVEMENT OF FOREST PRODUCT AND SERVICES</b>	
Zoran PODUŠKA, Snežana STAJIĆ, Branka PAVLOVIĆ, Vlado ČOKEŠA .....	1344
<b>CHARACTERISTICS OF LOWER NON-AGRICULTURAL SOILS IN THE NORTH BANAT REGION, MUNICIPALITY OF KIKINDA AND POSSIBILITIES FOR THEIR AFFORESTATION</b>	
Miodrag RADOVANOVIĆ, Zoran GALIĆ, Velisav KARAKLIĆ, Milutin ĐILAS	1351
<b>BACTERIAL TREATMENT IMPACT ON ONE-YEAR-OLD SESSILE OAK (<i>QUERCUS PETRAEA</i> (MATT.) LIEBL) SEEDLINGS OF THREE SERBIAN PROVENANCES</b>	
Sanja JOVANOVIĆ, Vladan POPOVIĆ, Aleksandar LUČIĆ, Ljubinko RAKONJAC	1357
<b>AWARENESS AND ADOPTION OF SCIENTIFIC AGRICULTURAL PRACTICES IN AGROFORESTRY HOME GARDENS WITH SPECIAL REFERENCE TO WELIGAMA, SRI LANKA</b>	
Malghaha Gamage Dilshani ABEYSINGHE, Ganganee Chandima SAMARAWEERA, Mangala DE ZOYSA.....	1362
<b>AUTHOR INDEX.....</b>	<b>1372</b>

## PREVIEW OF MEDICINAL PLANTS WITHIN LOWLAND PEDUNCULATE OAK FORESTS AND THEIR USEFUL PROPERTIES

Dušan JOKANOVIĆ<sup>1\*</sup>, Vesna NIKOLIĆ JOKANOVIĆ<sup>1</sup>, Kristina ŽIVANOVIĆ<sup>2</sup>, Ivan DESIMIROVIĆ<sup>3</sup>, Radoslav LOZJANIN<sup>4</sup>, Tihomir ŠOŠKIĆ<sup>2</sup>

<sup>1</sup>Faculty of Forestry, University of Belgrade, Serbia

<sup>2</sup>Institute for Multidisciplinary Research, University of Belgrade, Serbia

<sup>3</sup>PE "Srbijašume" FE "Severni Kučaj" Kučevo, Serbia

<sup>4</sup>PE „Vojvodinašume“, Petrovaradin, Serbia

\*Corresponding author: [dusan.jokanovic@sfb.bg.ac.rs](mailto:dusan.jokanovic@sfb.bg.ac.rs)

### Abstract

The study related to medicinal plants was carried out at the area of Gornji Srem within three management units: MU „Blata-Malovanci“ (forest type *Carpino-Fraxino-Quercetum roboris caricetosum remotae*), MU „Raškovića-Smogvica“ (forest type *Fraxino-Quercetum roboris aceretosum*) and MU „Vinična-Žeravinac Puk“ (forest type *Carpino-Fraxino-Quercetum roboris caricetosum remotae*). At the area of Gornji Srem in the middle of 30's last century protective embankment was built which eliminated flooding influence. As a result, vegetation is supplied with water mainly from groundwater and precipitation. There were recorded 139 medicinal plants that originate from 43 families. The aim of the paper is to determine useful properties of medicinal plants. The analysis of mentioned features of medicinal plants was conducted according to generally accepted methodology (Randelović et al., 2002) that all medicinal herbal drugs classified into 14 groups. Based on obtained results, the largest number of medicinal plants act on the digestive organs and cardiovascular system, and then follow drugs that treat problems with the skin, excretory and respiratory organs. Only one herb belongs to the category of antihistamines, while phytoncide herbs, galactose and drugs for improving the flavour and taste of various medicines have two representatives each. It should be noted that certain medicinal taxa have a wide range of useful properties and simultaneously treat several different health problems.

**Key words:** *Gornji Srem, useful properties, lowland pedunculate oak forests, phytotherapy.*

### Introduction

Medicinal plants have always been considered an extremely important natural resource and humans have used them extensively, both to satisfy their needs for food and to treat numerous health problems (Jokanović et al., 2020 a, b; Jokanović et al., 2021; Jokanović, 2021). Based on the Law on Nature Protection, the Rulebook on the proclamation and protection of strictly protected and protected wild species of plants, animals and mushrooms (Official Bulletin of the Republic of Serbia, No 5/2010) was adopted, which recognizes two basic categories of protection of wild species of plants, animals and mushrooms: the first category (strictly protected) and the second category (protected wild species). Species that belong to the first category are either those that have completely disappeared from the territory of the Republic of Serbia or are extremely endangered, relict, local endemic and very significant for preservation of biodiversity of the Republic of Serbia (Igić et al., 2010).

Protected wild species are currently not in danger of disappearing or becoming critically endangered, but they are of particular importance from an ecological, ecosystem, biogeographical, scientific, health and economic aspect (Igić et al., 2010). Serbia is characterized by extremely rich biodiversity which, among other things, includes 3.562 plant

species and subspecies, of which 606 belong to strictly protected and 535 to protected taxa, which is a total of 1.141 of about 1/3 of the total number of vascular flora taxa (Vilotić, 2018; Vilotić, 2021).

It should be noted that forest ecosystems at the area of Ravni Srem are characterized by a large number and diversity of vascular flora, which also includes many medicinal species (Jokanović et al., 2017; Jokanović et al., 2018; Jokanović et al., 2022). Based on a detailed taxonomic and phytogeographical analysis of medicinal species in the area of lowland pedunculate oak forests in Gornji Srem (Jokanović et al., 2022) the presence of 139 medicinal plants which belong to 43 families, and include 6 life forms and 16 areal types was determined. In general, medicinal plants also have significant phytoremediation properties (Stanković et al., 2015 a; Stanković et al., 2015 b; Stanković & Jokanović, 2017) in terms of soil, water and air cleaning, and this is another important reason why the gene pool of wild species should be preserved.

The scope of the paper is to establish useful properties of recorded medicinal plants at the area of Gornji Srem in order to establish what health problems these plants can treat. One of specific goals is also to emphasize the importance of phytotherapy as a preventive treatment method.

### **Material and methods**

Medicinal taxa within lowland pedunculate oak forests at protected area of Gornji Srem were determined based both on numerous references (Kojić & Vilotić, 2006; Vilotić, 2018; Vilotić, 2021) and detailed field study (Jokanović et al., 2022). People’s greatest interest when it comes to medicinal plants is the way they are used in practice. Systematic classification of medicinal species from lowland pedunculate oak forests in Gornji Srem was carried out on the basis of their effects on human health. Based on the modern classification principle according to medicinal plants effects on humans (Randelović et al., 2002), medicinal herbal drugs are divided into 14 groups:

1. drugs that affect the cardiovascular system;
2. drugs that affect the digestive organs;
3. drugs that affect the respiratory organs;
4. drugs for the treatment of the central and peripheral nervous system;
5. drugs that act on the autonomic nervous system;
6. drugs for the treatment of the urogenital tract;
7. drugs for the treatment of skin diseases;
8. drugs for regulating the circulation of substances;
9. antidiabetics;
10. antihistamines;
11. phytoncidal plants;
12. galactagogues;
13. tonics;
14. drugs for repairing the smell and taste of various medicines



## Results with discussion

At the area of lowland pedunculate oak forests in Gornji Srem (Jokanović et al., 2022) 139 medicinal plants were recorded: *Achillea millefolium* L., *Adonis vernalis* L., *Agrimonia eupatoria* L., *Agropyrum repens* L., *Agrostis alba* L., *Ajuga reptans* L., *Alliaria officinalis* M.Bieb., *Althea officinalis* L., *Anchusa officinalis* L., *Angelica archangelica* L., *Aristolochia clematidis* L., *Artemisia vulgaris* L., *Arum maculatum* L., *Asclepias syriaca* L., *Ballota nigra* L., *Bellis perennis* L., *Betula pendula* Roth., *Brassica nigra* L., *Bromus commutatus* Schrad., *Bromus inermis* Leyss., *Bromus molis* L., *Bromus racemosus* L., *Bromus sterilis*, *Calamintha officinalis* L., *Capsela bursa-pastoris* L., *Cardamine pratensis* L., *Centaurea jacea* L., *Centaureum umbellatum* Gilib., *Chelidonium majus* L., *Cichorium intybus* L., *Colutea arborescens* L., *Colchicum autumnale* L., *Conium maculatum* L., *Convallaria majalis* L., *Convolvulus arvensis* L., *Cornus mas* L., *Cornus sanguinea* L., *Coronilla varia* L., *Corylus avellana* L., *Crataegus monogyna* Jacq., *Crataegus oxyacantha* (Poir.) DC., *Dactylis glomerata* L., *Datura stramonium* L., *Daucus carota* L., *Eupatorium cannabinum* L., *Euphorbia cyparissias* L., *Festuca pratensis* Huds., *Filipendula hexapetala* Moench., *Fragaria vesca* L., *Fumaria officinalis* L., *Galanthus nivalis* L., *Galega officinalis* L., *Geranium robertianum* L., *Geum urbanum* L., *Hedera helix* L., *Helleborus odoratus* Waldst & Kit., *Hordeum murinum* L., *Humulus lupulus* L., *Hyoscyamus niger* L., *Hypericum perforatum* L., *Hypericum hirsutum* L., *Inula helenium* L., *Juglans regia* L., *Lamium purpureum* L., *Lathyrus tuberosus* L., *Leonorus cardiaca* L., *Lithospermum purpureocaeruleum* L., *Lolium perenne* L., *Lonicera caprifolium* L., *Loranthus europaeus* Jacq., *Lotus corniculatus* L., *Malva sylvestris* L., *Marrubium vulgare* L., *Melissa officinalis* L., *Mentha longifolia* L., *Matricaria chamomilla* L., *Medicago lupulina* L., *Medicago sativa* L., *Morus alba* L., *Morus nigra* L., *Ononis spinosa* L., *Origanum vulgare* L., *Quercus cerris* L., *Quercus robur* L., *Papaver rhoeas* L., *Plantago lanceolata* L., *Plantago major* L., *Plantago media* L., *Platanthera bifolia* L.C.Rich., *Poa pratensis* L., *Poa trivialis* L., *Polygonum aviculare* L., *Populus alba* L., *Populus tremula* L., *Potentilla palustris* L., *Potentilla reptans* L., *Prunus avium* L., *Primula acaulis* L., *Prunella vulgaris* L., *Prunus spinosa* L., *Pulmonaria officinalis* L., *Pulsatilla vulgaris* Mill., *Ranunculus repens* L., *Rosa canina* L., *Rubus hirtus* L., *Rumex acetosella* L., *Ruscus aculeatus* L., *Sambucus nigra* L., *Sanguisorba minor* Scop., *Stachys sylvatica* L., *Stellaria nemorum* L., *Salix alba* L., *Saponaria officinalis* L., *Solanum dulcamara* L., *Symphytum officinale* L., *Tamus communis* L., *Tanacetum vulgare* L., *Taraxacum officinale* Web., *Tilia cordata* Mill., *Tilia platyphyllos* Scop., *Tilia tomentosa* L., *Trifolium alpestre* L., *Trifolium arvense* L., *Trifolium pratense* L., *Trifolium repens* L., *Tussilago farfara* L., *Valeriana officinalis* L., *Vicia cracca* L., *Vicia dumetorum* L., *Vicia pannonica* Crantz., *Vicia sativa* L., *Veronica officinalis* L., *Viola alba* Besser, *Viola tricolor* L., *Urtica dioica* L., *Viburnum opulus* L., *Vinca minor* L., *Verbascum phlomoides* L., *Verbena officinalis* L.

### I : Drugs that affect the cardiovascular system:

*Helleborus odoratus*, *Urtica dioica*, *Crataegus monogyna*, *Crataegus oxyacantha*, *Leonorus cardiaca*, *Convallaria majalis*, *Hypericum perforatum*, *Hypericum hirsutum*, *Sambucus nigra*, *Capsela bursa-pastoris*, *Rosa canina*, *Prunella vulgaris*, *Daucus carota*, *Achillea millefolium*, *Fragaria vesca*, *Rumex acetosella*, *Malva sylvestris*, *Potentilla palustris*, *Potentilla reptans*, *Geum urbanum*, *Rubus hirtus*, *Chelidonium majus*, *Artemisia vulgaris*, *Taraxacum officinale*, *Tilia cordata*, *Tilia platyphyllos*, *Tilia tomentosa*, *Symphytum officinale*, *Vinca minor*, *Juglans regia*, *Prunus avium*.

II Drugs that affect the digestive organs:

*Sambucus nigra, Artemisia vulgaris, Taraxacum officinale, Geum urbanum, Potentilla palustris, Potentilla reptans, Ajuga reptans, Achillea millefolium, Agropyrum repens, Verbascum phlomoides, Rosa canina, Capsela bursa-pastoris, Prunella vulgaris, Quercus cerris, Cornus mas, Cornus sanguinea, Chelidonium majus, Daucus carota, Agrimonia eupatoria, Brassica nigra, Centaurium ubellatum, Cichorium intybus, Filipendula hexapetala, Fragaria vesca, Matricaria chamomilla, Melissa officinalis, Origanum vulgare, Rumex acetosella, Symphytum officinale, Urtica dioica, Corylus avellana, Juglans regia, Quercus robur, Rubus hirtus, Salix alba, Centaurea jacea.*

III Drugs that affect the respiratory organs:

*Hypericum perforatum, Malva sylvestris, Quercus cerris, Corylus avellana, Sambucus nigra, Verbascum phlomoides, Viola tricolor, Viola alba, Plantago major, Plantago lanceolata, Plantago media, Crataegus monogyna, Crataegus oxyacantha, Papaver rhoeas, Bellis perennis, Primula acaulis, Althea officinalis, Matricaria chamomilla, Origanum vulgare, Polygonum aviculare, Tussilago farfara, Populus tremula, Populus alba, Brassica nigra, Pulmonaria officinalis, Cardamine pratensis, Prunus spinosa.*

IV Drugs for the treatment of the central and peripheral nervous system:

*Chelidonium majus, Hypericum perforatum, Hypericum hirsutum, Salix alba, Veronica officinalis, Solanum dulcamara, Ranunculus repens, Pulsatilla vulgaris.*

V Drugs that act on the autonomic nervous system:

*Chelidonium majus, Melissa officinalis, Hyoscyamus niger.*

VI Drugs for the treatment of the urogenital tract:

*Daucus carota, Taraxacum officinale, Capsela bursa-pastoris, Prunus avium, Sambucus nigra, Pulmonaria officinalis, Agropyrum repens, Urtica dioica, Artemisia vulgaris, Populus tremula, Populus alba, Betula pendula, Viola tricolor, Viola alba, Vinca minor, Polygonum aviculare, Ononis spinosa, Origanum vulgare, Matricaria chamomilla, Leonorus cardiaca, Fragaria vesca, Filipendula hexapetala, Cichorium intybus, Centaurea jacea, Agrimonia eupatoria, Achillea millefolium, Solanum dulcamara, Ruscus aculeatus, Arum maculatum.*

VII Drugs for the treatment of skin diseases:

*Corylus avellana, Juglans regia, Salix alba, Filipendula hexapetala, Fragaria vesca, Urtica dioica, Hedera helix, Pulmonaria officinalis, Solanum dulcamara, Veronica officinalis, Origanum vulgare, Malva sylvestris, Tussilago farfara, Plantago major, Plantago lanceolata, Plantago media, Achillea millefolium, Sambucus nigra, Helleborus odoratus, Morus nigra, Morus alba, Betula pendula, Tilia cordata, Tilia platyphyllos, Tilia tomentosa, Eupatorium cannabinum, Hyoscyamus niger, Rubus hirtus, Ballota nigra, Tamus communis.*

VIII Drugs for regulating the circulation of substances:

*Arum maculatum, Ranunculus repens, Urtica dioica, Rumex acetosella, Populus alba, Populus tremula, Polygonum aviculare, Sambucus nigra, Colchicum autumnale, Solanum dulcamara, Viola tricolor, Viola alba.*

IX Antidiabetics:

*Galega officinalis, Daucus carota, Achillea millefolium, Urtica dioica.*

X Antihistamines:

*Hyoscyamus niger.*

XI Phytoncidal plants:

*Betula pendula, Colchicum autumnale.*

XII Galactagogues:

*Daucus carota, Galega officinalis.*

XIII Tonics:

*Filipendula hexapetala, Rosa canina, Achillea millefolium, Centaurium umbellatum, Urtica dioica, Ononis spinosa, Verbena officinalis, Taraxacum officinale, Geranium robertianum.*

XIV Drugs for repairing the smell and taste of various medicines:

*Mellisa officinalis, Centaurea jacea.*

Based on the obtained results, the largest number belongs to drugs which affect digestive organs, cardiovascular system, skin diseases, urogenital tract and respiratory organs. This completely coincides with results of similar studies (Jovanović, 2016; Došić, 2016). Analysis of useful properties of medicinal plants from the mountain Kukavica (Jovanović, 2016) shows that drugs which act on skin diseases, urogenital tract, respiratory and digestive organs are the most distributed, while there are also many plants which affect the cardiovascular system, central and peripheral nervous system, and regulated circulation of substances in organisms. Došić (2016) investigated useful properties of medicinal plants at the Besna Kobila mountain and concluded that the most represented are drugs which affect the cardiovascular system, then these which act on central and peripheral nervous system, while drugs which can be used for problems of urogenital, respiratory and digestive organs are much less are distributed. Similar results were obtained by analysis conducted among medicinal plants in the area of Vlasina (Randelović et al., 2002) and within nature monument „Šuma Košutnjak“ (Jokanović et al., 2021).

### Conclusions

At studied area of lowland pedunculate oak forests in Gornji Srem a total of 139 medicinal plants were found. Based on conducted analysis, according to valid, generally accepted methodology (Randelović et al., 2002), we found that the most plants affect digestive organs (36), then cardiovascular system (31), skin diseases (30), urogenital tract (29) and respiratory organs (27). After these five numerous groups, there are also drugs which regulate substances circulation (12) and these which treat central and peripheral nervous system (8) represented with many individuals. Bearing in mind the significance of medicinal plants using in phytotherapy, before all for prevention, this valuable natural resource needs to be planted and protected.

### References

- Došić M. (2016). Analiza flore lekovitih biljaka planine Besne Kobile u jugoistočnoj Srbiji. Master rad u rukopisu, Prirodno-matematički fakultet, Univerzitet u Nišu. In English: Analysis of medicinal plants flora of Besna Kobila mountain in south-eastern Serbia. Master thesis, Faculty of Science, University of Niš. pp. 49.
- Igić R., Vukov D., Božin B., Orlović, S. (2010). Lekovite biljke – prirodni resursi Vojvodine. „Vrelo“ – Društvo za zdravu ishranu i zaštitu životne sredine, Novi Sad. In English: Medicinal plants – natural resources of Vojvodina. „Vrelo“ – Society for healthy nutrition and environmental protection, Novi Sad. pp. 262.
- Jokanović D., Desimirović I., Živanović K. (2022). Taksonomska i fitogeografska analiza lekovitog bilja u okviru šumskog kompleksa hrasta lužnjaka na području Gornjeg Srema. Topola, 210. In English: Taxonomy and phytogeography analysis of medicinal plants within forest complex of pedunculate oak at the area of Gornji Srem. Poplar, 210. pp. 5-14.

- Jokanović D., Petrović J., Indić P., Stanković D., Trivan G., Urošević J., Marić M. (2021). Pharmacodynamic properties of medicinal plants within eight departments at the area of NM „Šuma Košutnjak“. *Ecologica* 101 (28), pp. 11-15.
- Jokanović D. (2021). Praktikum iz Lekovitog bilja. Šumarski fakultet - Univerzitet u Beogradu. In English: Practicum of Medicinal Plants. Faculty of Forestry – University of Belgrade. pp. 115.
- Jokanović D., Petrović J., Vilotić D., Gačić D., Stankov B., Lozjanin R. (2020 a). Vascular flora in the function of red deer feeding in meadows within Bosut forests. Book of Proceedings, International Symposium at Jahorina – Bosnia and Herzegovina, 8<sup>th</sup>-9<sup>th</sup> October 2020, pp. 1061-1067.
- Jokanović D., Indić P., Petrović J., Devetaković J. (2020 b). Analysis of medicinal plants within eight departments at the area of NM „Šuma Košutnjak“. *Bulletin of Faculty of Forestry*, 122. pp. 71-90.
- Jokanović D., Cvetković T., Perović M., Nikolić V., Stanković D., Lekić J. (2018). Floristic composition of forests at the area of Donji Srem – MU „Kupinske grede“. *Ecologica* 92 (25), pp. 905-910.
- Jokanović D., Vilotić D., Cvetković T., Perović M., Stanković D., Jović Đ. (2017): Horological-phytogeographic characteristics of forest ecosystems at the area of Donji Srem (MU „Kupinske grede“). *Ecologica* 87 (24), pp. 588-592.
- Jovanović M. (2016). Analiza flore lekovitih biljaka planine Kukavice u južnoj Srbiji. Master rad u rukopisu, Prirodno-matematički fakultet, Univerzitet u Nišu. In English: Analysis of medicinal plants flora of Kukavica mountain in southern Serbia. Master thesis, Faculty of Science, University of Niš. pp. 49.
- Kojić M., Vilotić D. (2006). Ekskurziona flora Srbije. Monografija, Šumarski fakultet- Univerzitet u Beogradu. In English: Excursion flora of Serbia. Monography, Faculty of Forestry – University of Belgrade. pp. 387.
- Randelović V., Mitrović T., Jušković M. (2002). Farmakodinamska analiza lekovitih biljaka Vlasinske visoravni. Zbornik radova, VII Simpozijum flore jugoistočne Srbije i regiona, Odsek za biologiju i ekologiju, Prirodno-matematički fakultet, Univerzitet u Nišu. In English: Pharmacodynamic analysis of medicinal plants of Vlasina plateau. Proceedings, VII Symposium of flora of southeastern Serbia and region, Department of Biology and Ecology, Faculty of Science, University of Niš. pp. 111-116.
- Stanković D., Jokanović D. (2017). Pollutants in plants, environmental role of woody and herbaceous plants. Lambert Academic Publishing, pp. 178.
- Stanković D., Ivetić V., Ocokoljić M., Jokanović D., Oljača R., Mitrović S. (2015 a). Manganese concentration in plants of the protected natural resource, Kosmaj, in Serbia. *Archives of Biological Sciences, Belgrade*, 67 (1), pp. 251-255.
- Stanković D., Jokanović D., Veselinović M., Letić Lj., Jović Đ., Karić, D. (2015 b). Zinc concentration in woody and herbaceous plants at Kosmaj area. *Fresenius Environmental Bulletin, Freising – Germany*, 24 (11), pp. 3672-3675.
- Vilotić D. (2021). Lekovite biljke Nacionalnog parka „Tara“. JP Nacionalni park Tara, Bajina Bašta. In English: Medicinal plants of the National park „Tara“. PE National park Tara, Bajina Bašta. Donji Milanovac. pp. 201.
- Vilotić D. (2018). Lekovite biljke Nacionalnog parka „Đerdap“. Monografija, JP Nacionalni park „Đerdap“. Donji Milanovac. In English: Medicinal plants of the National park Đerdap. Donji Milanovac. pp. 199.