

BOOK OF PROCEEDINGS

**Fifth International Scientific Agricultural Symposium
“Agrosym 2014”**

AGROSYM 2014



Jahorina, October 23 - 26, 2014

Impressum

Fifth International Scientific Agricultural Symposium „Agrosym 2014“

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
Academy of Engineering Sciences of Serbia, Serbia
Maize Research Institute „Zemun Polje“ Serbia
Biotechnical Faculty, University of Montenegro, Montenegro
Balkan Scientific Association of Agricultural Economics, Serbia
Institute of Agricultural Economics, Serbia
Faculty of Agriculture, University of Banja Luka, Bosnia and Herzegovina

Editor in Chief

Dusan Kovacevic

Tehcnical editors

Sinisa Berjan
Milan Jugovic
Mirjana Radovic
Noureddin Driouech
Rosanna Quagliariello

Website:

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

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

631(082)(0.034.2)

INTERNATIONAL Scientific Agricultural Symposium "Agrosym
2014" (5 ; Jahorina)

Book of proceedings [Elektronski izvor] / Fifth International
Scientific Agricultural Symposium "Agrosym 2014", Jahorina,
October 23 - 26, 2014 ; [editor in chief Dušan Kovačević]. - East
Sarajevo =Istočno Sarajevo : Faculty of Agriculture =Poljoprivredni
fakultet, 2014. - 1 elektronski optički disk (CD-ROM) : tekst, slika ;
12 cm

CD ROM čitač. - Dostupno i na:

http://www.agrosym.rs.ba/agrosym/agrosym_2014/index.html. -
Nasl. sa nasl. ekrana. - Bibliografija uz svaki rad. - Registar.

ISBN 978-99955-751-9-9

COBISS.RS-ID 4641816

**Fifth International Scientific Agricultural Symposium “Agrosym 2014”
Jahorina, October 23-26, 2014, Bosnia and Herzegovina**

HONORARY COMMITTEE

STEVO MIRJANIC, Minister of Agriculture, Water Management and Forestry of Republic of Srpska, Bosnia; JASMIN KOMIC, Minister of Science and Technology of Republic of Srpska, Bosnia; GORAN MUTABDZIJA, Minister of Education and Culture of Republic of Srpska, Bosnia; RADOSLAV GRUJIC, Rector of the University of East Sarajevo, Bosnia; MILICA PETROVIC, Dean of the Faculty of Agriculture, University of Belgrade, Serbia; COSIMO LACIRIGNOLA, Director of the Mediterranean Agronomic Institute of Bari, Italy; MARIO T. TABUCANON, President of the International Society of Environment and Rural Development, Japan; FOKIAON K. VOSNIAKOS, President of the Balkan Environmental Association (B.EN.A), Greece; BRANKO KOVACEVIC, President of the Academy of Engineering Sciences of Serbia, Serbia; BRANKA KRESOVIC, Director of the Maize Research Institute “Zemun Polje”, Serbia; MIOMIR JOVANOVIC, Dean of the Biotechnical Faculty, University of Podgorica; DRAGO CVIJANOVIC, Director of the Institute of Agricultural Economics, Serbia; NIKOLA MICIC, Dean of the Faculty of Agriculture, University of Banja Luka, Bosnia.

SCIENTIFIC COMMITTEE

DUSAN KOVACEVIC, Faculty of Agriculture, University of Belgrade, Serbia; WILLIAM MEYERS, Howard Cowden Professor of Agricultural and Applied Economics, University of Missouri, USA; JOHN BRAYDEN, Norwegian Agricultural Economics Research Institute (NILF), Norway; STEVE QUARIE, Visiting Professor, School of Biology, Newcastle University, United Kingdom; ATEF HAMDY, Emeritus Professor, Land and Water Resources Department; IAMB, Italy; DANI SHTIENBERG, full professor, Department of Plant pathology and Weed Research, ARO, the Volcani Center, Bet Dagan, Israel; THOMAS G. JOHNSON, University of Missouri – Columbia, USA; DIETER TRAUTZ, University of Applied Science, Germany; MACHITO MIHARA, Tokyo University of Agriculture, Japan; MARKUS SCHERMER, Department of Sociology, University of Innsbruck, Austria; FOKIAON VOSNIAKOS, Balkan Environmental Association (B.EN.A), Greece; MATTEO VITTUARI, Faculty of Agriculture, University of Bologna, Italy; VELIBOR SPALEVIC, The journal “Agriculture and Forestry”, Biotechnical Faculty, University of Montenegro, Montenegro; EPN UDAYAKUMARA, Faculty of Applied Sciences, Sabaragamuwa University, Sri Lanka; VLADIMIR SMUTNÝ, full professor, Mendel University, Faculty of agronomy, Czech Republic; FRANC BAVEC, full professor, Faculty of Agriculture and Life Sciences, Maribor, Slovenia; NICOLAE ESTUDOE, full professor, Academy of Economic Studies, Bucharest, Romania; JAN MOUDRÝ, full professor, Faculty of Agriculture, South Bohemia University, Czech Republic; STEFAN TYR, full professor, Faculty of Agrobiology and Food Resources, Slovakia; NATALIJA BOGDANOV, Faculty of Agriculture, University of Belgrade, Serbia; SABAHUDIN BAJRAMOVIC, Faculty of Agriculture and Food Sciences, University of Sarajevo, Bosnia; FRANCESCO PORCELLI, University of Bari Aldo Moro, Italy; VASILJE ISAJEV, Faculty of Forestry, University of Belgrade, Serbia; ELAZAR FALLIK, Agricultural Research Organization (ARO), Volcani, Israel; JUNAID ALAM MEMON, Pakistan Institute of Development Economics, Pakistan; HIROMU OKAZAWA, Faculty of Regional Environment Science, Tokyo University of Agriculture, Japan; MLADEN TODOROVIC, Land and Water Resources Department; IAMB, Italy; HAMID EL BILALI, Sustainable Agriculture, Food and Rural Development Department, IAMB, Italy; NOUREDDIN DRIOUECH, Environmental Sciences and Organic Agriculture, IAMB, Italy; LALITA SIRIWATTANANON, Faculty of Agricultural Technology, Rajamangala University of Technology Thanyaburi (RMUTT), Thailand; ABID HUSSAIN, International Centre for Integrated Mountain Development (ICIMOD), Nepal; AMRITA GHATAK, Gujarat Institute of Development Research (GIDR), India; MÁRTA BIRKÁS, full professor, St. Istvan University, Godollo – Hungary; UDAI PRATAP SINGH, Department of Mycology and Plant Pathology, Banaras Hindu University, India; ANDRZEJ KOWALSKI, Director of the Institute for Agricultural and Food Economy, Warszawa-Poland; YALCIN KAYA, The Director of the Plant Breeding Research Center, University of Trakya, Turkey; KOSANA KONSTATINOV, Academy of Engineering Sciences of Serbia, Serbia; NEBOJSA MOMIROVIC, Faculty of Agriculture, University of Belgrade, Serbia; ZORAN JOVOVIC, Biotechnical Faculty, University of Montenegro, Montenegro; VLADIMIR VUKADINOVIC, full professor, Faculty of Agriculture, University of Osijek, Croatia; DANIJEL JUG, associate professor, Faculty of Agriculture, University of Osijek, Croatia; VLADO KOVACEVIC, full professor, Faculty of Agriculture, University of Osijek, Croatia; MILAN MARKOVIC, Department for Animal husbandry, Biotechnical Faculty, University of Montenegro, Montenegro.

ORGANIZATION COMMITTEE

VESNA MILIC, Dean of the Faculty of Agriculture, University of East Sarajevo, Bosnia; DEJAN BOKONJIC, Vice rector of the University of East Sarajevo, Bosnia; STEVAN TRBOJEVIC, Vice rector of the University of East Sarajevo, Bosnia; PREDRAG PUDJA, Vice dean of the Faculty of Agriculture, University of Belgrade, Serbia; JEGOR MILADINOVIC, Scientific Advisor, Institute of Field and Vegetable Crops, Novi Sad, Serbia; ZELJKO DOLJANOVIC, Faculty of Agriculture, University of Belgrade, Serbia; ROBERTO CAPONE, Mediterranean Agronomic Institute of Bari, Italy; ROSANNA QUAGLIARIELLO, Mediterranean Agronomic Institute of Bari, Italy; NOUREDDIN DRIOUECH, Coordinator of MAIB Alumni Network (FTN), Mediterranean Agronomic Institute of Bari, Italy; ALEKSANDRA DESPOTOVIC, Biotechnical Faculty Podgorica, University of Montenegro, Montenegro; MILIC CUROVIC, The journal “Agriculture and Forestry”, Biotechnical Faculty Podgorica, University of Montenegro, Montenegro; GORAN PERKOVIC, Faculty of Agriculture, University of East Sarajevo, Bosnia; MIRJANA RADOVIC, Faculty of Agriculture, University of East Sarajevo, Bosnia; MILAN JUGOVIC, Faculty of Agriculture, University of East Sarajevo, Bosnia; SINISA BERJAN, Faculty of Agriculture, University of East Sarajevo, Bosnia, secretary

Foreword

The current agro-food system failed to feed the world population and to eradicate rural poverty. The environmental and social problems caused by such an agricultural production model are well known and widespread. The most dramatic environmental damage is caused by climate change, loss of biodiversity and ecosystem functions, soil erosion and degradation, and pollution from fertilizers and pesticides.

Climate change, population growth and competing demands for land and resources are putting great pressure on the world's food systems. The world's population is set to reach nine billion by 2050. To feed them it is needed to produce 70% more food, and do so without destroying our environment. The successful management of agricultural resources for meeting the changing human needs, while maintaining or enhancing the quality of the environment and conserving natural resources, is imperative for a stable food production.

Agriculture is at the core of sustainable development. Ecological agriculture, agroecological practices and sustainable agricultural production are alternative farming methods to address the environmental consequences of conventional agriculture dependent on intensive chemical inputs. Sustainable agriculture is not only a technological solution but also an approach that embodies a shift in agricultural paradigms. Sustainable food systems should integrate the economic, social and environmental dimensions of sustainable development.

Appropriate agricultural and rural development strategies in the Balkan area and beyond should ensure food and nutrition security - through the sustainable and eco-functional intensification of crop and animal production systems - while conserving the natural resource base. They should also contribute to the eradication of rural poverty and improvement of livelihoods and quality of life of rural populations.

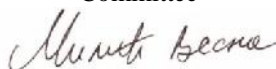
Innovative and responsible measures - based on sound and accurate scientific knowledge - are required to respond to the multiple food-related challenges of the New Millennium in a resource-constrained world. During four days; October 23-26, 2014; the 5th International Scientific Agricultural Symposium “AGROSYM 2014” made an important contribution to the improvement of knowledge in agriculture, environment and rural development fields. In fact, 430 contributions were presented by scientists from 56 countries (Albania, Algeria, Australia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burundi, Burkina Faso, Cameroon, Croatia, Czech Republic, Egypt, Germany, Ghana, Hungary, Greece, India, Indonesia, Iran, Iraq, Italy, Japan, Kazakhstan, Latvia, Lithuania, Republic of Macedonia, Mauritania, Montenegro, Morocco, Nepal, Niger, Nigeria, Norway, Pakistan, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Serbia, Slovenia, South Africa, Spain, Syria, Sweden, Switzerland, Tajikistan, Thailand, The Netherlands, Tunisia, Turkey, Vietnam). This publication comprises 180 accepted full papers while selected papers will be published in the International Journal “Agriculture and Forestry”.

The success of the symposium was made possible thanks to the unconditional commitment and invaluable contributions of a wide range of partners and sponsors. Much appreciation is due to the authors of all papers submitted to and presented at the symposium, the reviewers for their sound comments and feedback as well as to all the symposium participants for ideas, insights and contributions.

Academician Dusan Kovacevic
President of the Scientific
Committee



Prof. Vesna Milic
President of the Organization
Committee



Mr. Cosimo Lacirignola
Director, MAIB
Secretary General, CIHEAM



KEYNOTE PAPERS	22
THE WATER- ENERGY-FOOD SECURITY NEXUS IN THE MEDITERRANEAN: CHALLENGES AND OPPORTUNITIES	
Atef HAMDY, Nouredin DRIOUECH, Amine HMID	23
ORGANIC AGRICULTURE IN TERMS OF SUSTAINABLE DEVELOPMENT OF SERBIA	
Snezana OLJACA, Dusan KOVACEVIC, Zeljko DOLIJANOVIC, Vesna MILIC	34
MAIZE HYBRIDS AS RAW MATERIAL FOR BIOETHANOL PRODUCTION	
Snezana MLADENOVIC DRINIC, Valentina SEMECENKO, Milica RADOSAVLJEVIC	45
IMPACT OF CLIMATE CHANGE ON CROP EVAPOTRANSPIRATION AND IRRIGATION REQUIREMENTS IN THE MEDITERRANEAN WITH A SPECIAL FOCUS ON THE COUNTRIES OF FORMER YUGOSLAVIA	
Mladen TODOROVIC, Lazar TANASIJEVIC, Sameh SAADI, Luis S. PEREIRA, Piero LIONELLO	51
1. PLANT PRODUCTION.....	61
A TRANSPIRATION MODEL TO SCREEN LOCAL FRUIT TREE GENOTYPES FOR DROUGHT TOLERANCE	
Dhimiter THOMA, Endrit KULLAJ.....	62
PRODUCTION CAPABILITIES AND NUTRITIVE VALUE OF FODDER FOR ANIMAL NUTRITION IN MOUNTAINOUS AREA OF REPUBLIC OF SRPSKA	
Vojo RADIC, Milanka DRINIC, Aleksandar KRALJ.....	69
INFLUENCE OF SUBSTRATE AND CELL VOLUME OF CONTAINERS ON THE QUALITY OF BASIL	
Aleksandra GOVEDARICA-LUCIC, Goran PERKOVIC, Alma RAHIMIC.....	75
LEVELS OF POTENTIALLY TOXIC HEAVY METALS IN BULBS OF DIFFERENT VARIETIES OF ONION	
Azra HADZIC, Josip COTA, Edita SARIC, Omer KURTOVIC, Milana SILJ, Jelena COTA	79
SANA – NEW VARIETY OF SPRING OAT	
Dragan MANDIC, Goran DJURASINOVIC, Iskra MIHIC	85
AFLATOXIN B1 CONTAMINATION OF CORN IN REPUBLIC OF SRPSKA	
Vojislav TRKULJA, Slavko RADANOVIC, Bojana VUKOVIC, Dragana KOVACIC JOSIC, Jelena MIHIC SALAPURA	91
GENOTYPE SPECIFICITY OF THE ORGANOGENESIS OF FRUIT-BEARING PEAR TREE (II THE ANALYSIS OF TWO-YEAR-OLD OUTSPREAD BRANCH)	
Ljubomir RADOS	97
EFFECT OF DIFFERENT HAYLAGE LINES ON HAYLAGE CHEMICAL COMPOSITION	
Milan JUGOVIC, Dusan RADIVOJEVIC, Miroslav LALOVIC, Julijana TRIFKOVIC.	104

HABITAT CONDITIONS AND USABILITY OF THE HOG TRUFFLE (<i>Choiromyces Meandriformis</i> Vitt.) FOUND IN BOSNIA AND HERZEGOVINA	
Srdjan LJUBOJEVIC, Dane MARCETA, Vladimir STUPAR	109
UPTAKE AND UTILIZATION EFFICIENCY OF NITROGEN AND PHOSPHORUS IN DURUM WHEAT	
Mladen ALMALIEV, Galia PANAYOTOVA, Svetla KOSTADINOVA	118
IMPACT OF LIMING WITH FERTDOLOMITE ON GRAIN YIELD OF FIELD CROPS	
Vlado KOVACEVIC, Mirta RASTIJA, Dario ILJKIC, Monika MARKOVIC, Ivana VARGA.....	123
EFFECT OF INTEGRATED MINERAL AND ORGANIC NITROGEN APPLICATIONS ON CROP PERFORMANCE	
Saied WAHBA, El-Saeed SHIBL.....	128
THE EFFECT OF PLANT DENSITIES AND PLANT ORIENTATION ON YIELD AND YIELD COMPONENTS IN WHEAT CULTIVARS	
Hava Mirzadeh ABGARMI, Abbas BIABANI, Ali Rahmeni KARIZAKI, Hossein Ali FALAHI, Azarnia.....	133
OAT GRAIN YIELD VARIATIONS ASSOCIATED WITH PRODUCTIVITY PARAMETERS AMONG OAT CULTIVARS GROWN IN LATVIA	
Linda BRUNAVA, Ina ALSI A, Sanita ZUTE.....	138
EXAMINATION OF SEEDLINGS QUALITY OF <i>PELARGONIUM X HORTORUM</i> L. H. BAIL. TREATED WITH DIFFERENT FERTILIZERS	
Margarita DAVITKOVSKA, Gordana POPSIMONOVA, Rukie AGIC, Zvezda BOGEVSKA, Igor ILJOVSKI.....	145
PHENOLOGIC, BIOMETRIC AND PRODUCTION PARAMETERS IN SOME WHEAT VARIETIES CULTIVATED IN THE REGION OF POLLOG	
Xhabir ABDULLAI, Elmi JUSUFI, Mentor ZEKIRI.....	151
EFFECT OF COVERING ON SWEET CORN GROWING PERIOD AND SOME MORPHOLOGICAL PROPERTIES	
Ferenc OROSZ.....	157
EFFECT OF DIFFERENT Mo FERTILIZERS ON YIELD, CHEMICAL COMPOSITION OF SEED AND SOME PHYSIOLOGICAL PARAMETERS IN TWO SOYBEAN (<i>Glycine Max. Merr.</i>) CULTIVARS	
Bogdan NIKOLIC, Vesna DRAGICEVIC, M. STOJILJKOVIC, H. WAISI, Sanja DJUROVIC, Igor SPASOJEVIC, Milena SIMIC.....	163
AMPELOGRAPHIC CHARACTERISTICS OF TWO FORMS OF GRAPEVINE CULTIVAR TRAMINER IN VINEGROWING SUBREGION OF NIŠ	
Bratislav CIRKOVIC, Dragoljub ZUNIC, Nebojsa DELETIC, Zoran JOVANOVIC, Sasa MATIJASEVIC, Dusica CIRKOVIC	169
EFFECT OF ADDITIONAL FERTILIZING WITH NITROGEN ON FORAGE YIELD IN RED CLOVER-ITALIAN RYEGRASS GRASS-LEGUME MIXTURE	

Dalibor TOMIC, Vladeta STEVOVIC, Dragan DJUROVIC, Nikola BOKAN, Rade STANISAVLJEVIC, Djordje LAZAREVIC	175
EFFECTS OF FERTILIZATION AND MULCHING ON YIELD OF EARLY CABBAGE	
Darinka BOGDANOVIC, Zarko ILIN, Ranko CABILOVSKI, Klara MARIJANUSIC, Boris ADAMOVIĆ	181
GENETIC AND PHENOTYPIC VARIABILITY OF LENGTH OF SPIKE IN BREAD WHEAT GROWN UNDER DIFFERENT RATE OF NITROGEN NUTRITION	
Desimir KNEZEVIC, Danijela KONDIC, Sretenka MARKOVIC, Dimitrije MARKOVIC, Vlado KOVACEVIC.....	187
EVALUATION OF NEW APRICOT CULTIVARS FROM SLOVAK REPUBLIC IN THE REGION OF BELGRADE	
Dragan MILATOVIĆ*, Dejan DJUROVIC, Gordan ZEC	193
THE EFFECT OF FOLIAR APPLIACATION OF ZINC ON YIELD OF ALFALFA SEED	
Dragan TERZIC, Savo VUCKOVIC, Aleksandar SIMIC , Rade STANISAVLJEVIC, Sanja VASILJEVIC, Dragoslav DJOKIC, Tanja VASIC	198
INFLUENCE OF PLANTING DENSITY ON YIELD OF PEACH AND NECTARINE	
Gordan ZEC, Slavica SOLIC, Todor VULIC, Dragan MILATOVIĆ, Boban DJORDJEVIC, Dejan DJUROVIC, Milovan VELICKOVIC.....	204
IMPORTANCE OF TWO-CROP ROTATION IN MAIZE WEED CONTROL	
Igor SPASOJEVIC, Milena SIMIC, Dusan KOVACEVIC, Zeljko DOLIJANOVIC, Nebojsa MOMIROVIC, Vesna DRAGICEVIC	209
AGROECONOMIC ANALYSIS OF APRICOT PRODUCTION IN EARLY YEARS AFTER PLANTING	
Ivan GLISIC, Tomo MILOSEVIC, Nebojsa MILOSEVIC, Radmila NIKOLIC, Gorica PAUNOVIC	215
EFFICIENCY OF INOCULATION WITH <i>AZOTOBACTER CHROOCOCCUM</i> ON AGRONOMIC CHARACTERISTICS AND YIELD OF MAIZE AND SUGARBEET	
Nastasija MRKOVACKI, Ivica DJALOVIC, Djordje JOCKOVIC, Mirjana JARAK, Dragana BIJELIC	221
SOYA BEAN BIOMASS PRODUCTION UNDER DIFFERENT WATER REGIME CONDITIONS	
Jela IKANOVIC, Snezana JANKOVIC, Vera POPOVIC, Gordana KULIC, Sveto RAKIC, Gordana DRAZIC	229
THE EFFECT OF CYTOPLASMIC MALE STERILITY ON MORPHOLOGICAL TRAITS OF MAIZE INBRED LINE	
Milan STEVANOVIC, Jovan PAVLOV, Goran STANKOVIC, Zoran CAMDZIJA, Sofija BOZINOVIC, Milos CREVAR, Jelena VANCETOVIĆ	235

GRAIN YIELD, YIELD COMPONENTS AND MALTING QUALITY TRAITS OF SPRING BARLEY ON ACIDIC SOILS

Milomirka MADIC, Dragan DJUROVIC, Aleksandar PAUNOVIC, Miodrag JELIC, Desimir KNEZEVIC, Branka GOVEDARICA 240

INDIVIDUAL AND JOINT EFFECT OF SOME QUANTITATIVE TRAITS ON GRAIN YIELD OF TRITICALE AND BARLEY

Nebojsa DELETIC, Slavisa STOJKOVIC, Slavisa GUDZIC, Miroljub AKSIC 246

OLIVE SUITABILITY IN CORRELATION WITH THE LONGITUDE OF CULTIVATION

Hairi ISMAILI, Benard RUCI 251

PRELIMINARY POMOLOGICAL AND BIOCHEMICAL CHARACTERIZATION OF FIG (*Ficus Carica* L) GERMPLASM COLLECTED IN HERZEGOVINA

Gordana DJURIC, Predrag ILIC, Sanda STANIVUKOVIC, Nikola MICIC, Dijana VEGO, Paulina SARAVANJA, Ana IVANKOVIC 257

INVESTIGATIONS OF THE VARIABILITY OF QUANTITATIVE CHARACTERS OF ORIENTAL BASMAK TOBACCO

Karolina K COSKA, Ilija RISTESKI..... 263

APPLICATION OF PHOSPHATE GLASS IN THE PRODUCTION OF FLOWERS AND VEGETABLES

Ana M.VUJOSEVIC, Nada S. LAKIC, Jelena D. NIKOLIC, Vladimir D. ZIVANOVIC, Srdjan D. MATIJASEVIC 269

BIOCLIMATIC MOISTURE CONDITIONS IN THE LOWLANDS OF THE ŠUMADIJA-POMORAVLJE DISTRICT

Enike GREGORIC, Gordana MATOVIC, Mirjana RUML, Vesna POCUCA, Nevenka DJUROVIC 279

NITROGEN UTILIZATION OF WINTER WHEAT ON AN ACID SOIL

Slavisa STOJKOVIC, Nebojsa DELETIC, Milan BIBERDZIC, Miroljub AKSIC, Dragoljub BEKOVIC, Slavisa GUDZIC 285

THE EFFECT OF DATE AND METHOD OF PLANTING MARSHMALLOW CROPS ON ROOT YIELD AND QUALITY

Slobodan DRAZIC, Helena MAJSTOROVIC, Damir BEATOVIC, Jela IKANOVIC, Maja SUDIMAC, Radmila BOJOVIC 290

EFFECTS OF INTERCROPPING PATTERN AND FERTILIZERS ON WEEDINESS OF RED MAIZE-BLACK SOYABEAN INTERCROPPING SYSTEM

Snezana OLJACA, Zeljko DOLJANOVIC, Milena SIMIC, Igor SPASOJEVIC, Vesna DRAGICEVIC, Mico OLJACA 295

THE EFFECTS OF DIFFERENT COVER CROPS ON YIELD AND YIELD COMPONENTS OF SWEET MAIZE

Zeljko DOLJANOVIC, Nebojsa MOMIROVIC, Milena SIMIC, Dusan KOVACEVIC, Snezana OLJACA 300

EVALUATION OF COMBINING ABILITIES OF ZP INBRED LINES

Zoran CAMDZIJA, Milomir FILIPOVIC, Sofija BOZINOVIC, Slaven PORDANOVIC, Snezana MLADENOVIC DRINIC, Milan STEVANOVIC, Jovan PAVLOV	306
WHEAT VARIETY SPECIFIC AT ONCE PROTECTION OF PARASITES AND PESTS BY PESTICIDES	
Zoran JERKOVIC, Radivoje JEVTIC, Zeljana PRIJIC, Branka ORBOVIC, Mirjana LALOSEVIC.....	312
ENHANCEMENT OF NUTRIENT UPTAKE IN PEACH ROOTSTOCK WITH ARBUSCULAR MYCORRHIZAL FUNGI AND PLANT-GROWTH PROMOTING RHIZO-BACTERIA INOCULATION IN NURSERY	
Hasna GHARBI HAJJI, Mustapha SANAA.....	318
BREEDING OF LOCAL ALFALFA (<i>Medicago Sativa L.</i>) “GABSSIA” FOR YIELD AND IMPROVING TOLERANCE TO WATER SALINITY AND WINTER DORMANCY IN THE ARID REGIONS OF TUNISIA	
Mohamed LOUMEREM, Samir TLAHIG, Paolo ANNICCHIARICO, Luciano PECETTI, Manuel Maria Tavares DE SOUSA	324
CRITICAL NITROGEN CURVE FOR TWO POTATO CULTIVARS UNDER SEMI-ARID CONDITIONS	
Amel MAROUANI, Omar BEHI, Ali SAHLI, Faysal BEN JEDDI	332
COMPARISON OF YIELD PARAMETERS FOR KABULI CHICKPEA (<i>Cicer Arietinum L.</i>) GENOTYPES WITH THE FERN AND UNIFOLIATE LEAF TYPES	
Abdulkadir AYDO AN, Cemalettin Ya ar Ç FTÇ	340
AN ALTERNATIVE PLANT PROPAGATION AND CONSERVATION PROCESS FOR <i>IRIS PAMPYHLICA</i> AN ENDEMIC AND ENDANGERED GEOPHYTE	
Ayse Gul NASIRCILAR, Ismail Gokhan DENIZ.....	346
DETERMINATION OF YIELD AND YIELD COMPONENTS OF SOME VARIETY AND POPULATIONS ON FALSE FLAX (<i>Camelina Sativa L. Crantz.</i>) IN TURKEY	
Bü ra YÜCEKAYA AKBULUT, Dilek BA ALMA.....	352
EFFECT OF PLANT VARIETY AND GROWING METHODS ON YIELD AND QUALITY IN SUMMER SQUASH	
Funda YOLDA	358
EFFECTS OF DIFFERENT NITROGEN DOSES ON THE NUTRITIONAL MINERAL CONTENT OF FIELD PEA SEEDS	
rfa ÖZER, Ahmet TAMKOÇ, Zhumadilhan KER MBEK	364
EVALUATION OF HYBRID STOCKS ON VIGOR, YIELD AND QUALITY OF WATERMELON	
Özlem ALAN, afak CEYLAN, Murat ÖZGE	369
DETERMINATION OF FORAGE QUALITY COMPONENTS ON LESSER BURNET CULTIVARS UNDER CONDITIONS OF CENTRAL ANATOLIA, TURKEY	
Nurdan Sahin DEMIRBAG, Ugur OZKAN, Hayrettin EKIZ.....	375
EFFECT OF SUPPORTING CULTURE AND INOCULANT ON QUALITY OF COMBINED VETCH SILAGES WITH OATS AND ITALIAN RYEGRASS	

Milomir BLAGOJEVIC, Bora DINIC, Jasmina RADOVIC, Jordan MARKOVIC, Dragan TERZIC	383
PHENOTYPIC AND GENETIC EVALUATION OF SOME APPLE SEEDLINGS ROOTSTOCKS TO WOOLLY APPLE APHID (<i>Eriosomalnigerum Hausm</i>) RESISTANCE IN SYRIA.	
Bayan MUZHER, Ola AL-HALABI	390
THE EFFECT OF DEFICIT IRRIGATION ON THE GROWTH OF SOME APPLE SEEDLINGS ROOTSTOCKS	
Ola AL-HALABI, Bayan MUZHER, Saoud SARBOUKH	396
THE EFFECT OF SOIL MULCHING ON THE QUALITY OF THE BULB AND THE YIELD OF DIFFERENT AUTUMN GARLIC GENOTYPES	
Djordje MORAVCEVIC, Jelica GVOZDANOVIC VARGA, Anamarija STOJANOVIC, Dubravka SAVIC, Damir BEATOVIC, Nenad PAVLOVIC	403
QUALITATIVE CHARACTERISTICS OF BUCKWHEAT	
Vesna MILIC, Branka GOVEDARICA, Sinisa BERJAN, Igor DJURDJIC, Milovan SARAC.....	409
VARIABILITY OF β-GLUCANS CONTENTS IN GRAIN OF BARLEY CULTIVARS	
Desimir KNEZEVIC, Aleksandra YURIEVNA DRAGOVIC, Novo PRZULJ, Aleksandra SISKINA, Mirjana MENKOVSKA	416
POMOLOGICAL PROPERTIES OF CULTIVAR "ČAČANSKA RODNA" IN CONDITIONS OF SARAJEVO	
Zlatka ALIC-DZANOVIC, Mirjana RADOVIC, Bosko GACESA, Mirko KULINA, Omer KURTOVIC	421
THE INFLUENCE OF QUALITY OF PLANTATIONS AND AGRO-TECHNICAL MEASURES ON A YIELD OF LETTUCE (<i>Lactuca Sativa</i> L.)	
Gavro KALUDJEROVIC, Natasa MIRECKI.....	426
POSSIBILITY OF SUMMER PLANTING OF POTATO IN AGROECOLOGICAL CONDITIONS OF PODGORICA	
Zoran JOVOVIC, Ana VELIMIROVIC, Zeljko DOLIJANOVIC, Milana SILJ, Dejan ZEJAK.....	433
SEED GERMINATIONS OF 20 WILD SPECIES GROWING IN ANTALYA (TURKEY) WITH OUTDOOR ORNAMENTAL PLANT POTENTIAL	
Esin ARI, Ercan GÜRBÜZ, Saadet TU RUL AY	439
2. PLANT PROTECTION AND FOOD SAFETY	446
STUDY OF TECHNOLOGICAL CHARACTERISTICS OF SELECTED OENOLOGICAL YEASTS FOR DIRECTED FERMENTATION	
Fatbardha LAMÇE, Kristaq SINI	447
IMPACT OF SOIL CALCIFICATION TO THE MORPHOLOGICAL AND PRODUCTIVE INDICATORS OF SAGE	
Qatip DODA, Nikollaq BARDHI, Bujar ZEKA, Agim RAMETA, Dilaman NELAJ, Nefrus ÇELIKU	453

DISTRIBUTION MAPPING OF JAPANESE KNOTWEED (<i>Fallopia Japonica</i> (Hout.) Ronse Decr.) IN NORTH WESTERN AREA OF REPUBLIC OF SRPSKA	
Gordana BABIC, Vojislav TRKULJA.....	461
DETERMINATION OF TOTAL PHENOLS IN SOME SPICES IN DIFFERENT PACKAGING	
Zilha ASIMOVIC, Mejrema ZORNIC, Maida VELIC, Selma CORBO, Lejla CENGIC.	468
PESTICIDES AS POLLUTANTS OF ENVIRONMENT AND USE OF BOTANICALS AS AN ALTERNATE MANAGEMENT STRATEGY	
Meera SRIVASTAVA	473
<i>ALEUROCANTHUS SPINIFERUS</i> (QUAINTANCE) (HEMIPTERA ALEYRODIDAE) IS SPREADING THROUGHOUT THE ITALIAN REGION APULIA	
Ahmed EL KENAWY, Daniele CORNARA, Isabella CORRADO, Ahmed EL-HENEIDY, Carmelo RAPISARDA, Francesco PORCELLI	478
LABORATORY EFFICACY OF NATURAL SUBSTANCES ON <i>PLANOCOCCUS FICUS</i> (SIGN.) AND THEIR IMPACT ON ITS TWO NATURAL ENEMIES	
Eren TASKIN, Flutura LAMAJ, Vincenzo VERRASTRO, Ferdinando BALDACCHINO	483
SURVEY RESULTS OF CITRUS TRISTEZA VIRUS (CTV) IN CRETE AND DETECTION BY DIRECT IMMUNOPRINTING-ELISA METHOD	
Anita GAZIVODA, Ana VELIMIROVIC, Vesna MARAS, Jovana RAICEVIC, Sanja SUCUR, Ana PAVICEVIC, Antonia KARAGIANNI, Ioannis LIVIERATOS	491
DYNAMICS OF SOLUBLE PROTEIN CONTENT AND GRAIN YIELD IN MAIZE INBRED LINES INFLUENCED BY FORAMSULFURON	
Milan BRANKOV, Vesna DRAGICEVIC, Milena SIMIC, Igor SPASOJEVIC	497
WEEDS SEED BANK RICHNESS IN MAIZE FIELD: EFFECTS OF CROP ROTATION AND HERBICIDES	
Milena SIMIC, Igor SPASOJEVIC, Milan BRANKOV, Vesna DRAGICEVIC	501
RAPESEED FLOWERS WILT CAUSED BY PATHOGENIC FUNGI <i>LEPTOSPHERIA MACULANS</i> IN SERBIA	
Petar MITROVIC, Zeljko MILOVAC, Ana MARJANOVIC JEROMELA, Vojislav TRKULJA, Radovan MARINKOVIC, Jelena MIHIC SALAPURA, Sreten TERZIC.....	508
RESISTENCE OF SOME WINTER WHEAT GENOTYPES TO PUCCINIA LEAF RUST	
Slavisa GUDZIC, Nebojsa DELETIC, Nebojsa GUDZIC, Miroљjub AKSIC, Katerina NIKOLIC, Slavisa STOJKOVIC	517
<i>IN VITRO</i> COMPREHENSIVE ASSESSMENT OF ANTAGONISTIC ACTIVITY OF <i>TRICHODERMA</i> GENUS FUNGI AGAINST <i>FUSARIUM</i> SPP.	
Dzmitry VOITKA, Helena YUZEFOVICH	521
TRAPPIST CHEESE HISTORY	
Drazenko BUDIMIR	528

THE ANTIOXIDANT ACTIVITY OF HONEY AND HONEY WITH ADDED MUSHROOM CORIOLUS VERSICOLOR	
Jelena PANTOVIC, Pavle MASKOVIC, Miomir NIKSIC, Ninoslav NIKICEVIC	534
SUPPRESSION OF OAK POWDERY MILDEW THROUGH USE OF BIOFUNGICIDES	
Miroslava MARKOVIC, Snezana RAJKOVIC, Ljubinko RAKONJAC, Aleksandar LUCIC.....	538
MYCOPOPULATIONS OF CORIANDER SEEDS	
Snezana PAVLOVIC, Mira STAROVIC, Milica ACIMOVIC, Goran ALEKSIC, Sasa STOJANOVIC	544
APHID SPECIES (HEMIPTERA: APHIDIDAE) OF SOUTH EASTERN ANATOLIA REGION (TURKEY) AND THEIR HOST PLANTS	
Erol BAYHAN, Selime ÖLMEZ-BAYHAN, İl ÖZDEMİR	551
NEED FOR INTEGRATED WEED MANAGEMENT IN FINE GRAINED DRY DIRECT SEEDED RICE	
Khawar JABRAN, Muhammad FAROOQ, Mubshar HUSSAIN	556
INFLUENCE OF DIFFERENT IRRIGATION LEVELS ON THE GROWTH OF REDROOT PIGWEED (<i>Amaranthus Retroflexus</i> L.) AND JIMSONWEED (<i>Datura Stramonium</i> L.) UNDER DIFFERENT COMPETITION CONDITIONS	
Selin AKÇAY, Derya Özü YAVUZ, Mehmet Nedim DOĞAN, Hüseyin BAĞAL, Aydın ÜNAY, Özhan. BOZ.....	563
INVESTIGATIONS ON PREVENTING WHEAT PHYTOTOXICITY DUE TO MISAPPLIED GLYPHOSATE	
Özhan BOZ, Serap M. EK, Bilgen Belkiz ARAT, Dilara KEleş AF, Aydın UNAY, Mehmet Nedim DOĞAN	568
VIRUS DISEASES OF EDIBLE SEED SQUASH (<i>CUCURBITA PEPO</i> L.) IN KONYA PROVINCE	
Serkan YEŞİL	576
INDIGENOUS PSEUDOMONAS CHLORORAPHIS AFFECTS GROWTH OF ALTERNARIA SP., PHOMA SP. AND DRECHSLERA TETRAMERA FROM ANISE	
Aleksandra STANOJKOVIC SEBIC, Snezana PAVLOVIC, Mira STAROVIC, Radmila PIVIC, Dobrivoj POSTIC, Zorica LEPSANOVIC, Dragana JOSIC.....	582
3. ORGANIC AGRICULTURE	588
ISOLATED AND IDENTIFIED A CHEMICAL COMPOSITION OF THE LEAVES EXTRACT OF <i>WARIONIA SAHARAE</i> FROM ALGERIAN WESTERN SOUTH	
Mimouna YAKOUBI, Nacer BELBOUKHARI, Abdelkarim CHERITI, Mohamed BOUCHKARA.....	589
YIELD AND QUALITY OF BLACKBERRIES (<i>Rubus Fruticosus</i> Agg.) IN ORGANIC PRODUCTION	
Nada ZAVISIC, Zeljko LAKIC, Milutin MISIMOVIC	593

THE IMPORTANCE OF PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) IN HEALTH AND PRODUCTIVITY OF AGRO-ECOSYSTEMS	
Peiman ZANDI, Shahram Khademi CHALARAS	599
FACTS AND VISIONS ON THE STATUS AND THE FUTURE OF ORGANIC FARMING IN THE REPUBLIC OF MACEDONIA AND THE MEDITERRANEAN COUNTRIES	
Ljupcho MIHAJLOV, Vasko ZLATKOVSKI, Olivera BICHIKLISKI.....	604
PLANT PROTECTION PRACTISE OF ORGANIC FARMERS IN MACEDONIA AND THE ROLE OF HIGHER EDUCATION INSTITUTION IN PROVIDING SUPPORT	
Vasko ZLATKOVSKI, Ljupcho MIHAJLOV, Sasa MITREV	611
ECOLOGICAL AGRICULTURE IN POLAND	
Jadwiga KOTLARZ	618
SOME EXPERIENCES FROM THE WORLD IN THE USE OF COVER CROPS AND THE POSSIBILITY OF THEIR IMPLEMENTATION IN THE REGION	
Dragana DRAZIC, Ljubinko JOVANOVIC, Srdjan BOJOVIC, Milorad VESELINOVIC, Nevena CULE, Suzana MITROVIC	623
EFFECT OF FERTILIZATION ON <i>Pimpinella Anisum L.</i> IN DIFFERENT LOCATIONS IN SERBIA	
Milica ACIMOVIC, Zeljko DOLIJANOVIC, Snezana OLJACA, Dusan KOVACEVIC, Mico OLJACA	629
POSSIBLE AVAILABILITY OF Mg, Fe, Mn AND Zn FROM ORGANICALLY PRODUCED MAIZE	
Vesna DRAGICEVIC, Igor SPASOJEVIC, Milovan STOJILJKOVIC, Milena SIMIC, Milan BRANKOV	635
EFFECTS OF PLANT ESSENTIAL OILS IN REDUCING FUNGAL CONTAMINATION OF ORGANIC DRIED FIGS DURING STORAGE	
Özlem DO AN, Birgül ERTAN	640
BIOLOGICAL, ECOLOGICAL, SUSTAINABLE AND ORGANIC FARMING SYSTEMS – COMPARISON, OPPORTUNITIES, CHALLENGES AND PROSPECTS	
Marin YOSSFIOV.....	644
4. ENVIRONMENT PROTECTION AND NATURAL RESOURCES MANAGEMENT	654
ENVIRONMENTAL ASSESSMENT OF WATER EROSION IN BOVILLA CATCHMENT BASIN AND ITS IMPACTS ON WATER POLLUTION	
Auron MËNERI, Vangjo KOVAÇI, Anjeza KOVAÇI.....	655
ECOCLIMATIC CHARACTERISTICS OF BANJA LUKA (BOSNIA AND HERZEGOVINA) FOR THE PERIOD 1961-2009	
Aleksandar SOBOT, Diana BILIC SOBOT	664
TOXICITY OF LEAD-ACETATE ON EXPERIMENTAL RATS INFECTED WITH <i>ESCHERICHIA COLI</i>	

Maja MANOJLOVIC, Radoslav DEKIC, Svjetlana LOLIC, Aleksandar IVANC, Ivica RADOVIC.....	670
THE IMPACT OF AGRICULTURAL MEASUREMENTS ON WATER QUALITY PARAMETERS AT FISHPOND BARDAČA	
Svjetlana LOLIC, Milan MATAVULJ, Radoslav DEKIC, Aleksandar IVANC, Maja MANOJLOVIC.....	676
THE IMPACT OF THE THERMAL POWER PLANT IN GACKO ON LAND DEGRADATION	
Vesna TUNGUZ, Ljiljana NESIC, Milivoj BELIC, Vladimir CIRIC.....	682
ASSESSMENT OF THE LAND SUITABILITY FOR APPLES AND HAZELS GROWING	
Mario SRAKA, Stjepan HUSNJAK, Doroteja VAROVIC	688
BIOSTIMULANT APPLICATION IN TRANSPLANTS PRODUCTION <i>OF Allium Sativum</i> L. AND <i>WILD ROSES (Rosa Canina</i> L.)	
Nada PARADJKOVIC, Monika TKALEC, Svjetlana ZELJKOVIC Tomislav VINKOVIC	694
CARBON FOOTPRINT OF FARM INPUTS USED IN AGRICULTURE SECTOR IN ALBANIA	
Andi MEHMETI, Mladen TODOROVIC	700
LAND DEGRADATION, AGRICULTURE PRODUCTIVITY AND FOOD SECURITY	
Atef HAMDY, Adil ALY	708
EFFECT OF GRASS MULCH ON SOIL PROPERTIES IN TEA PLANTATION	
Tomonori FUJIKAWA, Takahiko NAKAMURA, Yoshio NAKAMURA.....	718
ASSESSMENT OF SOIL EROSION IN THE LIPNICA WATERSHED, POLIMLJE, MONTENEGRO	
Velibor SPALEVIC, Alberto TAZIOLI, Vojislav DJEKOVIC, Aleksandar ANDJELKOVIC, Nevenka DJUROVIC	723
CALCULATION OF SOIL EROSION INTENSITY IN THE BOSNJAK WATERSHED, POLIMLJE RIVER BASIN, MONTENEGRO	
Velibor SPALEVIC, Johannes HÜBL, Hubert HASENAUER, Milic CUROVIC	730
SOIL EROSION IN THE ZIM POTOK WATERSHED, POLIMLJE RIVER BASIN, MONTENEGRO	
Velibor SPALEVIC, Milic CUROVIC, Paolo BILLI, Massimiliano FAZZINI, Amaury FRANKL, Jan NYSSSEN	739
PHYLOGENETIC RELATIONSHIPS OF THREE SPECIES OF <i>CUCURBITA</i> SPP. FROM PORTUGAL EVALUATED BY SSR MARKERS	
Sandra MARTINS, Olinda PINTO CARNIDE, Valdemar CARNIDE.....	748
SOIL EROSION: CAUSES AND EFFECTS WITHIN PERILO SMALL CATCHMENT (WESTERN SERBIA)	
Gordana SEKULARAC, Miodrag JELIC, Milena DJURIC, Miroljub AKSIC, Tanja JAKISIC	754

COMPARATIVE ANALYSIS OF FOREST ADMINISTRATION IN SERBIA WITH REGIONAL COUNTRIES	
Maja SRNDOVIC, Ljiljana KECA, Milica MARCETA	760
EVALUATION OF QUALITY PSEUDOGLEY SOILS BASED ON ITS WATER-AIR PROPERTIES	
Miodrag JELIC, Goran DUGALIC, Jelena MILIVOJEVIC, Aleksandar DIKIC, Gordana SEKULARAC, Aleksandar PAUNOVIC	766
CHARACTERISTICS, APPLICABILITY AND INFLUENCE ON ENVIRONMENT OF THE PRODUCT "VESTA AGRI"	
Natasa B. SARAP, Adriana RADOSAVAC	772
PRESENCE OF DIFFERENT GROUPS OF MICROORGANISMS DEPOSOL IN RECLAMATION AT STANARI COAL MINE	
Zorica GOLIC, Nenad MALIC, Vera RAICEVIC	777
WATER AND PHYSICAL PROPERTIES OF URBISOLS	
Ljiljana NESIC, Milivoj BELIC, Vladimir CIRIC, Lazar PAVLOVIC, Borivoj PEJIC ..	783
CHANGES IN WINE GRAPE YIELD AND COMPOSITION FOR THE REGION OF SREMSKI KARLOVCI	
Mirjana RUML, Nada KORAC, Mirjam VUJADINOVIC, Ana VUKOVIC, Dragoslav IVANISEVIC	789
WATER QUALITY OF THE DRINA RIVER AS A SOURCE OF IRRIGATION IN AGRICULTURE	
Radmila PIVIC, Dragana JOSIC, Zoran DINIC, Zeljko DZELETOVIC, Jelena MAKSIMOVIC, Aleksandra STANOJKOVIC SEBIC.....	795
FOLIAR INJURY OF OZONE – LEVEL II – MONITORING PLOT	
Snezana RAJKOVIC, Miroslava MARKOVIC, Radoslav RAJKOVIC, Dragan MITIC, Ljubinko RAKONJAC, Aleksandar LUCIC.....	802
NATURAL RESOURCE MANAGEMENT	
Zarko RISTIC, Kristijan RISTIC	808
THE FIRST RECORD OF THE INVASIVE <i>Impatiens Glandulifera</i> Royle (HIMALAYAN BALSAM) IN THE REPUBLIC OF MACEDONIA	
Zvonko PACANOSKI, Alirami SALIJI	814
ENVIRONMENTAL SUSTAINABILITY ANALYSIS OF SUB-NATIONAL AGRICULTURE IN PAKISTAN	
Farhad ZULFIQAR, Gopal B. THAPA	822
5. ANIMAL HUSBANDRY.....	829
BRUCELLOSIS IN REPUBLIC OF SRPSKA AND PREVENTIVE MEASURES	
Sanela TODIC, Aleksandar SOBOT.....	830
QUALITY OF PORK CARCASS ON THE SLAUGHTER LINE IN MINI SLAUGHTERHOUSES	
Diana BILIC SOBOT, Aleksandar SOBOT	836

**COURSE DELIVERY (PARTURITION) COWS ON THE BEEF FARM „GRCIC“
IN THE EXTENSIVE FARMING**

Duska SLIJEPAC 841

**MONITORING QUALITY OF HAY ON FARMS FOR MILK PRODUCTION IN
NORTHERN BOSNIA AND HERZEGOVINA**

Midhat GLAVIC, Aleksandra BUDISA, Senad OSMANAGIC, Amir ZENUNOVIC, Amir
HASIC, Jasmin BRNJAK 844

**QUALITY OF CHICKEN MEAT FROM CONVENTIONAL AND ORGANIC
PRODUCTION**

Tatjana PANDUREVIC, Sreten MITROVIC, Bojana RISTANOVIC, Vladan STANISIC
..... 849

**EXAMINATION OF CERTAIN PARAMETERS AFFECTING DAIRY COWS
WELFARE IN BOSNIA AND HERZEGOVINA**

Vanja JOVOVIC, Biljana ROGIC, Bozo VAZIC, Knut Egil BØE, Lars Erik RUUD,
Aleksandar MARIC, Miljan ERBEZ 854

**EFFECTS OF PROBIOTICS AND PREBIOTICS ON THE PRODUCTION
PERFORMANCE OF FATTENING CHICKENS**

Izeta OMEROVIC, Bozidar MILOSEVIC, Zvonko SPASIC, Gorica CVIJANOVIC,
Dragan CIRKOVIC 859

**MACROELEMENTS IN RED CLOVER (*Trifolium Pratense* L.) RELATIVE TO
COW REQUIREMENTS**

Jordan MARKOVIC, Bora DINIC, Dragan TERZIC, Snezana ANDJELKOVIC, Jasmina
MILENKOVIC, Milimir BLAGOJEVIC, Biljana CELJAJ 863

**EVALUATION OF METABOLIC STATUS IN DAIRY COWS DURING
TRANSITION PERIOD**

Radojica DJOKOVIC, Marko CINCOVIC, Vladimir KURCUBIC, Zoran ILIC, Milun
PETROVIC, Miroslav LALOVIC, Boban JASOVIC 868

**THE EFFECT OF GENOTYPE AND THE NUMBER OF FARROWING ON SOW
FERTILITY TRAITS**

Milovan PUSIC, Robert RADISIC, Nikola POPOVIC, Radmila BESKOROVAJNI, Natasa
TOLIMIR 874

**QUALITY OF MILK AND WHEY OBTAINED DURING THE PRODUCTION OF
SJENICA CHEESE AND A TYPE OF SJENICA CHEESE**

Zeljko SAVIC, Ognjen MACEJ, Milinko MILINKOVIC 879

**THE MECHANIZATION PROPERTIES OF CATTLE FARMS IN DİYARBAKIR
PROVINCE, TURKEY**

Abdullah SESS Z, Muzaffer DENL , Muhittin TUTKUN 884

**THE EFFECTS OF TRITICALE REPLACEMENT IN MAIZE BASED BROILER
DIETS WITHOUT ENZYMES SUPPLEMENTATION ON GROWTH
PERFORMANCE AND CARCASS TRAITS**

Eyup BA ER^{1*} 889

THE LIVESTOCK SITUATION OF TURKEY

Muhittin TUTKUN*, Ali Murat TATAR, Halit Deniz REL	896
THE STRUCTURAL SITUATION AND FEEDING PRACTICES IN CATTLE FARMS IN DIYARBAKIR PROVINCE IN TURKEY	
Muzaffer DENL , Abdullah SESS Z, Muhittin TUTKUN	901
CAMEL WRESTLING ECONOMY IN MODERN TURKEY	
Orhan YILMAZ, Yakup Erdal ERTÜRK, Füsün CO KUN, Mehmet ERTU RUL	905
ENVIRONMENTAL POLLUTIONS CAUSED BY ANIMAL WASTE AND POTENTIAL SOLUTIONS	
Halit Deniz REL , Muhittin TUTKUN, Ali Murat TATAR, Nihat TEKEL, Ahmet Konuralp EL Ç N, Müge EL Ç N	912
6. RURAL DEVELOPMENT AND AGROECONOMY	917
AGRICULTURE AROUND PROTECTED AREAS IN ALBANIA – CHANGING POLICY	
Majlinda ÇAKALLI.....	918
REFORMING THE PENSION SCHEME OF SELF – EMPLOYED IN AGRICULTURE	
Majlinda ÇAKALLI, Loreta KODRA	924
ASSESSMENT OF SEDENTARY AND MOBILE PASTORALISM DYNAMICS IN THE REGION OF DIFFA (NIGER)	
Laouali ABDOULKADRI, Yamba BOUBACAR, Philippe LEBAILLY.....	930
SOCIO-ECONOMIC CHARACTERISTICS OF FULANI’S HOUSEHOLDS IN NORTHEASTERN BENIN	
Roukayath CHABI TOKO, Anselme ADEGBIDI, Philippe LEBAILLY.....	936
BUDGETARY SUPPORT TO AGRICULTURE IN BOSNIA AND HERZEGOVINA, AND EURO - AND WTO INTEGRATION PROCESSES	
Sabahudin BAJRAMOVIC, Jakub BUTKOVIC	942
POSSIBILITIES FOR DEVELOPMENT OF RURAL TOURISM AS AN ELEMENT OF RURAL DEVELOPMENT ON MOUNTAIN BJELAŠNICA	
Tamara BAJKUSA, Ajla MEHMEDOVIC	951
ORGANIC MEAT CONSUMERS AND THEIR AWARENESS OF ANIMAL WELFARE AS REFLECTED BY PURCHASE PREFERENCES	
Karolína ČAKLOVÁ, Zbyněk ULÁK	958
NUTRITIONAL CHALLENGES IN ORGANIC LIVESTOCK SYSTEMS OF THE TROPICS AND SUBTROPICS: CASE OF SHEEP PRODUCTION IN IRAN	
Shahin GHAZIANI	965
RURAL TOURISM IN SOUTH-EASTERN BOSNIA: STRUCTURES MANAGEMENT AND SERVICE DIVERSIFICATION	
Hamid EL BILALI, Sinisa BERJAN, Noureddin DRIOUECH, Biljana PANIN, Adriana RADOSAVAC, Marija LAZIC.....	971
ECONOMIC OPTIMIZATION OF THE APPLE INVESTMENT AND GROWING SYSTEM ALTERNATIVES IN REPUBLIC OF MACEDONIA	

Marija GJOSHEVA KOVACHEVIKJ, Lazo DIMITROV	977
RURAL DEVELOPMENT IN THE SOUTHEAST PLANNING REGION IN THE REPUBLIC OF MACEDONIA THROUGH ENTREPRENEURSHIP	
Tosho KOSTADINOV, Nedeljka NIKOLOVA, Vesna LEVKOV, Eljmi JUSUFI, Konstantin MINOSKI	983
RURAL DEVELOPMENT IN THE VARDAR PLANNING REGION IN THE REPUBLIC OF MACEDONIA THROUGH ENTREPRENEURSHIP	
Tosho KOSTADINOV, Vesna LEVKOV, Elmi JUSUFI, Nedeljka NIKOLOVA, Konstantin MINOSKI	989
FAMILY ENTREPRISES IN RURAL AREAS OF THE VARDAR REGION IN THE REPUBLIC OF MACEDONIA	
Tosho KOSTADINOV, Elmi JUSUFI, Vesma LEVKOV, Nedeljka NIKOLOVA, Konstantin MINOSKI	995
IMPORTANCE OF AGRICULTURE IN MONTENEGRIN ECONOMY	
Gorica BOJIC	1000
KOŁOCZ ŚLĄSKI – THE INCREASE IN PRODUCTION GROWTH DUE TO PRODUCT CERTIFICATION	
Szymon GODYLA	1007
INNOVATIVE TECHNOLOGIES AND INCREASING COMPETITIVENESS OF RURAL TERRITORIES	
Marina MOREKHANOVA	1013
MODELING AND FORECASTING THE NUMBER OF THE EMPLOYED IN AGRICULTURE IN RUSSIA UNTIL 2020	
Tatiana BLINOVA, Svetlana BYLINA, Viktor RUSANOVSKIY	1020
COOPERATIVE SIGNIFICANCE FOR ECONOMIC DEVELOPMENT OF AGRO - RURAL ECONOMY OF BOSNIA AND HERCEGOVINA	
Adriana RADOSAVAC, Sanja DJUKIC, Dusko JOVANOVIC	1027
AGRICULTURE AND TOURISM IN SERBIA	
Branislav GULAN	1034
ECOLOGICAL CLUSTERS IN TERMS OF THE ENVIRONMENT PROTECTION	
Branko MIHAILOVIC, Drago CVIJANOVIC, Gorica CVIJANOVIC	1041
PROFITABILITY OF HAZELNUTS PRODUCTION IN SERBIAN ENCLAVES IN KOSOVO	
Goran MAKSIMOVIC, Radomir JOVANOVIC, Slavka MITROVIC, Tatjana IVANOVIC	1046
ECONOMIC PROFITABILITY OF MILK PRODUCTION AND POSSIBILITY OF ORGANIC SYSTEM DEVELOPMENT ON PEŠTER REGION FOR RURAL DEVELOPMENT CAUSE	
Mersida JANDRIC, Dragic ZIVKOVIC, Sreten JELIC, Zoran RAJIC	1051
PREDICTIONS OF TOMATO PRODUCTION CHARACTERISTICS IN SERBIA	

Gora MILJANOVIC, Beba MUTAVDZIC, Nebojsa NOVKOVIC, Miljojko JANOSEVIC	1056
POTATO PRODUCTION CHARACTERISTICS – COMPERATIVE ANALYSIS IN EUROPEAN UNION COUNTRIES AND SERBIA	
Nebojsa NOVKOVIC, Beba MUTAVDZIC, Miljojko JANOSEVIC, Gora MILJANOVIC	1062
WINE TOURISM AS A FACTOR OF RURAL DEVELOPMENT OF FRUŠKA GORA (VOJVODINA PROVINCE)	
Radovan PEJANOVIC, Sanja DJUKIC, Dunja DEMIROVIC, Adriana RADOSAVAC	1068
CHARACTERISTICS AND DEVELOPMENT TRENDS IN FISH PRODUCTION IN THE WORLD	
Rasko STEFANOVIC, Sasa OBRADOVIC, Branislav SARCEVIC, Branislav PETRUJKIC, Milan KOSTIC	1074
ASSOCIATIONS AND COOPERATIVES AS DEVELOPMENT FACTORS IN REVITALIZATION OF VILLAGES	
Rasko STEFANOVIC, Branislav SARCEVIC, Sasa OBRADOVIC, Branislav PETRUJKIC, Milan KOSTIC	1081
CO-OPERATIVES AS A FACTOR OF THE SOCIO-ECONOMIC DEVELOPMENT OF SOUTH BANAT AND BRANICEVO DISTRICT	
Vedran TOMIC, Huanita MILUTINOVIC, Aleksandar STOJANOVIC, Snezana JANKOVIC, Nada KOSANOVIC, Aleksandra ANDJELKOVIC, Mirjana ARANDJELOVIC	1087
OPPORTUNITIES AND CHALLENGES OF WOMEN CASSAVA PRODUCERS IN BITYILI (SOUTH-CAMEROON) AND THE IMPLICATIONS FOR GENDER ROLES	
Crescence MOMA, Chimène MFOUMOU, Marie ZIBI, Philippe LEBAILLY	1092
AN ANALYTICAL STUDY OF THE PRODUCTION EFFICIENCY AND MARKETING OF CHAMOMILE CROP UNDER ORGANIC FARMING SYSTEMS IN EGYPT	
Khaled El Sayed Abd EL-MOWLA MOHAMED, Atef Abd EL AZIZ HASSAN RAGAB	1100
TRENDS IN PRODUCTION OF RAW MEDICINAL AND AROMATIC PLANTS IN SERBIA	
Svetlana TURUDIJA ZIVANOVIC, Slavica STEVANETIC, Slobodan CERANIC, Tomislav ZIVANOVIC	1106
PROFIT EFFICIENCY OF POULTRY EGG PRODUCTION SYSTEM IN OGUN STATE, NIGERIA.	
Mudashiru AKINYEMI, Peter Adebola OKUNEYE, Yiseon Sunday HOSU	1112
THE POTENTIALS OF THE MUNICIPALITY OF PODGORICA IN AGRICULTURE AND TOURISM AND THEIR EVALUTION	
Miroslav DODEROVIC, Dragomir KICOVIC	1117

EVALUATION OF KASTAMONU VILLAGE DEVELOPMENT AND OTHER AGRICULTURAL COOPERATIVE ASSOCIATION'S (VDACA): ORGANIZATION, OPERATION MODE AND IMPACT ASSESSMENT	
Ya ar AKTA , Nesli ah TANER	1123
ECONOMIC EVALUATION OF CLIMATE INFORMATION IN SAHEL: CASE OF FARM HOUSEHOLDS IN BURKINA FASO	
Beteo ZONGO, Abdoulaye DIARRA, Bruno BARBIER, Malicki ZOROM, Hama YACOUBA, Thomas DOGOT	1129
THE MAIN DIRECTIONS OF SCIENCE AND TECHNOLOGY DEVELOPMENT IN AGRIBUSINESS SECTOR OF THE REPUBLIC OF SERBIA	
Zoran NJEGOVAN, Mirela TOMAS-SIMIN	1135
AUTHOR INDEX	1141

INDIGENOUS *PSEUDOMONAS CHLORORAPHIS* AFFECTS GROWTH OF *ALTERNARIA* SP., *PHOMA* SP. AND *DRECHSLERA TETRAMERA* FROM ANISE

Aleksandra STANOJKOVIC SEBIC^{1*}, Snezana PAVLOVIC², Mira STAROVIC², Radmila PIVIC¹, Dobrivoj POSTIC², Zorica LEPSANOVIC³, Dragana JOSIC¹

¹Institute of Soil Science, Belgrade, Serbia

²Institute for Medicinal Plant Research “Dr. J. Pan i ”, Belgrade, Serbia

³Military Medical Academy, Belgrade, Serbia

*Corresponding author: astanojkovic@yahoo.com

Abstract

Pseudomonas chlororaphis is a bacterium used as a soil inoculant in agriculture and horticulture. It can act as a biocontrol agent against certain phytopathogenic fungi via production of phenazine type antibiotics. Phytopathogenic fungi are responsible for several plant diseases in different medicinal plants and cause very important economic losses in Serbian plantation. Among them, *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera* are known as major plant pathogens, whereby at least 20% of agricultural spoilage is caused by *Alternaria* species. In this study, we examined the antifungal activity of indigenous *Pseudomonas chlororaphis* isolates against the phytopathogenic fungi *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera*, which had infected anise (*Pimpinella anisum* L., fam. Apiaceae), using *in vitro* inhibition tests. The obtained results showed that studied antibiotic-producing *Ps. chlororaphis* isolates inhibited the tested fungi as follows: *D. tetramera* in the range from 3.85-69.23%, *Alternaria* sp. in the range from 5-50%, and *Phoma* sp. in the range from 0-50%. In general, it has been concluded that studied *P. chlororaphis* isolates have potential in controlling plant diseases caused by phytopathogenic fungi *Alternaria* sp., *Phoma* sp. and *D. tetramera*, whereby the bacterial isolates with the highest inhibitory potential will be selected for further experiments.

Key words: *Pseudomonas chlororaphis* isolates, phytopathogenic fungi, *Pimpinella anisum*, antifungal activity.

Introduction

Pathogenic microorganisms affecting plant health are a major and chronic threat to food production and ecosystem stability worldwide. As agricultural production intensified over the past few decades, producers became more and more dependent on agrochemicals as a relatively reliable method of crop protection helping with economic stability of their operations. However, increasing use of chemical inputs causes several negative effects, i.e., development of pathogen resistance to the applied agents and their non-target environmental impacts (Compant et al., 2005). An answer to this problem is replacing chemicals with biological approaches, which are considered more environment friendly in the long term. One of the emerging research areas for the control of different phytopathogenic agents is the use of biocontrol activities of microorganisms, which are capable of suppressing or preventing the damages caused by phytopathogens (Nihorembere et al., 2011).

Phytopathogenic fungi, as the most common plant pathogens, are capable of infecting different types of plant tissues. Among the main aims in agriculture is finding adequate strategies for their suppression. One of these strategies is biological control (biocontrol) of plant diseases that relies on the use of natural antagonists of phytopathogenic fungi (Heydari and Pessarakli, 2010). A special place among the natural antagonists of phytopathogenic

fungi belongs to rhizobacteria that show beneficial effects on plant growth (PGPR) (Zehnder et al., 2001). These bacteria use various mechanisms for their action: production of plant hormones, asymbiotic fixation of N₂, antagonism towards phytopathogenic microorganisms and the ability to solubilize mineral phosphates and other nutrients (Cattelan et al., 1999).

Different isolates of fluorescent *Pseudomonas* species take prominent place in this respect. Fluorescent *Pseudomonas* species are present in temperate and tropical soils, often dominant among rhizobacteria (Ayyadurai et al., 2007). They belong to PGPR because of the ability to colonize the roots of plants and stimulate growth by decreasing the frequency of diseases. Suppression of diseases includes the inhibition of pathogens by competition and/or by antagonism (Couillerot et al., 2009). The prominent feature of fluorescent *Pseudomonas* species is the production of antibiotics as inhibitory compounds that play a role in the suppression of diseases caused by phytopathogenic fungi (Haas and Défago, 2005). One of the best-studied antibiotics of fluorescent *Pseudomonas* species are phenazines, nitrogencontaining heterocyclic compounds (Fernando et al., 2005). The only known natural producers of phenazines are bacteria (Pierson III and Pierson, 2010). Among fluorescent *Pseudomonas* species a bacterium *Pseudomonas chlororaphis* is used as a soil inoculant in agriculture and horticulture. It can act as a biocontrol agent against certain phytopathogenic fungi via production of phenazine type antibiotics (Maddula et al., 2008; Shen et al., 2012).

Phytopathogenic fungi are responsible for several plant diseases in different medicinal plants and cause very important economic losses in Serbian plantation. Among them, *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera* are known as major plant pathogens, whereby at least 20% of agricultural spoilage is caused by *Alternaria* species. The genus *Alternaria* is widely distributed in nature and its species are among the most common fungi on the phyllosphere (Lopes and Martins, 2008). It includes both plant-pathogenic and plant-saprophytic species that may damage crops in the field or cause post-harvest decay (Griffin and Chu, 1983), causing considerable economic losses for farmers and food industries. In addition, the genus produces mycotoxins and phytotoxins. The toxins alternariol, alternariol methyl ether, altenuene, and tenuazonic acid are known as possible food contaminants with potential toxicological risk (Pose et al., 2004). Most *Phoma* species are saprobes, but have plant pathogenic potential causing numerous diseases of vegetables and other annual plants (Schwartz and Mohan, 1999; Boerema et al., 2004). *Phoma* sp. infects subterranean organs directly and aerial parts of the plants indirectly (Boerema et al., 2004). The species *Drechslera tetramera* was first described causing foot rot in winter wheat (McKinney, 1925). It was reported to cause crown and root rot disease, leaf spot (Singh and Lal, 1965; Naphade, 1968) and storage disease in many plants (Rao, 1967). The species was also observed on seeds of many crops (Chidambaram et al., 1973). One of the hosts of *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera* is anise (*Pimpinella anisum* L., fam. Apiaceae). Anise is an aromatic plant which is used in traditional medicine (especially its fruits) as carminative, aromatic, disinfectant and galactagogue (Shojaii and Abdollahi Fard, 2012). Regarding the widely distribution and phytopathogenicity of *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera*, as well as the capability of *Pseudomonas chlororaphis* isolates to inhibit the phytopathogenic fungi, the aim of this study was to examine the antifungal activity of thirteen indigenous *P. chlororaphis* isolates against the phytopathogenic fungi *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera*, which had infected anise (*Pimpinella anisum* L., fam. Apiaceae).

Material and methods

The antifungal activity of the following indigenous *Pseudomonas chlororaphis* isolates: PB4, PB5, K38, Q34, M28, B25, PBA12, PD5, C7, C8, Q16P, K24, K29 and K35, was examined

against the phytopathogenic fungi *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera*, which had infected anise (*Pimpinella anisum* L., fam. Apiaceae).

The study was carried out in the Genetics Section of the Institute of Soil Science, Belgrade, from February to April in 2014. The examination was conducted on Waksman agar nutrient media, using *in vitro* inhibition tests. Overnight cultures of the tested *P. chlororaphis* isolates, optimized to $1 \cdot 10^7$ cfu/ml were used to examine the influence of extracellular metabolites of cells (1 ml of cultures was centrifuged at 13000 rpm for 10 min and resuspended in the same volume of sterile saline solution).

The sowing of Waksman nutrient media with the tested cultures of *P. chlororaphis* isolates was done near the edges of Petri dishes and mycelia of the studied phytopathogenic fungi were placed in the center. Control variants contained only mycelia of phytopathogenic fungi on Waksman agar plates.

Observation and the measuring of zones of mycelia growth inhibition around bacterial colonies were performed after seven days of incubation at 25°C (Nair and Anith, 2009). The percentage of growth inhibition of mycelia of *Alternaria* sp., *Phoma* sp. and *D. tetramera* was calculated by the formula: % Inhibition = [(Control - Treatment)/Control] x 100 (Ogbebor and Adekunle, 2005).

Results and discussion

Due to the soil-borne nature of the diseases caused by *Alternaria* sp., *Phoma* sp. and *D. tetramera* the use of chemical methods for the control of disease is rarely successful. Inconsistencies in biocontrol under varying environmental conditions have been a common limitation of soil-borne pathogens. The present research was conducted to evaluate the efficacy of indigenous *P. chlororaphis* isolates against these pathogens.

Table 1 displays the data on *in vitro* antifungal activity of selected *P. chlororaphis* isolates toward *Alternaria* sp., *Phoma* sp. and *D. tetramera*, which had infected anise.

The obtained results imposed that all studied antibiotic-producing *P. chlororaphis* isolates showed more or less pronounced antifungal activity and inhibited the tested fungi as follows: *D. tetramera* in the range from 3.85-69.23%, *Alternaria* sp. in the range from 5-50%, and *Phoma* sp. in the range from 0-50%.

The highest percentage of growth inhibition was caused by the following *P. chlororaphis* isolates: K24 (from 50.00% toward *Phoma* sp. and *Alternaria* sp. to 69.23% toward *D. tetramera*), K35 (from 40.00% toward *Alternaria* sp. to 69.23% toward *D. tetramera*), K29 (from 40.00% toward *Alternaria* sp. to 65.38% toward *D. tetramera*), Q16P (from 40.00% toward *Alternaria* sp. to 69.23% toward *D. tetramera*) and M28 (from 35.00% toward *Alternaria* sp. to 61.54% toward *D. tetramera*).

The lowest percentage of inhibition was caused by *P. chlororaphis* isolates PD5 (from 0.00% toward *Phoma* sp. to 15.00% toward *Alternaria* sp.) and PBA12 (from 0.00% toward *Phoma* sp. to 30.00% toward *Alternaria* sp.).

In general, *D. tetramera* showed the highest sensitivity to antibiotic-producing *P. chlororaphis* isolates.

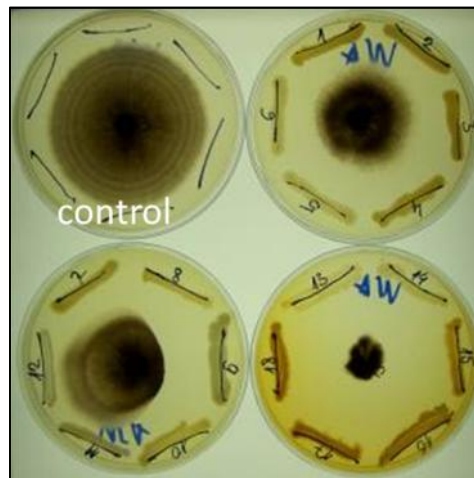
Figures 1 and 2 display the zones of inhibition, caused by the most active *P. chlororaphis* isolates toward *Phoma* sp. and *D. tetramera*.

More or less pronounced antifungal activity of indigenous *Pseudomonas* isolates toward phytopathogenic fungi *Alternaria* sp. and *D. tetramera* was also confirmed in other investigations (Joši et al., 2012; 2012a; 2012b). In addition, *in vitro* assays in previous studies (Lovic et al., 1993; Avinash and Ravishankar Rai, 2014) revealed that PGPR strains showed good antifungal activity against *Phoma* sp. As pronounced by other authors (Haas and Défago, 2005; Couillerot et al., 2009; Karimi et al., 2012), PGPR can be used in the biocontrol of phytopathogens.

Table 1. Antifungal activity of selected *Pseudomonas chlororaphis* isolates toward phytopathogenic fungi *Alternaria* sp., *Phoma* sp. and *Drechslera tetramera*

<i>Pseudomonas chlororaphis</i> isolates	<i>Alternaria</i> sp.	<i>Phoma</i> sp.	<i>Drechslera tetramera</i>
PB4	10.00*	10.00	26.92
PB5	10.00	15.00	30.77
K38	20.00	10.00	23.08
Q34	30.00	15.00	26.92
M28	35.00	45.00	61.54
B25	15.00	10.00	26.92
PBA12	30.00	0.00	11.54
PD5	15.00	0.00	3.85
C7	15.00	20.00	61.54
C8	5.00	20.00	61.54
Q16P	40.00	45.00	69.23
K24	40.00	50.00	69.23
K29	40.00	50.00	65.38
K35	50.00	50.00	69.23

*Inhibition (in %).

Figure 1. Zones of inhibition caused by *P. chlororaphis* isolates toward *Drechslera tetramera*Figure 2. Zones of inhibition caused by *P. chlororaphis* isolates toward *Phoma* sp.

Conclusion

Biological control of phytopathogenic fungi *Alternaria* sp., *Phoma* sp. and *D. tetramera*, causing considerable economic losses in cultivation of medicinal plants in Serbia, is an ecological method of plant protection. In this regard, different isolates of fluorescent *P. chlororaphis* species have been intensively studied.

Our investigation confirmed more or less pronounced antifungal activity of all tested *P. chlororaphis* isolates, whereby the most pronounced activity was observed for K24, K35, K29, Q16P and M28 strains. Regarding the studied phytopathogenic fungi, the highest sensitivity to antibiotic-producing *P. chlororaphis* isolates was observed for *D. tetramera*.

Our findings impose that the studied *P. chlororaphis* isolates have potential in controlling plant diseases caused by phytopathogenic fungi *Alternaria* sp., *Phoma* sp. and *D. tetramera*, whereby the bacterial isolates with the highest inhibitory potential will be selected for further experiments.

Acknowledgements

This research was financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Project III46007.

References

- Avinash, TS, Ravishankar Rai, V, (2014). Antifungal activity of plant growth promoting rhizobacteria against *Fusarium oxysporum* and *Phoma* sp. of Cucurbitaceae, In: Kharwar, RN, Upadhyay, R, Dubey, N, Raghuwanshi, R. (eds), *Microbial Diversity and Biotechnology in Food Security*, Springer, India, 257-264.
- Ayyadurai, N, Ravindra Naik, P, Sakthivel, N, (2007). Functional characterization of antagonistic fluorescent pseudomonads associated with rhizospheric soil of rice (*Oryza sativa* L.), *Journal of Microbiology and Biotechnology*, 17, 919-927.
- Boerema, GH, de Gruyter, J, Noordeloos, ME, Hamers, MEC, (2004). *Phoma Identification Manual: Differentiation of Specific and Infra-specific Taxa in Culture*, CABI Publishing, Wallingford, Oxfordshire, UK.
- Cattelan, AJ, Hartel PG, Fuhrmann, JJ, (1999). Screening for plant growth-promoting rhizobacteria to promote early soybean growth, *Soil Science Society of America Journal*, 63, 1670-1680.
- Chidambaram, P, Mathur, SB, Neergaard, P, (1973). Identification of seed-borne *Drechslera* species, *Friesia*, X (3), 165-208.
- Couillerot, O, Prigent-Combaret, C, Caballero-Mellado, J, Moënne-Loccoz, Y, (2009). *Pseudomonas fluorescens* and closely related fluorescent pseudomonads as biocontrol agents of soil-borne phytopathogens, *Letters in Applied Microbiology*, 48, 505-512.
- Fernando, WGD, Nakkeeran, S, Zhang, Y, (2005). Biosynthesis of antibiotics by PGPR and its relation in biocontrol of plant diseases, In: Siddiqui, ZA (ed), *PGPR: Biocontrol and Biofertilization*, Springer Science, Dordrecht, The Netherlands, 67-109.
- Griffin, GF, Chu, FS, (1983). Toxicity of the *Alternaria* metabolites alternariol, alternariol methyl ether, altenuene, and tenuazonic acid in the chicken embryo assay, *Applied and Environmental Microbiology*, 46, 1420-1422.
- Haas, D, Défago, G, (2005). Biological control of soil-borne pathogens by fluorescent pseudomonads, *Nature Reviews Microbiology*, 3, 307-319.
- Heydari, A, Pessarakli, M, (2010). A review on biological control of fungal plant pathogens using microbial antagonists, *Journal of Biological Sciences*, 10, 273-290.
- Joši , D, Protolipac, K, Starovi , M, Stojanovi , S, Pavlovi , S, Miladinovi , M, Radovi , S, (2012). Phenazines producing *Pseudomonas* isolates decrease *Alternaria tenuissima* growth, pathogenicity and disease incidence on cardoon, *Archives of Biological Sciences*, Belgrade, 64, 1495-1503.
- Joši , D, Pivi , R, Miladinovi , M, Starovi , M, Pavlovi , S, Đuri , S, Jarak, M, (2012a). Antifungal activity and genetic diversity of selected *Pseudomonas* spp. from maize rhizosphere in Vojvodina, *Genetika*, 44 (2), 377-388.
- Joši , D, Deli , D, Rasuli , N, Stajkovi , O, Kuzmanovi , , Stanojkovi , A, Pivi , R, (2012b). Indigenous *Pseudomonas* from rhizosphere of maize grown on pseudogley soil in Serbia, *Bulgarian Journal of Agricultural Science*, 18, 197-206

- Karimi, K, Amini, J, Harighi, B, Bahramnejad, B, (2012). Evaluation of biocontrol potential of *Pseudomonas* and *Bacillus* spp. against *Fusarium* wilt of chickpea, *Australian Journal of Crop Science*, 6, 695-703.
- Lopes, MC, Martins, VC, (2008). Fungal plant pathogens in Portugal: *Alternaria dauci*, *Revista Iberoamericana de Micología*, 25, 254-256.
- Lovic, B, Heck, C, Gallian, JJ, Anderson, AJ, (1993). Inhibition of the sugarbeet pathogens *Phoma betae* and *Rhizoctonia solani* by bacteria associated with sugarbeet seeds and roots, *Journal of Sugar Beet Research*, 30 (31), 169-184.
- Maddula, VSRK, Pierson, EA, Pierson III, LS, (2008). Altering the ratio of phenazines in *Pseudomonas chlororaphis* (aureofaciens) strain 30-84: effects on biofilm formation and pathogen inhibition. *Journal of Bacteriology*, 190, 2759-2766.
- McKinney, HH, (1925). Foot-rot diseases of wheat in America, *Bulletin of the U.S. Department of Agriculture*, 134 (7), 33.
- Nair, CB, Anith, KN, (2009). Efficacy of acibenzolar-smethyl and rhizobacteria for the management of foliar blight disease of amaranth, *Journal of Tropical Agriculture*, 47, 43-47.
- Naphade, SR, (1968). A new leaf blight disease of *Crotalaria juncea* from India, *Plant Disease Reporter*, 52, 377-378.
- Nihorembere, V, Ongena, M, Smargiass, M, (2011). Beneficial effect of the rhizosphere microbial community for plant growth and health, *Biotechnologie, Agronomie, Société et Environnement*, 15, 327-337.
- Ogbebor, N, Adekunle, AT, (2005). Inhibition of conidial germination and mycelial growth of *Corynespora cassiicola* (Berk and Curt) of rubber (*Hevea brasiliensis* muell. Arg.) using extracts of some plants, *African Journal of Biotechnology*, 4, 996-1000.
- Pierson III, LS, Pierson, EA, (2010). Metabolism and function of phenazines in bacteria: impacts on the behavior of bacteria in the environment and biotechnological processes, *Applied Microbiology and Biotechnology*, 86, 1659-1670.
- Pose, G, Ludemann, V, Segura J, Fernández Pinto, V, (2004). Mycotoxin production by *Alternaria* strains isolated from tomatoes affected by Blackmold in Argentina, *Mycotoxin Research*, 20, 80-86.
- Schwartz, HF, Mohan, SK, (1999). *Compendium of Onion and Garlic Diseases*, The American Phytopathological Society Press, St. Paul, MN.
- Shen, X, Chen, M, Hu, H, Wang, W, Peng, H, Xu, P, Zhang, X, (2012). Genome sequence of *Pseudomonas chlororaphis* GP72, a root-colonizing biocontrol strain, *Journal of Bacteriology*, 194 (5), 1269-1270.
- Shojaii, A, Abdollahi Fard, M, (2012). Review of pharmacological properties and chemical constituents of *Pimpinella anisum*, *ISRN Pharmaceutics*, 510795.
- Singh, GP, Lal, S, (1965). A new leaf spot disease of Singhara (*Trapa bispinosa*) caused by *Bipolaris tetramera*, *Indian Phytopathology*, 18, 85-87.
- Zehnder, GW, Murphy, JF, Sikora, EJ, Kloepper, JW, (2001). Application of rhizobacteria for induced resistance, *European Journal of Plant Pathology*, 107, 39-50.