



UNIVERSITY OF AGRONOMIC SCIENCES  
AND VETERINARY MEDICINE OF BUCHAREST

FACULTY OF AGRICULTURE



*International Conference*  
*"Agriculture for Life, Life for Agriculture"*

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# BOOK OF ABSTRACTS

SECTION 1

# AGRONOMY



2023  
BUCHAREST

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# **SOIL SCIENCES**

## RESEARCH ON EARTHWORM COMMUNITY IN MAIZE CROP IN DOBROGEA PLATEAU

Angela Cristina AMUZA, Leonard ILIE

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: [angela.amuza@yahoo.com](mailto:angela.amuza@yahoo.com)

### **Abstract**

*Earthworms play an important role in soil formation contributing to the composition and functioning of its ecosystem. By their activity in the soil, earthworms offer many benefits: increased nutrient availability, better drainage, and a more stable soil structure, all of which help improve farm productivity. The purpose of this study was to assess the presence of earthworm species in maize crops in Dobrogea Plateau over the years 2020-2022. The sampling consisted of 15 pits of 25 x 25 x 40 cm. Five earthworm species belonging to three genera Aporrectodea, Allolobophora and Proctodrilus were identified. The most abundant species was Aporrectodea caliginosa nocturna and Aporrectodea caliginosa. This study reports the first data on earthworm fauna for the Dobrogea Plateau.*

**Key words:** earthworms, lumbricidae, diversity of populations, agriculture, maize.

## THE DEGRADATION OF THE FERTILITY POTENTIAL OF THE SOILS IN THE CRISURILOR PLAIN

Octavian BERCHEZ, Olimpia Smaranda MINTAȘ,  
Alina Ștefania STANCIU

University of Oradea, 1 Universitatii Street, Oradea, Romania

Corresponding author email: [olimpia.mintas@uoradea.ro](mailto:olimpia.mintas@uoradea.ro)

### ***Abstract***

*The present paper aims to study complex degradation processes and an assessment of these processes by presenting the soils affected by degradation as well as quantifying the intensity. The surveys on the identification and mapping of degraded soils have been carried out between 2012 and 2022. Following the correlation of field data with laboratory analyses and previously existing scientific information, the soils of the Crisurilor Plain soils with low fertility potential due to the degradation processes were identified and mapping of surface areas was developed in order to elaborate the complex of meliorative measures to improve the trophic characteristics, in order to increase the fertility potential and establish the assortment of cultivated plants.*

**Key words:** *erosion, clogging, compaction, sedimentation, water erosion.*

**STUDY OF THE PATHOGENICITY  
OF FUNGAL CONTAMINANTS  
ON GROUNDNUT SEEDS (*Arachis hypogaea* L.)**

**Zamble Bi Irie Abel BOLI**

University Nangui Abrogoua, Abobo Road Express,  
Abidjan, Ivory Coast (Cote D'Ivoire)

Corresponding author email: boliabe.sta@univ-na.ci

***Abstract***

*In Côte d'Ivoire, groundnut pastes and cakes are most often contaminated by moulds. The objective of this study is to evaluate the pathogenicity of fungal strains on groundnut seeds during storage in order to propose a control strategy outside of chemicals. Thus, 27 samples of 500 g each of groundnut seeds were collected in the markets of Abidjan. Fungal contaminants were isolated from groundnut seeds by the direct method on Sabouraud Chloramphenicol agar previously poured into Petri dishes and incubated at 30°C for five days. Subsequently, pathogenicity tests of isolated fungal strains were carried out on healthy groundnut seeds disinfected on the surface with a chlorine solution (2%). The results indicate that groundnut seeds exhibited rotting patterns characterized by seedcoat discoloration and soft rot with *Absidia* sp, slight seedcoat discoloration with *Mucor*, seedcoat discoloration with soft rot and black spots with *Rhizopus* sp, discoloration and drying of the integument with *Aspergillus* sp and slight discoloration and drying of the integument with *Trichophyton*.*

**Key words:** *Groundnut seeds, Storage, Fungal contamination, Pathogenicity tests.*

**EVALUATION OF THE MORPHOMETRIC  
PARAMETERS OF THE CUBOLTA RIVER BASIN  
WITH THE GIS SUPPORT**

**Angela CANTÎR, Tatiana CIOLACU**

Institute of Ecology and Geography, 1 Academiei Street,  
Chisinau, Republic of Moldova

Corresponding author email: [angelamadan87@gmail.com](mailto:angelamadan87@gmail.com)

***Abstract***

*The morphometric parameters of a territory are an important part in the research carried out in order to have a complete picture of its relief. Morphometry represents the main elements through which it is possible to achieve a complete description of geomorphological conditions within a given territory. This article presents aspects regarding the morphometric parameters that are achieved with the help of GIS technology. With the help of the digital terrain model, a series of morphometric parameters were generated: altitude, slope inclination, relief fragmentation. Subsequently, these data can be used in the complex and detailed geomorphological and pedological analysis of the basin territory.*

**Key words:** *morphometric parameters, GIS technology, geomorphological conditions.*



**ALLUVIAL SOILS OF THE LOWER DNIESTER  
MEADOW - GENETIC FEATURES  
AND CLASSIFICATION PRINCIPLES**

**Valerian CERBARI, Tamara LEAH**

Institute of Soil Science, Agrochemistry and Soil Protection “Nicolae Dimo”,  
100 Ialoveni Street, 2070, Chisinau, Republic of Moldova

Corresponding author email: tamaraleah09@gmail.com

***Abstract***

*In the Lower Dniester meadow from the Republic of Moldova are spread the following subtypes of alluvial soils: ochric (poorly evolved), typical, humic, slitized, hydric, salinized, solonized, gleyic. The most widespread are the clayey-loamy humic alluvisols in the central meadow, the post-marshy clayey deep-humic alluvisols in the meadow under the terrace and the weak humiferous alluvisols with semi-deep humiferous profile and humiferous soil layers buried deeper than 70 cm, formed on the loamy-sandy grind near the bed of the Blind Dniester. Most of the alluvisols in the Lower Dniester meadow are irrigated or have been irrigated. The texture is one of the most spatially variable on the profile of the alluvial soils in the Lower Dniester meadow.*

**Key words:** *alluvial soil, Lower Dniester, texture, classification, genetic peculiarities.*

## REVIEW OF EX-SITU RESEARCH METHODS REGARDING THE PLANT - SOIL FAUNA RELATIONSHIP

**Luiza Silvia CHIRIAC<sup>1,2</sup>, Dumitru T. MURARIU<sup>1,2</sup>**

<sup>1</sup>Institute of Biology Bucharest of Romanian Academy,  
296 Splaiul Independentei, Bucharest, Romania

<sup>2</sup>Faculty of Biology, University of Bucharest,  
91-95 Splaiul Independentei, Bucharest, Romania

Corresponding author email: [luizaschiriac@gmail.com](mailto:luizaschiriac@gmail.com)

### ***Abstract***

*While the plant community controls the quality and quantity of resources available to soil invertebrates, the soil invertebrates regulates plant growth and plant community composition. Soil invertebrates can modify plant traits, this effect cascading up to higher trophic levels, potentially thus determining changes in ecosystem functions. Thus, considering the special importance of this relationship between plants and soil invertebrates, our work aims to identify the various methods that support the study of this relationship. Although following the critical analysis of the literature, multiple methods were identified that highlight the interactions between underground and aboveground communities, we cannot claim that the study is exhaustive, which is caused by the immense number of works in the field. This aspect can only pave the way for new works and experiments to fill the knowledge gaps in this thematic area.*

**Key words:** *ex situ methods, methods, plants, plants-soil fauna relationships, soil invertebrates.*

## THE STATE AND PROTECTION OF LAND RESOURCES AND DEPOSITS IN THE LEOVA DISTRICT

Olesea COJOCARU, Sergiu STANILĂ

Technical University of Moldova, 50 Mircesti Street, Chisinau,  
Republic of Moldova

Corresponding author email: olesea.cojocaru@am.utm.md

### **Abstract**

*The protection of the environment is a national priority, which directly aims at the living conditions and health of the population, the achievement of economic and social-human interests, as well as the sustainable development capacities of society in the future. The purpose of the research was to evaluate the state of land resources and deposits located on the territory of the Leova district, as well as to identify the factors that contribute to the ecological state of land resources. Leova district is located in the southwest of the Republic of Moldova, on the border with Romania, along the left bank of the Prut river. The district has an area of 764.7 km<sup>2</sup>, representing 2.26% of the total area of the country. The natural resources of the district are forests, rivers and ponds. The underground natural wealth is represented by deposits of sand, clay, clay, bentonite, mineral waters. Of the total area of the district of 76.5 thousand ha, the agricultural land constitutes 57.3 thousand ha, and the non-agricultural land constitutes 19.2 thousand ha.*

**Key words:** *environmental protection, deposits, land resources, Leova district.*

**EXPLOITATION OF AGRICULTURAL LAND -  
RESULT OF THE INTENSIFICATION OF LAND SUBJECT  
TO DEGRADATION IN THE NISPORENI DISTRICT**

**Olesea COJOCARU, Alexandru VERBIȚCHI**

Technical University of Moldova, 50 Mircesti Street, Chisinau,  
Republic of Moldova

Corresponding author email: [olesea.cojocaru@am.utm.md](mailto:olesea.cojocaru@am.utm.md)

***Abstract***

*In recent decades, the intensification of multiple forms of soil degradation has been recorded, especially that through erosion due to inappropriate intensive exploitations. The purpose of the research is to examine the condition of the agricultural lands in the Nisporeni district and what is the weight of their exploitation, by proposing measures to remedy them. Nisporeni district is located in the central part of Moldova, in the wooded area. Nisporeni district is a component of the „Siret-Prut-Nistru” Euroregion. The geographical position favors access, communications and trade of the district at the border with the European Union. In the structure of agricultural holdings, the lowest share of multi-year plantations is in Frontier and in the North-West. Over 50% of the district’s land fund is concentrated in the Nisporeni and Nord-Est microzones, which also own over 46% of agricultural land and approx. 60% of the forest fund. The cost of washed soil is about 1.85 billion lei, and the cost of agricultural production losses - about 0.873 billion lei. Thus, the direct and indirect damage caused by erosion is 2.723 billion lei.*

***Key words:*** agricultural lands, exploitation, degradation, Nisporeni district.

## ***Lumbricidae* FAMILY IN BROWN FOREST SOILS: ABUNDANCE, BIOMASS, PROFILE DISTRIBUTION**

**Andriana DANILOV, Irina SENICOVSCAIA**

Institute of Pedology, Agrochemistry and Soil Protection “Nicolae Dimo”,  
100 Ialoveni Street, MD 2070, Chisinau, Republic of Moldova

Corresponding author email: [irina\\_sen@mail.ru](mailto:irina_sen@mail.ru)

### ***Abstract***

*The Lumbricidae family of brown forest soils in natural and agricultural ecosystems located in the central zones of the Republic of Moldova has been investigated in May, 2021 and 2022. Earthworms sampling was carried out from test cuts by manual sampling of soil layers to the depth of soil fauna occurrence. The number and biomass of Lumbricidae family in natural brown soils are greater by 3.8-17.9 times and by 2.6-16.5 times compared to brown soils of agricultural ecosystems. The highest values of abundance and biomass of earthworms were registered in the typical brown forest soils under natural vegetation and the smallest values - in arable luvic brown forest soils. A characteristic feature of the natural brown soils is the high concentration of invertebrates and Lumbricidae family in the upper layers of soils. The species Lumbricus terrestris, Lumbricus rubellus, Aporrectodea caliginosa and Aporrectodea longa and other were identified in the faunal samples from the natural brown forest soils.*

**Key words:** *Lumbricidae family, brown forest soil, natural and agricultural ecosystems.*

**ABUNDANCE AND DIVERSITY OF *Carabidae*  
FAMILY IN SOILS OF THE REPUBLIC OF MOLDOVA**

**Andrei DANILOV, Irina SENICOVSCAIA**

Institute of Pedology, Agrochemistry and Soil Protection “Nicolae Dimo”,  
100 Ialoveni Street, MD 2070, Chisinau, Republic of Moldova

Corresponding author email: [irina\\_sen@mail.ru](mailto:irina_sen@mail.ru)

***Abstract***

*The family of Carabidae in soils of natural and agricultural ecosystems located in the different zones of the Republic of Moldova has been investigated in May and August, 2021. Carabids sampling was carried out from test cuts by manual sampling of soil layers to the depth of soil fauna occurrence. Abundance of Carabidae family in natural soils is much greater compared to soils of agricultural ecosystems. Carabids were practically absent in arable soils at the time of sampling. The share of Carabidae family in the total abundance of invertebrates in forest soils of natural ecosystems constitutes of 2.1-9.6%, in chernozems - 3.0-10.2%. The base mass of Carabidae family in soils under natural vegetation is located in the litter and 0-10 cm layer. Species of the Carabus nemoralis, Carabus granulatus, Harpalus affinis, Harpalus rufipes, Calosoma inquisitor and others were identified in the faunal samples from soils in natural ecosystems.*

**Key words:** *Carabidae family, forest soil, chernozem, natural and agricultural ecosystems.*

## FORMATION OF SOIL STRUCTURE OF CHERNOZEMS IN DIFFERENT AGROECOSYSTEMS

**Yurii DEHTIAROV**

State Biotechnological University, 44 Alchevskyh Street,  
Kharkiv, Ukraine

Corresponding author email: [degt7@ukr.net](mailto:degt7@ukr.net)

### ***Abstract***

*In order to preserve the satisfactory functioning of agroecosystems of the Left Bank of Ukraine in the context of global warming, based on the results of soil structure formation studies, proposals can be made for the reproduction of fertility and protection of chernozem soils and rational land use. Soil organic matter and soil biota have a leading influence in soil structure formation. It is established that the best structured variants of agroecosystems with the addition of organic and organo-mineral fertilizers. Such agrochernozems have the highest content of organic soil and the highest biogenicity indicators. The biogenicity index is calculated by the percentage of the number of ecological and trophic groups of microorganisms.*

**Key words:** *soil structure, chernozem, organic part of soil, biological activity of soil.*

**RESEARCH ON THE INFLUENCE  
OF THE CONSERVATIVE TILLAGE SYSTEM  
ON MAIZE CULTURE, AN AGROTECHNICAL  
AND ECONOMIC ALTERNATIVE FOR SUSTAINABLE  
AGRICULTURE, UNDER THE CONDITIONS  
OF A.R.D.S. PITESTI - ALBOTA**

**Ilie Cătălin DINUȚĂ<sup>1,2</sup>, Doru Ioan MARIN<sup>1</sup>**

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Agricultural Research and Development Station Pitesti,  
Pitesti-Slatina Road km 5,117030, Pitesti, Romania

Corresponding author email: catalindinuta@yahoo.com

***Abstract***

*The research was carried out in the experimental field in the ARDS Pitesti area on the typical luvosol soil. The paper contains results obtained in 2022 regarding the effect of pedomeliorative and basic soil works - classic and unconventional system direct sowing - on agricultural maize crops. The yields were influenced by the factors studied (scarified, nonscarified; the working depth of the basic soil works), but also by the climatic conditions recorded during the research period. The average grain maize yield in 2022 was 7707 kg/ha in the conventional system with the scarified soil variant and 6681 kg/ha in the conventional system with the nonscarified soil variant with a difference of 1026 kg/ha in the advantage of the scarified soil variants. From an economic point of view, the most efficient soil tillage system, in the ARDS Pitesti Albota area, for maize culture is the conventional deep plowing scarified system that ensures superior profitability compared to the conservative system sown directly because of the achieved yield.*

***Key words:*** direct sowing, economic efficiency, maize yield, tillage system.



## DEVELOPMENT OF A BIOFERTILIZATION TECHNOLOGY BASED ON MYCORRHIZAE

**Marina Alina DRAGOTA, Ștefana JURCOANE**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: marina.dragota@ic-cim.company

### ***Abstract***

*The importance of mycorrhiza for the plant is not limited to the absorption of water and nutrients from the soil. Symbiotic plants are often more competitive and more tolerant to environmental stress than those without mycorrhizae. Here we can give an example of osmotic stress, mycorrhizae make plants more resistant to cold weather (below 15 degrees). Arbuscular mycorrhizal fungi colonize the roots of most monocotyledons and dicotyledons despite their different root architecture and cell patterning. Key Result Large lateral roots are preferentially colonized, and fine lateral roots are immune to arbuscular mycorrhizal colonization. Fungal preference for large lateral roots also occurred in sym mutants that block colonization of the root beyond rhizodermal penetration.*

**Key words:** *biotechnology, mycorrhizae, wheat, roots.*

**INFLUENCE OF BIODESTRUCTOR  
ON DECOMPOSITION OF CROP RESIDUES  
AND HUMUS CONDITION OF TYPICAL CHERNOZEM**

**Vladyslava FOMENKO, Alla KAZIUTA**

State Biotechnological University, p/o Dokuchayevs'ke-2,  
Building 4, Kharkiv, Ukraine

Corresponding author email: [log.horizont@gmail.com](mailto:log.horizont@gmail.com)

***Abstract***

*The study examined the composting of agricultural plant residues during the summer period of 2021 in typical chernozem soil. The mass of plant residues decreased during composting, with the use of a destructor resulting in a greater loss of plant material. Different rates of decomposition were observed for residues of different crops, and surface residues generally decomposed more rapidly than root residues. Changes in total humus content were also observed, with an increase in the humus content during composting of wheat and barley residues without a destructor. However, most variants with a destructor showed negative changes in the content of total humus. The study found that humification processes took place only in the version with winter wheat and spring barley, and the use of a destructor led to a decrease in the intensity of humification processes or to the passage of dehumification processes. Overall, the study highlights the importance of considering the impact of crop residues and the use of a destructor on soil quality and nutrient cycling.*

**Key words:** *typical chernozem, crop residues, stubble destructor, winter wheat, spring barley, maize, sunflower.*

## INFLUENCE OF CROP SPECIES ON SOIL MICROBIAL ABUNDANCE AND DIVERSITY

**Andrei-Mihai GAFENCU, Andreea-Mihaela FLOREA,  
Florin-Daniel LIPȘA, Eugen ULEA**

“Ion Ionescu de la Brad” Iasi University of Life Sciences,  
3 Mihail Sadoveanu Alley, 700490, Iasi, Romania

Corresponding author email: [agafencu@uaiasi.ro](mailto:agafencu@uaiasi.ro)

### **Abstract**

*Agricultural crop species can influence the soil microbial population through the influence of root exudates, which compounds released by plant roots into the soil. Some crop species exude compounds that are more beneficial for certain groups of microbes, while others exude compounds that inhibit the growth of certain groups. Additionally, different crop species have different root systems, which can affect the physical structure of the soil and the availability of water and nutrients, which in turn can influence the soil microbial population. Moreover, crop species can also influence the soil microbial population by changing the soil pH and the level of organic matter. Crop species that produce large amounts of biomass can increase the amount of organic matter in the soil, which can support a greater diversity of microorganisms. Maize and soybean are some of the most important agricultural crop globally. Both corn and soybean are important crop species for the global food system and also for the economy of many countries, including Romania. A study was conducted to determine the composition of the soil microbial community in the rhizosphere of maize (*Zea mays* L.) and soybean (*Glycine max* (L.) Merrill.) at different phenological stages and to determine whether the two crops influence the microbiological abundance and diversity in the soil.*

**Key words:** *soil microbial communities, maize, soybean.*

## INFLUENCE OF DIFFERENT AGRICULTURAL MANAGEMENT PRACTICES ON SOIL MICROBIOME

**Andrei-Mihai GAFENCU, Andreea-Mihaela FLOREA,  
Florin-Daniel LIPȘA, Eugen ULEA**

“Ion Ionescu de la Brad” Iasi University of Life Sciences,  
3 Mihail Sadoveanu Alley, 700490, Iasi, Romania

Corresponding author email: [agafencu@uaiasi.ro](mailto:agafencu@uaiasi.ro)

### ***Abstract***

*Microbiomes are the collection of all microbial inhabitants of a given system. At the level of the soil, the microbiome includes four major groups of microorganisms: bacteria, fungi, archaea, and protozoa, as they are the main organisms for essential soil processes such as nutrient cycling, decomposition of organic matter, and plant growth promotion. A healthy soil microbiome is essential for sustainable agriculture and the overall health of terrestrial ecosystems. Some agricultural management practices, i.e. irrigation, can have a significant impact on the soil microbiome. The quality and quantity of irrigation water can affect the abundance and diversity of microorganisms in the soil. For example, excess irrigation can lead to waterlogging, which can create anaerobic conditions that favour the growth of certain types of bacteria. On the other hand, irrigation water in the right amounts can have a positive impact on the soil microbiome and promote plant growth. To test this hypothesis in the agricultural year 2022, a research was carried out on maize and soybean grown under irrigated conditions, to analyse the variations of microbial density during the vegetation period.*

**Key words:** *soil microbiome, soil bacteria communities, soil microbiota.*

## CHARACTERISTICS OF SOME NEW VARIETIES AND LINES OF WHEAT UNDER THE YEAR 2021-2022 CONDITIONS

Robert Marian GHEORGHE<sup>1,2</sup>, Cristina Mariana NICOLAE<sup>1</sup>

<sup>1</sup>Agricultural Research and Development Station Pitești,  
5 Pitești-Slatina Road, 117030, Pitești, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, 011464, Bucharest, Romania

Corresponding author email: gheorghemarianrobert@yahoo.com

### **Abstract**

*And in the conditions of luvic soils, a series of new characters were obtained in winter wheat lines. Compared to the control varieties, Trivale and Ursita, the 4 new lines obtained showed a number of improved characteristics. Thus, lines A4-10 and A57-14 approached the size of the Trivale variety, and in culture all these lines showed a very good uniformity. In terms of the ear formed, the new lines have surpassed those of the Trivale variety in length. Spike weight was superior to A4-10 and A57-14. The number of grains in a spike was higher in the A57-14 line (42.0 grains). Under the same conditions, the weight of the grains in one ear in the lines A4-10 and A57-14 again exceeded the Trivale variety. Line A57-14 slightly outperformed the new Ursita wheat variety. Positive correlations were obtained between grain yield and crude protein (CP%) and between PB and wet gluten (WG%). From the results obtained with the new winter wheat lines, a genetic progress was found, which recommends the future steps for homologation.*

**Key words:** *luvic soil, morphology, new wheat lines, production and quality.*

**THE CHARACTERISTICS OF THE ADSORPTIVE  
COMPLEX AND THE REACTION OF SOILS  
SUBJECTED TO HIGH ANTHROPOGENIC PRESSURE  
FROM THE COPȘA MICĂ AREA**

**Goji GYŐZŐ<sup>1</sup>, Ioana Andra VLAD<sup>2</sup>, Bartha SZILÁRD<sup>2</sup>**

<sup>1</sup>Tehnological High School “Stefan Manciulea”, 3 Piata 1848, Blaj, Romania

<sup>2</sup>University of Oradea, 26 General Magheru Street, Oradea, Romania

Corresponding author email: barthaszilard10@yahoo.com

***Abstract***

*Anthropogenic pollution triggers a series of processes that also affect the bioavailability of nutrients, the soil being a key element in food security and sustaining biodiversity. The purpose of this research is to identify the influence of the soil reaction and the values of the adsorptive complex indices (SH, SB, CEC, V) on the nutritional status of the soils around the town of Copșa Mică in the context of over 70 years of pollution). Soil pH is a reliable indicator of chemical transformations and a predictor of possible deficiencies or toxicity of elements necessary for plant physiology. The adsorptive complex indices have a diagnostic and prognostic role on the health of the soils, reflecting the degree of nutrient supply. In the 13 sample areas, the soil reaction varies from very strongly acidic to weakly alkaline, an important role being attributed to the influence of the orography of the land and the local pollutant-dispersing microclimate. The dynamics of the determined or calculated values of the adsorptive complex indices vary depending on the sampling depth and the investigated SP.*

***Key words:*** adsorptive complex indices, soil reaction, Copșa Mică area.

## AGRO-CLIMATOGENIC NEOHYDROMORPHISM: PLACE IN THE EVOLUTION OF ARABLE CHERNOZEMS

Gheorghe JIGĂU<sup>1</sup>, Boris TURCHIN<sup>1</sup>, Sergiu DOBROJAN<sup>1</sup>,  
Tatiana CIOLACU<sup>2</sup>, Galina DOBROJAN<sup>1</sup>

<sup>1</sup>State University of Moldova, 65 Cogalniceanu M. Street,  
Chisinau, Republic of Moldova

<sup>2</sup>Institute of Ecology and Geography, 1 Academiei Street,  
Chisinau, Republic of Moldova

Corresponding author email: gheorghe.jigau@gmail.com

### **Abstract**

*The evolution of chernozems within the current phase of anthropo-natural pedogenesis is influenced by the agro-climatogenic neohydromorphism whose development is determined by the modification of the atmospheric precipitation regime caused by climate change and the physical degradation of soils induced by agrogenesis. The latter manifests itself in the reduction of water permeability, the hydraulic conductivity of soils and the overwetting of their upper and middle segments during periods of heavy rainfall. As a result, within the space with an advanced degree of physical degradation, the automorphic-non-percolative hydric regime is replaced by the stagnant-non-percolative hydric regime (ephemeral, periodic, permanent) and the derno-chernosiomic pedogenesis is replaced by the hydrometamorphic one. Within it, the evolution of soils is determined by the processes induced by overwetting: gleyzation, montmorillonitization, metastructuring.*

**Key words:** non-percolating stagnant water regime, gleyzation, montmorillonitization, structure degradation, differential porosity.

## COMPACTION OF ARABLE CHERNOZEMS: PEDOFUNCTIONAL AND AGROTECHNOLOGICAL CONSIDERATIONS

**Gheorghe JIGAU<sup>1</sup>, Tatiana CIOLACU<sup>2</sup>, Boris TURCHIN<sup>1</sup>,  
Sergiu DOBROJAN<sup>1</sup>, Galina DOBROJAN<sup>1</sup>**

<sup>1</sup>State University of Moldova, 65 Cogalniceanu M. Street,  
Chisinau, Republic of Moldova

<sup>2</sup>Institute of Ecology and Geography, 1 Academiei Street,  
Chisinau, Republic of Moldova

Corresponding author email: gheorghe.jigau@gmail.com

### ***Abstract***

*The contemporary evolution processes of arable chernozems lead to the modification of the indices of the agrogen layer settlement state materialized in the change of the ratio between the mass and the volume of the soil phases in the evolutionary-genetic sequence: compaction → overcompaction → settling → vertisolation. It is favored by the high proportion of interaggregate pores, humus loss, disaggregation and destructuring of soil, the increased content of fine clay (<0.001 mm) in the physical clay (<0.01 mm), the low degree of saturation of physical clay with humus, the high proportion of smectite-montmorillonites in the composition of clay minerals of the fine clay fraction. The modification of the settlement indices conducts to the establishment of some regimes and processes in soils with an impact on the direction and intensity of the evolution processes of chernozems in arable regime, with the involvement of new mechanisms and processes uncharacteristic for native chernozems: compaction and overcompaction of structural aggregates, eluviation of finely dispersed clay from the arable layer to the sub-arable layer, reduction of the intensity of the chernozemous process. These lead to the detachment of the arable chernozems from the native ones and implies the need to establish a new management paradigm of arable chernozems in the framework of bioremedial adaptive-landscape technologies.*

**Key words:** *compaction, differential porosity, humus loss, vertisolation, settling.*



## REDOX REGIME OF ALLUVIAL SOILS IN THE SIVERSKY DONETS BASIN

Oleksandr KAZIUTA<sup>1</sup>, Alla KAZIUTA<sup>1</sup>, Nataliia PALAMAR<sup>2</sup>

<sup>1</sup>State Biotechnological University, 44 Alchevskikh Street, Kharkov,  
61002, Ukraine

<sup>2</sup>NSC ISSAR n.a. Sokolovskiy, 4 Chaikovska Street, Kharkov,  
61000, Ukraine

Corresponding author email: [poshvoshka@gmail.com](mailto:poshvoshka@gmail.com)

### ***Abstract***

*Alluvial soils are a special product of pedolithogenesis, which takes place in floodplain conditions. Their formation is associated with the passage of floodplain and flood processes. This leads to the formation of soils that have maximum biogenicity and fertility levels. Changes in the conditions of soil formation during the year (changes in the level and composition of groundwater, the presence or absence of floods, features of the activity of the biological factor) cause changes in the physical and chemical parameters of soils, the intensity of the passage of biochemical processes, which is necessarily reflected in redox processes. This relationship is not only direct, but also reverse. The indicators of the redox potential of alluvial soils of the floodplains of the rivers of the Siversky Donets basin are given in the article. They were determined by the seasons of the year in layers at depths from 0 to 40 cm. The ORP level was determined in the field using the potentiometric method. Both for soil layers and for the seasons of the year, the indicators of the redox potential indicate the passage of reduction processes, and only in summer these processes can have the character of low-intensity oxidation. The restoration processes in the soil are most intense in spring. The bog alluvial soils of the near-Teras depression are characterized by more pronounced processes of reduction, as evidenced by the minimum values of the redox potential.*

**Key words:** *alluvial soil, floodplain, redox potential.*

**CONTENT OF MACRONUTRIENTS  
OF MALTING BARLEY IN DEPENDENCE  
OF NITROGEN NUTRITION LEVEL**

**Svetla KOSTADINOVA**

Agricultural University of Plovdiv, 12 Mendeleev Blvd,  
Plovdiv, Bulgaria

Corresponding author email: svetlak@au-plovdiv.bg

***Abstract***

*Macronutrients content of five barley varieties was studied at three levels of nitrogen 0, 200, and 400 mg N/kg soil. It was found that the Kristi variety had a low grain protein content of 8.8% on average. Obzor, Krami and Kaskadior varieties increased the crude protein in the grain to 12.3%–13.0% at the  $N_{400}$  level. Strong positive correlation was proven between the soil nitrogen and grain protein ( $r=0.993^{**}$ ). Added nitrogen ( $N_{400}$ ) increased the straw nitrogen content from 0.51% ( $N_0$ ) to 0.74% N. The Krami variety showed a higher concentration of grain phosphorus 0.87%  $P_2O_5$ , on average. The grain potassium content slightly depended on the variety. Varieties grown at  $N_{400}$  level had a higher concentration of potassium at maturity and of phosphorus in the grain than the plants at  $N_0$ . Calcium content of grain was higher in Emon and Kristi varieties (0.30 and 0.29% CaO, respectively), and in straw in Kristi and Kaskadior (1.10, and 1.14% CaO, respectively). Nitrogen level had a little effect on the calcium and magnesium contents. Their average concentrations of barley grain were 0.28% CaO and 0.12% MgO at  $N_{400}$  variant.*

**Key words:** mineral composition, malting barley, nitrogen.

## LEACHING OF THE BASIC NUTRIENTS FROM IRRIGATED SOILS OF THE DRY SUBTROPICAL ZONE OF AZERBAIJAN

Tamara LEAH<sup>1</sup>, Goshgar MAMMADOV<sup>2</sup>, Turan MAMMADOV<sup>3</sup>

<sup>1</sup>Institute of Soil Science, Agrochemistry and Soil Protection “Nicolae Dimo”,  
100 Ialoveni Street, Chisinau, 2070, Republic of Moldova

<sup>2</sup>Institute of Soil Science and Agrochemistry, Ministry of Science and  
Education, M. Rahim 5, Baku, 1073, Republic of Azerbaijan

<sup>3</sup>Bursa Uludag University, Gorukle, Campus 16059 Nilufer, Türkiye

Corresponding author email: tamaraleah09@gmail.com

### **Abstract**

*The article presents the results of researches on the influence of water consumption and the length of the irrigation furrow on the leaching of nutrients and humus from irrigated soils of dry subtropics of Azerbaijan under tomato cultivation. The effect of different fertilization systems on tomato yields was also investigated. With a slope in a 100 - meter furrow at a water flow rate of 3.0 l/s, the content of leachable biogenic elements (N, P) and humus with soil was 0.03% for nitrogen, 0.02% for phosphorus and for humus 0.07%. Increasing water flow from 3.0 l/s. up to 3.5 l/s negatively affects the leaching of humus and nutrients from the soil. With an increase in water consumption to 3.5 l/s, these indicators increased markedly by 0.01% for nitrogen and phosphorus, and by 0.02% for humus. It was found that with an increase in the length of the furrow to 200 meters, at the same norms, the flow of water, leaching of humus and nutrients was not observed. Using of an organic-mineral fertilizer system had a positive effect on the yield of tomato. So, in the free-fertilized variant, the tomato yield was 0.32 t/ha per at 100 m furrow.*

**Key words:** leaching of the basic nutrients, irrigated soils, fertilizers system.

## THE EFFECTS OF THE APPLICATION OF ORGANIC AND MINERAL FERTILIZERS IN LONG-TERM EXPERIMENTS

Nicoleta MARIN<sup>1</sup>, Paul KURTINETZ<sup>2</sup>, Carmen SÎRBU<sup>1</sup>,  
Patrick URSAN<sup>2</sup>, Lavinia BURTAN<sup>1</sup>

<sup>1</sup>National Research and Development Institute for Soil Science,  
Agrochemistry and Environment - ICPA Bucharest,  
61 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Agricultural Research Station Livada, Satu Mare, Romania

Corresponding author email: author\_ursanpatrickandrei71@gmail.com

### **Abstract**

*The paper presents the results of soil samples obtained from a long-term experience at Livada (Satu Mare County). The experiment carried out was of bifactorial type with variants fertilized with manure and mineral fertilizers with nitrogen and phosphorus. Manure was applied once every 5 years in 4 doses (0t/ha, 20t/ha, 40t/ha and 60t/ha) and mineral fertilizers in 4 doses (N0P0, N50P0, N50P50, N100P100 kg/ha) annually. The obtained results showed that in the variants fertilized only with manure, the content of mobile potassium increased very significantly for all applied doses, from 162mg/kg in the control variant to 239 mg/kg in the variant fertilized with 60t/ha. Fertilization with nitrogen and phosphorus determined significant and very significant accumulations of nitrogen, mobile phosphorus, the potassium content having a decreasing trend. The humus content of the soil increased significantly when applying 40 t/ha and 60 t/ha. Productions were reduced in all experimental variants, the year 2022 being a very dry year.*

**Key words:** organic matter, mineral fertilization, long-term experience.

## **MODIFICATION OF THE LIMIT VALUES FOR SOIL LOADING WITH PETROLEUM HYDROCARBONS - A REVIEW**

**Nicoleta MARIN, Mihail DUMITRU, Carmen SÎRBU**

National Research-Development Institute for Soil Science, Agricultural  
Chemistry, and Environment - ICPA Bucharest, 61 Marasti Bldv,  
011464 Bucharest, Romania

Corresponding author email: marinnicoleta37@yahoo.com

### ***Abstract***

*This paper aims to synthesize relevant information and propose new limits for the degree of soil loading with petroleum hydrocarbons, considering the proven effects of soil pollution. It is noted that many organic pollutants can undergo a continuous process in soil, resulting in the concentration of the contaminant decreasing over time, although it can still be detected by laboratory analysis. The use of certain plant species can help remediate oil-polluted soils. In Romania, approximately 50,000 hectares were affected by oil and/or salt water pollution, and biodegradation was the main rehabilitation mechanism. The research and results presented highlight the complexity of bioremediation measures in areas polluted with oil residues, in order to obtain the cleanest possible environment. At the same time, it is noted that the classifications in different pollution classes, as well as the screening limits or thresholds, have not always been recommended precisely, often being even overestimated, and require reconsideration. In order to establish measures of oil biodegradation and to assess the associated environmental risk, knowledge of its bioaccessibility is crucial.*

**Key words:** *biodegradation, petroleum hydrocarbons, pollution, soil, toxicity.*

## ECONOMIC EFFICIENCY OF SOILS FROM BANAT'S VINEYARDS

**Casiana MIHUȚ, Anișoara DUMA COPCEA, Lucian NIȚĂ,  
Adalbert OKROS, Simona NIȚĂ, Daniel POPA,  
Vlad MIRCOV, Corina ȘÎRBU**

University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Romania

Corresponding author email: [casiana\\_mihut@usab-tm.ro](mailto:casiana_mihut@usab-tm.ro)

### *Abstract*

*This paper presents a qualitative evaluation of soils from the main vineyards of Banat, generally recognized by its red wines. Strictly viewed from a qualitative point of view, the soils cultivated with grapevines fall into the medium or low fertility category. However, if certain requirements are met - exposition, slope, soil land climate conditions – these soils can ensure the necessary conditions for cultivating grapevines and obtaining high and good quality productions. The geological conditions in which the soils of this area have been formed and evolved - in Moldova-Nouă, on shale, quartz and calcite; in Buziaș, on carbonate clays; and Recaș and Tyrol, on poorly reddish and slightly carbonated clays and loams.*

**Key words:** soil, vineyard, economic efficiency, fertility.

## BIOFORTIFICATION OF MAIZE WITH ZINC

Irina-Ramona MORARU<sup>1</sup>, Andrei VRÎNCEANU<sup>1,2</sup>, Mihaela LUNGU<sup>1</sup>,  
Anca-Rovena LĂCĂTUȘU<sup>1</sup>

<sup>1</sup>National Research and Development Institute for Soil, Agrochemistry  
and Environment, 61 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>“Dunarea de Jos” University of Galati, 47 Domneasca Street,  
800008, Galati, Romania

Corresponding author email: vranceanugeorgeandrei@gmail.com

### **Abstract**

*The article presents the experimental results obtained in the greenhouse to demonstrate the efficacy of administering zinc to the soil, plant, and seed in order to reduce the incidence of zinc deficiency in maize. For the experimentation in vegetation pots, a late hybrid FAO 430 and an organo-mineral material constituted from topsoil originating from a soil of the calcaric chernozem type, characteristic of the south-eastern region of Romanian Plain which received different treatments with  $\text{CaCO}_3$ ,  $\text{KH}_2\text{PO}_4$  and  $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ , were used. At 3 to 10 days intervals, phenological observations were made on maize plants, and at the end of the experiment, soil and plant samples were collected and analysed in the laboratory. According to obtained data, the most effective method for biofortification of plants with zinc, among the three methods of administration, was the application of zinc to seed. According to an analysis of the absorption of nutritional elements by maize plants, it can be stated that the administration of the microelement both in soil and on seed are optimal methods for biofortifying maize plant with zinc, with practically identical performance.*

**Key words:** zinc, maize, biofortification, soil, greenhouse.

**INFLUENCE OF APPLIED TECHNOLOGIES  
ON THE PHYSICO-CHEMICAL PROPERTIES  
OF SOILS IN PERIȘORU AREA, CĂLĂRAȘI COUNTY**

**Iulian Bogdan MUȘAT, Valentina Mihaela VASILE,  
Mircea MIHALACHE**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: [mihaelapetcu2505@yahoo.com](mailto:mihaelapetcu2505@yahoo.com)

***Abstract***

*The studied area is located the north-eastern part of Călărași County, belonging to the cadastral territory Perișoru, currently used as arable. The pedological mapping was carried out with the purpose of identifying the zonal soil, by assessing its fertility as well as the influence of applied technologies on the physico-chemical properties of the soil. A soil profile and several surveys were opened from which soil samples were collected in natural and modified settlement, for morphological, physical and chemical analysis. The soil type identified is represented by typical chernozem, vermic with undifferentiated loamy texture on the profile. The main physical characteristics (bulk density, total porosity and compaction degree), chemical (soil reaction, humus content, nitrogen, phosphorus, potassium) and hydrophysical indices were determined by indirect methods. Applying high-performance culture technologies, they highlighted the improvement of the aforementioned characteristics, by creating a favorable aerohydric regime and implicitly important production increases.*

***Key words:*** bulk density, total porosity, compaction degree, typical chernozem, performance technologies.



## INTRA-FIELD SPATIAL HETEROGENEITY PREDICTION FOR THE PURPOSES OF PRECISION FARMING: COMPARISON OF FREQUENCY RATIO AND SHANNON’S ENTROPY MODELS

Tamara MYSLYVA<sup>1</sup>, Petro NADTOCHIY<sup>2</sup>, Yurii BILYAVSKIY<sup>3</sup>,  
Petro TROFYMENKO<sup>4</sup>

<sup>1</sup>Polytechnic College Suriname, Slangenhoutstraat, 99A, Paramaribo,  
Republic of Suriname

<sup>2</sup>Institute of Agriculture of Polissia NAAS of Ukraine, Kyiv highway,  
132, 10132, Zhytomyr, Ukraine

<sup>3</sup>Zhytomyr Agricultural Technical Professional College, 96 Pokrovska Street,  
10008, Zhytomyr, Ukraine

<sup>4</sup>Taras Shevchenko National University of Kyiv, 60 Volodymyrska Street,  
01033, Kyiv, Ukraine

Corresponding author email: byrty41@yahoo.com

### **Abstract**

*This paper provides the results of assessing the possibility of using frequency ratio (FR) and Shannon’s entropy (SE) models to predict the intra-field spatial heterogeneity zones (IFHZ) which are taken into account when performing various technological processes in precision farming. The studies were carried out in 2021-2022 in the Radomyshl community of Zhytomyr raion (Zhytomyr oblast, Ukraine) in an area of 6.602 km<sup>2</sup>. To determine IFHZ, nine soil parameters were used, the suitability of which for prediction was determined by multicollinear analysis. These data include the hydrolytic acidity, nitrogen, phosphorus and potassium content, the soil buffer balance index, and B, Mo, Cu, and Zn content. The area under the receiver operating characteristic (AUROC) method has been utilised to validate both FR and SE models. The research suggests that the AUROC curve for SE (0.84) was better than that for FR (0.82). Hence, the SE model predicts IFHZ more accurately than the multivariate statistical model FR in the study area.*

**Key words:** *intra-field heterogeneity, forecasting; frequency ratio, Shannon’s entropy, model comparison.*

**RESEARCHERS ON THE INFLUENCE  
OF THE SOWING TIME ON THE BIOLOGY  
AND CULTIVATION TECHNOLOGY  
OF THE *Dracocephalum moldavica* SPECIES,  
UNDER THE CONDITIONS OF INCDS CZ BRASOV**

**Sorina NIȚU (NASTASE)<sup>1</sup>, Răzvan-Damian NIȚU<sup>2</sup>,  
Emilia CONSTANTINESCU<sup>3</sup>**

<sup>1</sup>National Institute of Research and Development for Potato and Sugar Beet  
Brașov, 2 Fundaturii Street, 500470, Brașov, Romania

<sup>2</sup>University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca,  
3-5 Calea Manastur, 400372, Cluj-Napoca, Romania

<sup>3</sup>University of Craiova, Faculty of Agronomy, Libertatii Street,  
Craiova, Dolj County, Romania,

Corresponding author email: emiliaconst2000@yahoo.com

***Abstract***

*The main aim of this research was to improve the knowledge of cultivation of *Dracocephalum moldavica* L., by studying some aspects of biology and technology, adaptability to environmental conditions; the studies were carried out at NIRDPSB Brașov, within the Laboratory of Technology and Good Agricultural Practices, Department of Medicinal and Aromatic Plants. Originally cultivated in Central Asia and acclimatized in Central and Eastern Europe, *Dracocephalum moldavica* L. is traditionally used for medicinal and aromatic purposes and is also a valuable honey plant. In order to determine the optimal sowing time for *Dracocephalum moldavica* L., an experiment with 5 planting variants was set up in three replications, following the randomized block method, during 2015 - 2018. The area of a plot was 7.5 m<sup>2</sup>, the experimental area including paths was 142.5 m<sup>2</sup>; the number of plants per variant was 60 plants, and the total per experiment was 900 plants.*

***Key words:*** *Dracocephalum moldavica* L., biology, conditions, planting, tehnology.

## THE INFLUENCE OF LONG-TERM ANTHROPOGENIC LOAD ON THE MIGRATION OF MOBILE ALUMINUM COMPOUNDS, PHYSICAL AND CHEMICAL PROPERTIES OF ALBIC STAGNIC LUVISOL

Yuriy OLIFIR, Anna HABRYEL, Oleh HAVRYSHKO,  
Tetiana PARTYKA, Hryhoriy KONYK, Nadiia KOZAK

Institute of Agriculture of Carpathian Region of National Academy  
of Agrarian Sciences of Ukraine, 5 Hrushevskoho Street, Obroshyne,  
81115, Lviv Region, Ukraine

Corresponding author email: [olifir.yura@gmail.com](mailto:olifir.yura@gmail.com)

### **Abstract**

*FAO singles out acidic soils, which are widespread in Ukraine, as problematic soils. At the same time, the role of aluminium in soil acidity formation and aluminium toxicity is becoming increasingly important. The study was conducted in a long-term stationary experiment and under conditions of natural analogues of Albic Stagnic Luvisol under forest and fallow land. It was found that cultivation and long-term use of different doses of fertilizers and lime change the content of mobile aluminium compounds, physical and chemical properties of not only the upper humus horizons but also affect the lower horizons and soil formation processes. The highest content of mobile aluminium compounds, 110.3-121.5 mg/kg of soil, is accumulated in the upper humus horizons in the control without fertilizers. With prolonged mineral fertilization, the highest content of mobile aluminium compounds (148.1 mg/kg) is concentrated in the illuvial-eluvial horizon. In the soil under the forest, the highest content of mobile aluminium is accumulated in the upper humus horizons A<sub>Eg</sub>, E<sub>hg</sub> and is 210.6 and 183.0 mg/kg of soil, respectively, with the lowest pH<sub>KCl</sub> value of 3.72 and the highest hydrolytic acidity of 9.73 mg-eq/100 g of soil. The content of mobile aluminium ranges on the fallow land from 54.3 in A<sub>Eg</sub> to 55.7 mg/kg in the C<sub>g</sub> horizon, i.e. it is characterized by its uniform distribution.*

**Key words:** acidity, aluminium, Albic Stagnic Luvisol, fertilizers, liming.

## SEARCHING POSSIBLE PGPR FROM NATURAL ECOSYSTEM

Önder ÖZAL<sup>1</sup>, Ali COŞKAN<sup>2</sup>

<sup>1</sup>International Agricultural Research and Training Center, Camikebir Mah.  
Menemen Maltepe yolu No: 27/1, 35660 Menemen, İzmir, Türkiye

<sup>2</sup>Isparta University of Applied Science, Faculty of Agriculture, Department  
of Soil Science and Plant Nutrition, 32200 Çünür, Isparta, Türkiye

Corresponding author email: onder.ozal@tarimorman.gov.tr

### **Abstract**

*The utilization of Plant Growing Promoting Bacteria (PGPR) holds significant importance in agricultural systems, especially as a biofertilizer. This study aimed to select effective PGPR for maize to improve yield and nutrient content in a greenhouse pot experiment. Forty-five bacteria were isolated from three different ecosystems as forest, organic farm site, and pasture. The results indicated that PGPR application increased macro nutrients ranging from 12.5% to 50% compared to the control. With the PGPR isolated from forest application, the micronutrient content of Fe, Zn, Mn, and Cu in maize increased around 100%, 20%, 60%, and 100%, respectively. In terms of physiological parameters such as fresh and dry biomass weight, plant height and stem diameter in maize plants were statistically significant than the control treatment. The results proved that PGPR isolated from various ecosystem applications had a more stimulating impact on macro micronutrient content and physiological parameters in maize plants than non-PGPR applications. In general, organic farming sites would be the more promising starting point for PGPR isolation.*

**Key words:** PGPR, ecosystem, nutrient, yield, maize.

## SUNFLOWER AND SOYBEAN CROPS CULTIVATED IN A MIXED INTERCROPPING SYSTEM, IN THE 2022

**Maria JOIȚA-PĂCUREANU<sup>1,2</sup>, Gabriel POPESCU<sup>1</sup>,  
Luxița RÎȘNOVEANU<sup>3,4</sup>, Laurențiu CIORNEI<sup>1</sup>, Ancuța BĂRBIERU<sup>2</sup>,  
Daniela OPREA<sup>2,5</sup>, Daniela TRIFAN<sup>3</sup>,  
Claudia DUNĂREANU<sup>6</sup>, Victor PETCU<sup>1,2</sup>**

<sup>1</sup>Center for Studies and Research for Agroforestry Biodiversity,  
“David Davidescu” Acad., Romanian Academy, Bucharest, Romania

<sup>2</sup>National Agricultural Research and Development Institute,  
Fundulea, 1 Nicolae Titulescu Street, 915200, Calarasi, Romania

<sup>3</sup>Agricultural Research Development Station Braila, Viziru km 9 Street,  
Braila County, Romania

<sup>4</sup>Bucharest University Economic Studies, Faculty of Agri-food &  
Environmental Economics, Research Center for Sustainable Development,  
6 Piata Romana Street, Bucharest 010374, Romania

<sup>5</sup>University of Agronomic Science and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>6</sup>Agricultural Research Development Station Simnic, 54 Balcesti Street,  
Craiova, Dolj, Romania

Corresponding author email: [claudia.borleanu@yahoo.com](mailto:claudia.borleanu@yahoo.com)

### **Abstract**

*The intercropping system employs growing several species in between each other, during the same season. Intercropping practices differ in arrangement, sowing time, and plant combination. Intercropping has significant advantages over monoculture farming, which aims to boost yields and more efficient usage of land and resources. The most fundamental intercropping benefits include increased profit, better pest management, improved weed management, and enhanced biodiversity and ecological stability. In 2022, an experiment was organized in the intercropping system, using sunflower and soybean crops. Ten sunflower hybrids and ten soybean varieties have been studied, regarding some morphological, and physiological characteristics, quality, and production. The results showed that even though the climatic conditions were not highly favorable for the crops developing, the seed and grain yields released by both crops were very good. There have been some differences between the experimented varieties and hybrids. The best varieties and hybrids, which can be cultivated in this system, can be recommended for the farmers in the studied area.*

**Key words:** sunflower, soybean, intercropping, advantages, biodiversity.

## MODERN APPROACHES FOR THE IMPLEMENTATION OF BACKGROUND SOIL MONITORING

**Irina PLISKO, Tatiana BYNDYCH**

National Scientific Center “Institute for Soil Science and  
Agrochemistry Research named after O.N. Sokolovsky”,  
4 Chaikovska Street, 61024, Kharkiv, Ukraine

Corresponding author email: [irinachujan@gmail.com](mailto:irinachujan@gmail.com)

### **Abstract**

*FAO's conclusions on the rate of soil degradation in the light of climate changes and the necessity of global soil monitoring actualize improvement of the methodology for research of reference or virgin soils. This is especially relevant for Ukraine, which is characterized by a high level of agricultural land plowing. Results of developing the fundamentals of multilevel thematic processing of satellite imagery data for diagnostics of virgin soil heterogeneity as the groundwork for establishing an information support system for soil research, as well as automated monitoring systems for agricultural land, are presented on the example of the soil studies of the Mikhailovskaya virgin land which is the only preserved area of virgin meadow steppe in the Forest-Steppe zone of Ukraine. Parameterization of soil properties and vegetation indices in classes derived from decoding of satellite imagery data and presented as a power-law probability distribution or geostatistical indicators are shown to provide a quantitative description of soil heterogeneity and are recommended for the purpose of comparison multitemporal satellite images as a high-sensitivity method to determine changes in their condition due anthropogenic influences.*

**Key words:** heterogeneity, geostatistical analysis, soil monitoring, virgin lands, remote sensing.

## THE DEGREE OF DEPENDENCY OF SOIL ECOSYSTEM SERVICES ON THE SOIL MICROBIOTA ACTIVITY

**Daniela RĂDUCU, Anca-Rovena LĂCĂTUȘU, Irina CALCIU,  
Alina GHERGHINA, Alexandrina MANEA, Olga VIZITIU**

National Research and Development Institute for Soil Science,  
Agrochemistry and Environment (RISSA-Bucharest),  
61 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: [alinagherghina@yahoo.com](mailto:alinagherghina@yahoo.com)

### ***Abstract***

*To reveal the degree of dependency of soil ecosystem services on soil biota activity, the detailed investigations at macroscopic - microscopic level had been used. At macroscopic level, the physical data showed a low to medium bulk density and consequently a high to medium porosity. The poral space quantified by the image analysis at microscopic level showed the dominance of the pores in the size classes of 100-300  $\mu\text{m}$  (equivalent pore diameter), the elongated pores being dominant. Among them the fine fissures delimitating the biological pedofeatures by the surrounding matrix were also included and represent the path for water and air circulation, creating thus hospitable conditions for the microorganisms developed on the biogenic pedofeatures surfaces. The micromorphological investigation showed textural differences in the macrofauna coprolites: many areas with skeleton grains concentrations depleted of plasmic material. But their further ingestion by the soil mezofauna resulted in the re-mixing of soil constituents, mezofauna proving to have an active role in the textural soil matrix restoration. Soil biota covered all the web food needs for the “factory fertility”: the main soil ecosystem service.*

**Key words:** micromorphology, image analysis, soil fauna, Chernozem, porosity.

**SMARAGD AS NEW CHELATED-GUMATIC  
PREPARATION FOR IMPROVING  
THE ENVIRONMENTAL STATE  
OF THE SOIL - PLANT SYSTEM**

**Valentina SAMOKHVALOVA<sup>1</sup>, Victor BUBLYK<sup>1</sup>,  
Yana POGROMSKA<sup>2</sup>**

<sup>1</sup>National Scientific Center “Institute for Soil Science  
and Agrochemistry Research named after O.N. Sokolovsky”,  
4 Chaykovska Street, Kharkiv, 61024, Ukraine

<sup>2</sup>State Enterprise “Experimental Economy Donetsk” of the National  
Scientific Center “Institute for Soil Science and Agrochemistry Research  
named after O.N. Sokolovsky”, 1 Myru Street, Sukha Balka vil.,  
Toretsk District, Donetsk Region, 85299, Ukraine

Corresponding author email: v.samokhvalova.com@gmail.com

***Abstract***

*A new method of obtaining fertilizer and soil improver and the procedure for using the chelated-gumatic drug Smaragd with a fertilizing-stimulating and remedial effect have been substantiated and elaborated. The method aims to improve the ecological condition and increase the stability of the soil-plant system due to the creation and use of a new effective composition of the drug. New composition ensures the saturation of the soil with trace elements in a form accessible to plants, increasing plant productivity, including under conditions of heavy metal pollution, arid conditions on carbonate and eroded soils for simplifying the preparation and use of the drug and simultaneously saving resources. The new chelated-gumatic preparation of the proposed complex composition contains trace elements (Fe, Mn, Zn, Cu, Co, Mo and B) in the form of chelate compounds; the gumatic component of the composition is of natural origin. The agents of the new drug Smaragd interact in a certain ratio. The method is protected by a security document (utility model patent 135145 UA 2019).*

**Key words:** *Smaragd chelated-gumatic preparation, soil-plant system, remediation, microbiological and biochemical activity of soil, trace elements, heavy metals pollution.*



## MICROBIAL BIOMASS IN FOREST SOILS OF NATURAL AND AGRICULTURAL ECOSYSTEMS

Irina SENICOVSCAIA, Andriana DANILOV, Andrei DANILOV

Institute of Pedology, Agrochemistry and Soil Protection “Nicolae Dimo”,  
100 Ialoveni Street, MD 2070, Chisinau, Republic of Moldova

Corresponding author email: irina\_sen@mail.ru

### **Abstract**

*The profile of vertical distributions of microbial biomass and its correlation with organic carbon in the brown and gray forest soils of the Republic of Moldova have been investigated in natural and agricultural ecosystems. Sampling was carried out in 10 profiles per soil horizons to a depth of 170-200 cm. Microbial biomass constituted in brown forest natural soils 367.5-643.1  $\mu\text{g C g}^{-1}$  soil and in gray forest natural soils 322.7-828.6  $\mu\text{g C g}^{-1}$  soil in the top layer. The negative effects on soil microbial biomass were observed as a result of long-term land management practices. Microbial biomass decreased in brown forest arable soils to the level of 91.6-116.4  $\mu\text{g C g}^{-1}$  of soil and in gray forest arable soils - to 117.1-283.0  $\mu\text{g C g}^{-1}$  of soil in the arable layer. Microbial biomass was connected with the humus content. Correlation coefficients constituted 0.98-0.99 in brown forest soils and 0.82-0.91 in gray forest soils. The link effect between microbial biomass and humus content decreased from virgin to arable soils. A negative link has been established with profile depth.*

**Key words:** microbial biomass, forest soils, organic carbon, humus.

## **CURRENT APPROACHES TO CARBON MANAGEMENT FOR INCREASING ITS BUDGET IN SOILS**

**Yevhen SKRYLNYK, Kateryna ARTEMIEVA, Iryna KHYZHNIAK**

“Institute for Soil Science and Agrochemistry Research named  
after O.N. Sokolovsky”, 4 Chaykovska Street, Kharkiv, Ukraine

Corresponding author email: irinamikaella@gmail.com

### ***Abstract***

*It is shown the average humus content in agricultural soils of different soil and climate zones of Ukraine. It is emphasized that today there is a positive trend in the humus content of soils in comparison with the data of previous years. The existing resources of organic raw materials for replenishment of organic carbon reserves in the soils of different zones of Ukraine have been analyzed. The characteristics of potential resources of organic raw materials of natural origin and organic waste from the standpoint of humus formation are given. Approaches to the management of organic materials to increase the efficiency of accumulation of humus in soils are proposed. In a model experiment, it is proved that humus of alluvial-meadow soils is easy to be mineralized in comparison with chernozem soils. Taking into account the peculiarities of meadow soil formation, approaches to carbon budget conservation in these environmentally sensitive soils are proposed.*

**Key words:** soil organic carbon, carbon budget conservation.

## SPATIAL DISTRIBUTION OF PHOSPHORUS ON THE SOIL CATENA OF CHROMIC CAMBISOLS COMPLEX

**Krasimir TRENDAFILOV, Violeta VALCHEVA,  
Mladen ALMALIEV, Nedialka YORDANOVA**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: [mladenalmaliev@abv.bg](mailto:mladenalmaliev@abv.bg)

### ***Abstract***

*The present study aims to establish the influence of the processes of secondary pedogenesis on the content and distribution of mobile forms of phosphorus in Chromic cambisols complex formed on a silicate base. Phosphorus is not a major nutrient in pedogenesis and is not clear its natural redistribution in the range of soils with general geological origin of terrigenous materials, but located differently in terms of their eluvial-deluvial transfer within a common long soil catena. The size of the total sample is 15 soil sampling points, and at each point samples are taken from the layer 0-25 and 25-50 cm. The sampling points are selected in the middle of a characteristic slope, without manifestation of local linear erosion forms or accumulation zones. Based on the study, it was found that the content of P<sub>2</sub>O<sub>5</sub> in the top soil layer did not depend on the location, and the deeper horizon should be considered as diagnostic one in terms of its distribution.*

**Key words:** soil catena, phosphorus, topographic factors, variogram.

**SUPPLY AND DISTRIBUTION DEGREE OF SOME  
MACRONUTRIENTS IN SOILS POLLUTED WITH HEAVY  
METALS NEARBY THE CITY OF COPȘA MICĂ**

**Ioana Andra VLAD<sup>1</sup>, Goji GYOZO<sup>2</sup>, Szilard BARTHA<sup>1</sup>**

<sup>1</sup>University of Oradea, 26 General Magheru Street, Oradea, Romania

<sup>2</sup>Tehnological High School “Stefan Manciulea”, Blaj, Romania

Corresponding author email: ggyozo2000@yahoo.com,

***Abstract***

*Nitrogen (N), potassium (K), and phosphorus (P) are macronutrients that are paramount for plant physiology. The aim of this research is to evaluate the content and distribution of total N, and mobile K and P in soils historically polluted in the Copșa Mică area. We also calculated an average content of mobile P and K, highlighting the variation of the C/N ratio in the shallow depth layers of the soils within the sample surfaces. The negative impact on the soils of the main polluter of the Copșa Mică area is corroborated with a low total N content, minimal K concentration at the first depth layer, following a trend characterised by extremely low concentrations at the depth of 10-15 cm to extremely low to very low concentrations at the depth of 30-35 cm. The same trend is also noticed in the content of mobile P, the lower concentration classes being favoured in terms of average P content.*

***Key words:*** soil nutritional status, total N, mobile K and P, polluted area.

**PRELIMINARY RESEARCH ON SOIL  
MICROFLORA AND MACROFAUNA IN THE  
EXPERIMENTAL FIELD MOARA DOMNEASCĂ**

**Cristinel Relu ZALĂ, Mali-Sanda MANOLE, Rada ISTRATE,  
Emilia CIOCOIU, Daniel ȚURCAN**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: cristinel.zala@agro-bucuresti.ro

***Abstract***

*Microorganisms and insects that living in the soil are an important component of it. These components play an important role in supporting and growing plant communities. Microflora and macrofauna exercise processes that influence the physical-chemical, biological and agricultural characteristics of the soil. In order to determine the species of microorganisms per 1 g of soil by the Petri dish culture method on different culture medium: potato-glucose-agar (PGA), dichloran-rose bengal chloramphenicol (DRBC) agar and dichloran 18% glycerol (DG18) agar decimal dilutions were performed beforehand. The results were compared with those obtained by the soil washing method. Bacteria from the genus Pseudomonas, yeasts, fungi from the genera Penicillium, Fusarium, Rhizopus, Aspergillus and Sclerotinia and one species each of coleoptera and lepidoptera were detected along with Lumbricus terrestris.*

**Key words:** soil microorganisms, bacteria, fungi, culture medium, macrofauna.

# **CROP SCIENCES**

## **PRODUCTIVITY OF SOME ROMANIAN POTATO VARIETIES IN THE AGROCLIMATIC CONTEXT OF THE BÂRSA COUNTRY**

**Lorena ADAM, Manuela HERMEZIU, Andreea TICAN**

National Institute of Research and Development for Potato and Sugar Beet  
Brasov, 2 Fundarurii Street, Brasov, Romania

Corresponding author email: hermeziuum@gmail.com

### ***Abstract***

*A highly economic important crop, potato is grown in more than 100 countries and is the fourth consumed food in the world. Twelve Romanian potato varieties were investigated for their growth parameters and yield to determine suitability for production. Experiments were conducted to National Institute of Research and Development for Potato and Sugar Beet Brasov using a randomised block design with four replications. Determination of the tuber number and their mass was done in each repetition. The potato yield was determined in each elementary plot and the yield per hectare was calculated. Darilena produced the tallest plants (90.5 cm) and Castrum. produced the shortest (58.88 cm). The number of stems per hill ranged from 2.5 cm (Foresta cv.) to 9.25 cm (Marvis). Tuber weight average per hill ranged from 2055 g (Sarmis) to 500 g (Castrum). Ervant (37.44 t/ha) and Azaria (37.94 t/ha) records superior productivity and Asinaria and Darilena showed adaptability to climate conditions and suitability for culture under high economic efficiency. Specific technologies must be established for each variety to reach the maximum potential in periods of stress that occur due to climatic variations.*

**Key words:** *climatic conditions, cultivars, growth parameters, potato, yield.*

## SUNFLOWER GENOTYPES IN FIELD INFESTED WITH BROOMRAPE IN BRAILA LOCATION, IN YEAR 2022

Florin Gabriel ANTON<sup>1</sup>, Laura CONTESCU<sup>1</sup>, Luxița RÎȘNOVEANU<sup>2, 3</sup>,  
Maria JOIȚA-PĂCUREANU<sup>1, 4</sup>, Daniela OPREA<sup>1</sup>, Mihaela ȘERBAN<sup>1</sup>

<sup>1</sup>National Agricultural Research and Development Institute Fundulea,  
1 Nicolae Titulescu Fundulea, Calarasi, Romania

<sup>2</sup>Bucharest University Economic Studies, Faculty of Agri-food  
and Environmental Economics, Bucharest,  
6 Piata Romana Street, Bucharest, Romania

<sup>3</sup>Agricultural Research Development Station Braila,  
Sos Viziru km 9, Braila, Romania

<sup>4</sup>Romanian Academy, Center of Study and Research for Agroforestry  
Biodiversity "Acad. David Davidescu", Bucharest, Romania

Corresponding author email: mily\_mily2007@yahoo.com

### **Abstract**

*In Romania, sunflower represent the main oil crop and occupies the third place after wheat and maize. Orobanche cumana Wallr (sunflower broomrape) is a parasitic plant who infested sunflower plants and causes low seed yield. In this paper we present behaviour of sunflower genotypes in field natural infested with broomrape, in Braila location, in year 2022. We tested for resistance/tolerance at parasite Orobanche cumana, 21 experimental sunflower hybrids, belonging to NARDI Fundulea and 10 differential genotypes and one additional for determination of broomrape races. Degree attack (GA) of broomrape was between 0.05 at sunflower hybrid H1 and 6.2 at H10 and infested sunflower plants (I %) was between 5% at H1 and 100% at H3 and from H6 to H21. All sunflower differential genotypes was infested with broomrape from 25% at KA41 (gene Or<sub>1</sub>) to 100% at AD66 (no Or gene), Record (gene Or<sub>3</sub>), S1358, LC 1002 (gene Or<sub>4</sub>), P1380, LC 1003 (gene Or<sub>5</sub>), P96 (gene Or<sub>6</sub>, Or<sub>7</sub>). Only one sunflower genotype (additional differential genotype), Neagra de Cluj (accession PI 650368), was resistant at broomrape race H<sub>RO</sub> or I<sub>RO</sub>.*

**Key words:** broomrape, sunflower, race, gene Or, resistance/tolerance.



## INFLUENCE OF $\text{CaCO}_3$ WORDINGS BY NP DOSES ON SOYBEAN YIELDS

Oana Daniela BADEA<sup>1,2</sup>, Diana Maria POPESCU<sup>1</sup>, Nicolae IONESCU<sup>1</sup>,  
Cristina Mariana NICOLAE<sup>1</sup>

<sup>1</sup>Agricultural Development Research Station Pitesti, 5 Pitesti-Slatina Road,  
117030, Pitesti, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: oanabadea94@yahoo.com

### **Abstract**

*Following recent research, the positive influence of calcium on soybean plants, especially on varieties with improved genetic qualities, was found. The results obtained on the plants were significant both on the total biomass of the plants and its components. In our ecological conditions with stagnant white luvisol soil (pH 5.0-5.5) different types of  $\text{CaCO}_3$  were used to primarily improve the chemistry of the plant culture medium. In the case of the variety Isa TD (group 00), the interaction between  $\text{CaCO}_3$  and NP fertilizers contributed to a maximum increase of 5.48 t/ha total biomass, 3.44 t/ha pod biomass and 1.47 t/ha of biomass grains. Of the two factors, the new formulations of  $\text{CaCO}_3$  had the greatest influence, and the interaction with NP was in all cases negative. The correlations obtained between the studied characters were significantly positive, except for the mass of one thousand grains (MTG). The obtained results invite the promotion of soybean crop technology, including the amendment system regarding this type of soil.*

**Key words:** acid soils, biomass,  $\text{Ca}^{2+}$ , Isa TD, NP.

**THE INFLUENCE OF SOIL TILLAGE SYSTEM  
AND FERTILIZATION ON THE DEVELOPMENT  
AND YIELD OF GRAIN SORGHUM  
IN THE CONDITIONS OF SĂRĂȚENI, IALOMIȚA**

**Andrei BĂNICĂ, Doru Ioan MARIN**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: andreibanica1995@gmail.com

***Abstract***

*This paper presents the results of the research carried out in the period 2020-2022, with the aim of identifying the best interactions between different variants of the soil tillage and some fertilization funds based on nitrogen, phosphorus and foliar fertilizers, thus it will be possible to establish, for the area under study (Sărățeni-Ialomița County), in non-irrigated conditions of sorghum culture, which are the optimal options for obtaining a high production. Analyzing the data from the two years of research, 2021 a year rich in precipitation and 2022 a year with a water deficit, the influence of climatic conditions can be observed. The deeper the loosening of the soil was, the higher the increase in yield was, tillage by scarification at 35 cm and at 45 cm excelled at all four fertilizations, thus having the highest biomass growth rates in the sorghum crop. The most favorable combination of technological factors that ensured a maximum yield in 2021 of 8,040 kg/ha, was represented by tillage by scarifying at 45 cm and a fertilization of N100P50.*

***Key words:*** *Sorghum bicolor L., soil tillage, fertilization, yield.*

## SELECTIVITY AND STABILITY OF SOME HERBICIDES FOR ANNUAL GRAMINACEOUS WEED CONTROL APPLIED DURING STEM ELONGATION STAGE OF DURUM WHEAT (*Triticum durum* Desf.)

Teodora BARAKOVA<sup>1</sup>, Grozi DELCHEV<sup>2</sup>

<sup>1</sup>Field Crops Institute, Chirpan, Bulgaria

<sup>2</sup>Trakia University, Faculty of Agriculture, Stara Zagora, Bulgaria

Corresponding author email: delchevkd@abv.bg

### **Abstract**

*The experiment was carried out during 2018-2020 in the experimental field of Field Crops Institute - Chirpan with durum wheat cultivar Progress (Triticum durum Desf.). The influence of 6 antigraminaceous herbicides was tested - Palace 75 WG (pinoxulam) - 250 g/ha; Axial 050 EC (pinoxaden) - 900 ml/ha; Traxos 045 EC (pinoxaden + clodinafop) - 1.3 ml/ha; Topic 080 EC (clodinafop) - 450 ml/ha; Puma super 7.5 EB (phenoxyprop-ethyl) - 1 ml/ha; Hussar max WG (mesosulfuron + iodosulfuron) - 250 g/ha. Herbicides were applied at the beginning of stem elongation stage - during 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> stem node stage of durum wheat. The highest grain yield was obtained by treatment of herbicide Topic during 1<sup>st</sup> stem node stage of durum wheat, followed by herbicides Puma super, Axial and Hussar max. During 2<sup>nd</sup> stem node stage of durum wheat, the highest grain yield was obtained by treatment of herbicide Puma super, followed by herbicides Traxos, Axial and Topic. During 3<sup>rd</sup> stem node stage of durum wheat, the highest grain yield was obtained by treatment of herbicide Puma super, followed by herbicides Topic and Traxos. Technologically, the most valuable are herbicides Puma super, Hussar max, Traxos and Palace, applied during 1<sup>st</sup> stem node stage; herbicides Hussar max, Topic and Puma super applied during 2<sup>nd</sup> stem node stage and herbicides Hussar max, Puma super, Topic and Traxos applied during 3<sup>rd</sup> stem node stage.*

**Key words:** durum wheat, herbicides, selectivity, stability, grain yield.

**RESEARCH ON TESTING NEW REMEDIES  
WITH SYSTEMIC FUNGICIDAL ACTION IN THE  
CHEMICAL MANAGEMENT OF WINTER WHEAT,  
CENTRAL AREA, REPUBLIC OF MOLDOVA**

**Alexei BIVOL<sup>1</sup>, Serghei BĂDĂRĂU<sup>1</sup>, Elena IURCU-STRĂISTARU<sup>1</sup>,  
Ion TODERAȘ<sup>1</sup>, Natalia CÎRLIG<sup>2</sup>, Eliza BIVOL<sup>1</sup>**

<sup>1</sup>Institute of Zoology, State University of Moldova, 1 Academiei Street,  
Chisinau, Republic of Moldova

<sup>2</sup>“Alexandru Ciubotaru” National Botanical Garden (Institute),  
Pădurii 18 Street, Chisinau, Republic of Moldova

Corresponding author email: iurcuelena@mail.ru

***Abstract***

*Wheat plants are subject to the impact of a complex of pathogenic agents, which include over ten species of diverse etiological and pathological nature, as key objects of economic importance, that annually cause serious damage, such as: Ustilago tritici; Tilletia caries; T. foetida; Puccinia recondita; P. glumarum; P. graminis; Erysiphe graminis; Fusarium graminearum; Septoria tritici, S. graminum; Helminthosporium tritici-repentis. The fungicidal remedies Camporo 25 EC, Custodia 320 SC and Sizaro ES fungicides have been tested against the diseases detected in winter wheat plantations. The efficiency of these new remedies with anti-fungal action was proved depending on the doses applied and the severity of the disease, as compared with the standard control. Camporo 25 EC and Custodia 320 SC, Cizaro ES fungicides are recommended as efficient chemical products in the integrated protection system of winter wheat. The frequency and intensity of the attack of pathogens, in 2021-2022, ranged between 10 and 45%, depending on environmental factors, and the biological efficiency of the new remedies tested on experimental plots as fungicides was 90-93%, at the level of the standard variant, comparing the variants and doses applied.*

***Key words:*** wheat grain; fungicides; disease, integrated protection system, biological control.

## **PRODUCTION AND SUGAR CONTENT OF FOUR SUGAR BEET HYBRIDS FUNCTION OF ENVIRONMENTAL TEMPERATURE, PRECIPITATIONS AND AGRICULTURAL KEY INPUTS**

**Letiția Adriana BOCOȘ<sup>1</sup>, Antonia ODAGIU<sup>1</sup>, Camelia OROIAN<sup>2</sup>,  
Cristian IEDERAN<sup>1</sup>, Petru BURDUHOS<sup>1</sup>**

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Cluj-Napoca,  
Faculty of Agriculture, 3-5 Calea Manastur, Cluj-Napoca, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Cluj-Napoca,  
Faculty of Horticulture and Business in Rural Development,  
3-5 Calea Manastur, Cluj-Napoca, Romania

Corresponding author email: antonia.odagiu@usamvcluj.ro

### ***Abstract***

*Sugar beet yields are highly influenced by a series of factors, both technological and environmental. This study aims to emphasize the effect of the environmental temperature and agricultural key inputs (fertilization and water) on production and sugar content function of sugar beet hybrid in the same growing area. A three factorial experiment was conducted (genotype x irrigation x fertilization) was organized from 2021 to 2022 in the experimental field located in Vișoara commune, Cluj County. Daily temperature and precipitations were monitored. The results of 2-years studies concerning the sugar content and yields for each experimental sugar beet variety (Vanghelis, Tesla, Penalty, and Gorilla) are recorded. The results of our study show that in Vanghelis variety are reported the highest average yields (66.60 t/ha), and sugar content (10.84%). The fresh and dry root yields and sucrose content did not differ significantly among Vanghelis and Gorilla varieties, but significant varieties are reported among these varieties, and the other two, Tesla, and Penalty, respectively. Strong and moderate correlations are identified between sugar beet yields and sucrose content on one hand, and environmental inputs on the other side, for each studied variety.*

**Key words:** *differences, dry matter, fertilizer, irrigation, water.*

**RESULTS REGARDING VARIABILITY OF PRODUCTION  
AND SOME ELEMENTS OF PRODUCTIVITY  
TO FOUR PEA (*Pisum sativum*) GENOTYPES AT  
DIFFERENT SOWING TIMES**

**Elena BONCIU<sup>1</sup>, Elena ROȘCULETE<sup>1</sup>, Gabriela PĂUNESCU<sup>2</sup>,  
Cătălin Aurelian ROȘCULETE<sup>1</sup>, Rodica SOARE<sup>1</sup>**

<sup>1</sup>University of Craiova, Faculty of Agronomy,  
19 Libertatii Street, Craiova, Romania

<sup>2</sup>University of Craiova, SCDA Caracal,  
106 Vasile Alecsandri Street, Caracal, Romania

Corresponding author email: [rosculeta2000@yahoo.com](mailto:rosculeta2000@yahoo.com)

***Abstract***

*The present paper presents the results obtained within a multifactorial experience at the Research and Development Station of the University of Craiova, SCDA Caracal, in the period 2021-2022. The biological material was represented by four pea varieties (Omega, Tiara, Favorit and Trinity), each of them being sown in two different seasons. The variability of production, plant height and some elements of productivity were monitored, such as: number of plants/m<sup>2</sup>, number of pods/plant, length of pods, number of grains in pod and weight of 1000 grains. The results obtained showed a high variability, both in terms of production and productivity elements. Thus, the highest average production value was recorded by the Omega variety (4500 kg/Ha) and the lowest one, Trinity (3,635 kg/Ha). The mass of 1000 grains had average values between 190.8 g (Omega) and 135.9 g (Tiara). Also, the ratio between plant weight and grains weight recorded average values from 1.74 (Tiara) and 1.59 (Favorit). These results confirm the very good suitability of the researched pea varieties for cultivation in the environmental and soil conditions of the South-West area of Oltenia.*

**Key words:** *genotypes, pea, production, sowing times, variability.*

**SEED GERMINATION AND EARLY SEEDLING  
GROWTH OF PEA (*Pisum sativum* L.)  
IN RESPONSE TO SEED PRIMING**

**Dorina BONEA, Mihai CICHI**

University of Craiova, Faculty of Agronomy,  
19, Libertatii Street, Dolj County, Romania

Corresponding author email: mihaicichi@yahoo.com

***Abstract***

*The early growth ability of plants strongly influences their growth and yields. Seed priming is widely used for better germination and emergence of plants both under stressful and non-stressful conditions. The purpose of this study was to determine the effects of seed priming on some growth parameters of *Pisum sativum* seedlings and to identify the most suitable priming techniques. For this reason, a laboratory experiment was carried out in randomized blocks with three repetitions, in which pea seeds were primed for 6 hours with distilled water and with two concentrations and combinations of salicylic acid and calcium carbonate (CaCO<sub>3</sub>). The treatment non-priming was used as a control. The results showed that the priming treatments had significant effects on all studied parameters ( $p < 0.05$ ). Seed priming with both concentrations of calcium carbonate (1 g/l and 2 g/l) and hydro-priming (with water) showed the best priming effects on root and shoot length, root and shoot fresh weight, and seedling vigour index. Therefore, these priming techniques, which are cheap and ecological, can be used by farmers for the successful establishment of pea crops.*

**Key words:** calcium carbonate, germination seed, pea, salicylic acid, seedlings.

## CRUDE PROTEIN YIELD AND ENERGY NUTRITIONAL VALUE OF FODDER OF PERENNIAL GRASS MIXTURES

**Tatyana BOZHANSKA, Magdalena PETKOVA,  
Biser BOZHANSKI, Minko ILIEV**

Agricultural Academy, Research Institute of Mountain Stockbreeding  
and Agriculture, 281 Vasil Levski Street, 5600 Troyan, Bulgaria

Corresponding author email: [tbozhanska@mail.bg](mailto:tbozhanska@mail.bg)

### **Abstract**

*The aim of the study was to determine the amount of crude protein yield and the yield of feed units in the fodder biomass of six variants of two-component legume-grass mixtures (*Lotus corniculatus*- *Festuca rubra*; *Trifolium repens*- *Lolium perenne*; *Trifolium repens*- *Poa pratensis*; *Trifolium pratense*- *Phleum pratense*; *Medicago sativa*- *Dactylis glomerata*; *Trifolium pratense*- *Festuca pratensis*) that would provide high-quality fodder in the conditions of the Central Balkan Mountain. The highest crude protein yield is for the mixtures *Tr. pratense* L.+*F. pratensis* L. and *Tr. repens* L.+*P. pratensis* L. The legume crop predominated in the regrowths of both variants during the entire experimental period from 7.4% to 48.4%, respectively, and the ratio of legume:grass in the mixed grass stands was 47.7:40.3% (*Tr. pratense* L.-*F. pratensis* L.) and 62.3:13.9% (*Tr. repens* L.- *P. pratensis* L.). A proven difference in crude protein yield was found between *Tr. repens* L.-*P. pratensis* L. and *M. sativa* L.-*D. glomerata* L. mixtures. The highest yield of feed units for milk and growth was found in the forage mixture of *Tr. pratense* L. with *Ph. pratense* L.*

**Key words:** *crude protein; feed unit for milk; feed unit for growth; grass-legume mixtures.*



## IMPACT OF CONVENTIONAL AND ORGANIC FERTILIZATION ON THE QUALITY AND NUTRITIONAL VALUE OF DEGRADED MOUNTAIN PASTURES

**Biser BOZHANSKI, Minko ILIEV, Magdalena PETKOVA,  
Tatyana BOZHANSKA**

Agricultural Academy, Research Institute of Mountain Stockbreeding  
and Agriculture, 281 Vasil Levski Street, 5600 Troyan, Bulgaria

Corresponding author email: [bbozhanski@gmail.bg](mailto:bbozhanski@gmail.bg)

### **Abstract**

*It was found that the dry mass of grasslands with organic fertilizing was by 2.0% higher in vitro digestibility of dry matter, higher content of CP (by 0.1%), CFr (by 1.7%) and N (by 0.1%), and a lower concentration of cellulose (by 0.3%) compared with of the mineral fertilizing variants, which led to a more in the concentration of NFE (by 1.2%), NDF (by 2.9%), hemicellulose (by 2.8%), Ca (by 0.3%) and P (0.2%). The energy nutritional value of fodder with of the mineral fertilizing of exceeded that of control with 0.4%-2.8% and at organic fertilizing with 0.5%-0.8%. A high correlation was found between the nitrogen content and CP ( $r=1.0$ ) of the grasslands with mineral fertilizing. The theoretical regression line and the equation of the regression dependence between the values of the indicators show  $-y=7.2224x-0.4841$  at a high coefficient of determination ( $R^2=0.9988$ ). For the variants with manure, the concentration of CP registered proven correlation ( $r=1.0$ ) and regression dependence with the nitrogen content:  $y=6.9861x-0.0815$  at  $R^2=0.9999$  ( $P<0.05$ ).*

**Key words:** mineral fertilizing, natural grassland, chemical composition.

**ANTIFUNGAL AND ANTI-MYCOTIC PROPERTIES  
OF ESSENTIAL OILS EXTRACTED FROM DIFFERENT  
PLANTS ON PATHOGENIC FUNGI THAT  
BIOSYNTHESIZE MYCOTOXINS**

**Liana Dănuța BUTTA, Alina NEACȘU, Laura Iosefina SMULEAC,  
Raul PASCALAU, Florin IMBREA,  
Ștefan Laurențiu BĂTRÎNA, Ilinca Merima IMBREA**

University of Life Sciences” King Mihai I” from Romania,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: [alineaneacsu@usab-tm.ro](mailto:alineaneacsu@usab-tm.ro)

***Abstract***

*The current scientific paper presents a review of essential oils with antifungal effect, the mechanism of action of the main components of essential oils and the possible synergistic actions between them on pathogens. Essential oils of oregano, cinnamon, fennel, mint and dill in various concentrations have demonstrated effects on ergosterol biosynthesis, specifically reducing the amount of ergosterol. Thus, a significant change in ergosterol biosynthesis will inhibit the growth of fungi and cause their death. An advantage of using essential oils over synthetic ones is the use of small amounts of essential oils to achieve strong fungistatic and fungicidal effects. In conclusion, through this work we tried to make: an enumeration / revision of volatile oils with bio pesticidal potential, highlighting the effects produced on fungi from the Aspergillus, Fusarium and Penicillium families, but also on the mycotoxins biosynthesized by them.*

**Key words:** agricultural products, antifungal effect, antimycotoxin effect, essential oil.

## STUDY ON SUNFLOWER PRODUCTION ESTIMATION BASED ON AERIAL IMAGES (UAV)

Ciprian BUZNA<sup>1</sup>, Marinel Nicolae HORABLAGA<sup>1,2</sup>, Florin SALA<sup>1,2</sup>

<sup>1</sup>Agricultural Research and Development Station Lovrin, Lovrin,  
307250, Romania

<sup>2</sup>University of Life Sciences “King Mihai I” from Timisoara,  
119 Calea Aradului Street, 300645, Timisoara, Romania

Corresponding author email: florin\_sala@usab-tm.ro

### **Abstract**

*The study used the technique based on aerial images (UAV) to estimate the production of the sunflower crop, hybrid P64LE25. The experiment was organized within SCDA Lovrin, Timis County, Romania, in the 2021-2022 agricultural year, under the conditions of a chernozem type soil, non-irrigated system. The images were taken with the drone (DJI Phantom 4), at variable heights (H, 3 to 50 m). From the analysis of the digital images, the values of the RGB color parameters were obtained. The distribution of the RGB data series was of normal type ( $r=0.950$  for R,  $r=0.960$  for G and  $r=0.965$  for B). Very strong correlations were recorded between color parameters ( $r=0.994$  for R and G,  $r=0.954$  for R and B,  $r=0.948$  for G and B), and weak correlations between RGB and H. From PCA, PC1 explained 97.698% of variance, and PC2 explained 2.1027% of variance. Regression analysis facilitated the prediction of sunflower production based on RGB values, under statistical safety conditions ( $p<0.001$ ; RMSEP= 1.7907 in relation to R and G; RMSEP=4.5869 in relation to R and B; RMSEP=3.6978 in relation to G and B).*

**Key words:** *imaging analysis, modeling, production estimation, sunflower, UAV images.*

***Pyrenophora teres*, HOST-PATHOGEN INTERACTION  
IN BARLEY UNDER SOME SEED TREATMENT  
CONDITIONS**

**Alin CARABET, Ioana GROZEA, Dan MANEA,  
Otilia COTUNA, Ramona ȘTEF**

University of Life Science “King Mihai I” from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: [nacatim@gmail.com](mailto:nacatim@gmail.com)

***Abstract***

*The paper aimed to present alternative against the pathogen *Pyrenophora teres* (anamorph *Drechslera teres*) which parasitizes barley crop in western parts of Romania even beginning with late autumn period, observing the evolution and symptoms spreading of this fungus. Across the world, *Pyrenophora teres* the net blotch of barley is regarded as the major foliar disease in *Hordeum vulgare* L. causes economic losses by reducing yield and grain quality and poor emergence in area with a high biological pressure of the pathogen. The trial extends for two years in monoculture system using same seed treatment list and following the seed-borne cereal fungi assessment protocol (EPPO 1/19 (4)). Trial setup consisted in 6 treatments like fludioxinil, fluxapyroxad and mixture, every plot measuring 10 m<sup>2</sup> and observations performed on 1 plants / 1 m in length sample. When treated with two active ingredients the result obtained exerts an efficacy up to 98%, maintained in both trial years compared with the untreated plots where the pathogen was well established.*

**Key words:** *Pyrenophora teres, net blotch, pathogen, barley, efficacy.*

**EVALUATION OF TUBER YIELD  
AND CULINARY QUALITY FOR TRUE POTATO  
SEED GENOTYPES GROWN UNDER DROUGHT  
STRESS FIELD CONDITIONS**

**Mihaela CIOLOCA<sup>1</sup>, Andreea TICAN<sup>1</sup>, Monica POPA<sup>1</sup>,  
Nina BĂRĂSCU<sup>1,2</sup>, Carmen Liliana BĂDĂRĂU<sup>1,2</sup>, Valentina ȘERBAN<sup>1</sup>**

<sup>1</sup>National Institute of Research and Development for Potato and Sugar Beet,  
2 Fundaturii Street, 500470, Brasov, Romania

<sup>2</sup>Transilvania University, Faculty of Food and Tourism, 148 Castelului Street,  
500014, Brasov, Romania

Corresponding author email: tican\_andreea@yahoo.com

***Abstract***

*The main objective of this study was to evaluate under field conditions potato genotypes derived from true seeds, that showed tolerance to in vitro induced water stress. The biological material was represented by 3 genotypes: GIL19-03-07, ZIL19-02-43 and GIL19-03-29, for which tuber number, yield and culinary quality were determined. The genotype GIL19-03-07 obtained the best results in terms of total number of tubers (647.20 thousand/ha), surpassing the variety Cosiana (control). In a dry growing year, in terms of total tuber production, the results obtained point to the genotype ZIL19-02-43 which obtained a production of 27.19 t/ha, followed by the genotype GIL19-03-07 with a production of 21.21 t/ha. The results of the culinary and technological quality analyses suggest that genotypes GIL19-03-07 and ZIL19-02-43 are suitable as raw material for chips, while genotype GIL19-03-29 is suitable for salads and other culinary preparations due to its pleasant taste and pulp texture.*

**Key words:** *culinary quality, field conditions, potato, true potato seed, tuber yield.*

## THE EFFICACY OF A FUNGICIDE MIXTURE IN CONTROLLING BLACK LEG AND STEM ROT IN WINTER OILSEED RAPE

Valentin-Marius CIONTU<sup>1,2</sup>, Daniel JALOBĂ<sup>1,2</sup>,  
Raluca Monica CRISTEA<sup>1,2</sup>, Marga GRĂDILĂ<sup>1</sup>

<sup>1</sup>Research-Development Institute for Plant Protection, 8 Ion Ionescu de la Brad Blvd, 013813, Bucharest, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, 011464, Bucharest, Romania

Corresponding author email: [ciontu.valentin@icdpp.com](mailto:ciontu.valentin@icdpp.com)

### **Abstract**

*Lately, winter oilseed rape has become more and more grown by farmers in Romania, being a rewarding and versatile crop. Black leg (*Leptosphaeria maculans*) and stem rot (*Sclerotinia sclerotiorum*) continue to cause significant yield losses in Romania in winter oilseed rape, despite widespread use of fungicides. A series of three trials were conducted in Călărași County in 2021 to quantify the contribution of a mixture of Azoxystrobin 20% and Difenoconazole 12.5% at three different rates and of cultivar resistance. In the field, assessments were performed to conclude the frequency (F%) and intensity (I%) of the attack, in order to calculate the degree of attack (DA%). In the end, the effectiveness of the treatment scheme was calculated. Significant effectiveness and yield differences were recorded between cultivars and fungicides dose rates in the fields. Fungicides higher rates gave better control of diseases than lower ones and contributed to disease control and to yield responses to a greater extent than cultivar resistance. DA% of black leg infection was lower than of stem rot.*

**Key words:** *effectiveness, *Leptosphaeria maculans*, *Sclerotinia sclerotiorum*, winter oilseed rape.*

**ASSESSMENT OF THE SPECIFIC DISEASES  
IN *Reynoutria sachalinensis* (F. Schmidt) NAKAI  
UNDER THE INFLUENCE OF ENVIRONMENTAL  
CONDITIONS OF THE REPUBLIC OF MOLDOVA**

**Natalia CÎRLIG<sup>1</sup>, Elena IURCU-STRĂISTARU<sup>2</sup>, Victor ȚÎȚEI<sup>1</sup>,  
Serghei COZARI<sup>1</sup>, Ana GUȚU<sup>1</sup>, Alexandru TELEUȚĂ<sup>1</sup>, Alexei BIVOL<sup>2</sup>**

<sup>1</sup> “Alexandru Ciubotaru” National Botanical Garden (Institute),  
Padurii 18 Street, Chisinau, Republic of Moldova

<sup>2</sup>Institute of Zoology, Moldova State University, 1 Academiei Street, 2028,  
Chisinau, Republic of Moldova

Corresponding author email: nataliacirlig86@gmail.com

**Abstract**

*A major risk for the species *Reynoutria sachalinensis*, as a non-traditional honey, fodder and bioenergy crop, in the Republic of Moldova, are the invasive diseases that affect the plants in the first growing season, once the assimilation organs are formed. It is an early-emerging species, subjected to the influence of stress factors, including diseases that affect the growth potential of plants. The research carried out in 2015-2022 by complex phytosanitary monitoring highlighted the spread of some pathogens that affect the plants of *R. sachalinensis* annually or periodically, being also favoured by environmental factors. We assessed the most significant diseases detected throughout the growing season, caused by pathogens such as: *Peronospora fagopyri*; *Erysiphe communis* f. *polygoni*; *Septoria ascophylli*; *Ascochyta fagopyri*; *Phyllosticta polygonorum*; *Botrytis cinerea*; *Sclerotinia sclerotiorum*, *Fusarium gibosus*, *F. oxysporum* f. *sp. spinacia*, *Cucumis virus*, *Tabacco mosaic virus (TMV)*. A total of 11 diseases were recorded, 9 of which were of fungal origin and 2 of viral origin, causing various pathologies of etiological nature, of various frequency and significant intensity of damage caused to *R. sachalinensis* plants.*

**Key words:** *Reynoutria sachalinensis*, pathogens, phytosanitary monitoring, pathogens, diseases.

**CONTRIBUTIONS TO THE ONTOGENETIC STUDY  
ON THE SPECIES *Silphium perfoliatum* L. UNDER THE  
CONDITIONS OF THE REPUBLIC OF MOLDOVA**

**Natalia CÎRLIG**

“Alexandru Ciubotaru” National Botanical Garden (Institute),  
18 Padurii Street, MD 2002, Chisinau, Republic of Moldova

Corresponding author email: nataliacirlig86@gmail.com

***Abstract***

*The ontogenetic peculiarities of the species *Silphium perfoliatum* L. cv. 'Vital', known as a high-potential melliferous, fodder and energy species, the periods and age stages that the plants go through under the climatic conditions of the Republic of Moldova have been described. The research was carried out in the experimental sectors of the "Alexandru Ciubotaru" National Botanical Garden (Institute), during four growing seasons. In the ontogenetic cycle, 4 ontogenetic periods (latent, pregenerative, generative, postgenerative) and 6 age stages (seed, seedling, juvenile, immature, virginal, senile) were described. The end of the ontogenesis in *S. perfoliatum*, in the Botanical Garden, has not been recorded yet. The duration of the active growth period varies between 197 and 234 days depending on the weather conditions recorded in the Republic of Moldova and the age of the plants. *S. perfoliatum* plants are characterized by long flowering stage, being able to provide honeybees and other pollinating insects with pollen and nectar at the end of summer - beginning of autumn.*

**Key words:** *Silphium perfoliatum*, ontogenetic periods, age stages, phenological stages.



## RESEARCH ON THE ATTACK OF FOLIAR DISEASES IN ALFALFA, MURIGHIOL LOCATION, TULCEA COUNTY

Gabi Valentin CÎRSTEA<sup>1</sup>, Elena Ștefania IVAN<sup>2</sup>, Stelica CRISTEA<sup>1</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Research Center for Studies of Food Quality and Agricultural Products,  
University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59, Marasti Bd. 011464, Bucharest, Romania

Corresponding author email: gabivalentin\_c@yahoo.com

### **Abstract**

*The aim of the research was to monitor the attack of some pathogens specific to alfalfa crops, in the period 2020-2022, in the Murighiol area, Tulcea county. An attack was detected by Pseudopeziza medicaginis ([Lib.] Sacc), responsible for the production of common leaf spot of lucerne or leaf spot of lucerne and Peronospora trifoliorum (de Bary) f.sp. medicaginis-sativae (Thuem.), a pseudofungus that produces downy mildew of alfalfa. The leaf spotting attack was higher during the observation period, reaching 10.3% in the control variant in 2021. The downy mildew attack was lower in 2022. The application of the treatments reduced the impact of the monitored pathogens, ensuring more than 60% effectiveness in the case of the attack of downy mildew and over 70% in the case of the attack of common leaf spot.*

**Key words:** alfalfa, pathogens, diseases, degree of attack.

**INFLUENCE OF SATURATION OF SHORT-TERM  
CROP ROTATIONS WITH SUNFLOWER  
ON SOME AGROPHYSICAL PARAMETERS  
OF TYPICAL CHERNOZEM**

**Zinaida DEHTIAROVA, Sergii KUDRIA, Yurii DEHTIAROV,  
Nadiia KUDRIA**

State Biotechnological University, p/o Dokuchaevske, Kharkiv, Ukraine

Corresponding author email: [zinaidasamosvat@gmail.com](mailto:zinaidasamosvat@gmail.com)

***Abstract***

*The article presents the results of the 2020-2021 research carried out in the experimental field of Kharkiv National Agrarian University named after V. V. Dokuchaev, located in the area of the Left Bank Forest-Steppe of Ukraine. The experiment was conducted on typical heavy loamy chernozem on loess-like loam. We aimed to find out the possibility of scientifically based expansion of sunflower crops and determine its productivity in field crop rotations. The effects of increasing the share of sunflower in short-term crop rotations on some agrophysical parameters in the topsoil (0-30 cm) were determined. The results show the influence of crop rotations with different sunflower saturation on the structure-aggregate composition, soil density, etc. Correlation analysis between these indicators and sunflower yield was also carried out. During the period of research, it was found that the increase in the share of sunflower in short-term crop rotations did not lead to a significant deterioration in the fertility of typical chernozem.*

***Key words:*** sunflower, saturation, agrophysical parameters, typical chernozem.

## COMPARATIVE STUDY OF PRODUCTIVE AND QUALITY INDICATORS OF WHEAT VARIETIES IN NORTH - EASTERN BULGARIAN REGION

Vanya DELIBALTOVA, Velika KUNEVA, Manol DALLEV,  
Dimitar RAZPOPOV, Svetlana MANHART, Ivan YORDANOV

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: vdelibaltova@abv.bg

### **Abstract**

*The field experiment was carried out in the selected area of Pristoe village, Shumen area in the period 2017-2019. The test was set by the block-plot design method in four replications with a plot size of 15 m<sup>2</sup>, after sunflower predecessor. The purpose of the study was to establish the productivity and quality of some common wheat varieties, grown in North-Eastern Bulgarian region. The varieties 'Avenue' 'Joker' 'Apache' and 'Neven' were tested. The indices; length of spike (cm), number of spikelets per spike number of grains per spike, grain yield (kg/ha), thousand kernel (grain) weight (g), test weight (kg), vitreousness (%), wet gluten content (%), gluten deformation index (mm) were reported. The results showed that the highest grain yield was obtained from Avenue variety - 7900 kg/ha, followed by Joker - 7400 kg/ha and the lowest one - from Neven variety 6600 kg/ha. The highest values of test weight and the vitreousness content was reported for Neven (84.7 kg and 89.6%) respectively. Joker variety show the best values of the investigated technological properties of the grain among the tested varieties wheat.*

**Key words:** wheat, yield, thousand kernel (grain) weight, test weight, gluten.

## **RESEARCH ON THE INFLUENCE OF HARVEST TIME ON YIELD IN GROUNDNUTS GROWN ON SANDY SOILS**

**Milica DIMA, Reta DRĂGHICI, Gheorghe COTET, Florentina NETCU,  
Maria-Florentina BĂJENARU**

Research Development Station for Plant Culture on Sands Dabuleni,  
217 Petre Banita Street, Calarasi, Dolj, Romania

Corresponding author email: [mariaciuca92@yahoo.com](mailto:mariaciuca92@yahoo.com)

### ***Abstract***

*The research was carried out in the experimental field cultivated with peanuts at Research Development Station for Plant Culture on Sandy Soils in the period 2019-2021. The purpose of this study was to determine the effect of different harvest times on some elements of productivity and yield in peanuts grown under sandy soil conditions. The experiment was mono-factorial with three harvest periods: 153, 163, 173 and 183 days after sowing (DAS). The Viviana variety was used for sowing. The results showed that the number of mature pods per plant was higher in the late harvest. The pod yield over the three years increased from 3805 kg/ha to 4710 kg/ha when the harvest was delayed from 153 days after sowing (DAS) to 173 days after sowing (DAS).*

**Key words:** *groundnuts, yield, pods, harvest, soil.*

## STUDY OF THE ELEMENTS OF THE PRODUCTIVITY OF OLD COMMON WINTER WHEAT VARIETIES UNDER CHANGING ENVIRONMENTAL CONDITIONS

Evgeniy DIMITROV<sup>1</sup>, Zlatina UHR<sup>1</sup>, Rangel DRAGOV<sup>2</sup>,  
Radoslav CHIPILSKY<sup>1</sup>, Teodora ANGELOVA<sup>1</sup>

<sup>1</sup>Agricultural Academy, Institute of Plant Genetic Resources,  
2 Druzhba Street, Sadovo, Bulgaria

<sup>2</sup>Agricultural Academy, Field Crops Institute,  
2 G. Dimitrov Blvd, Chirpan, Bulgaria

Corresponding author email: dragov1@abv.bg

### **Abstract**

*The experiment was conducted in the experimental field of IPGR - Sadovo in the period 2018-2020. Biometric analysis was performed on the sixteen old varieties of common winter wheat created in IPGR. The following traits were taken: yield, productive tillering, central spike length, spikelets number in central spike, grains number in central spike, grain weight in central spike, grains number in other spikes, grains weight in other spikes, grains number of 1 plant and grains weight of 1 plant. The data are processed by statistical methods – variance (ANOVA), variation and principal component analysis. The results show that the influence of the genotype and the interaction of the genotype x environment was proved in all the monitored traits. In terms of traits, the influence of the environment is unproven only in 3 traits – grains weight in 1 plant, grains weight in the other spikes and spikelets number in the central spike. The aim of the study is to test the effect of climate change on the structural elements of the yield of old varieties of common winter wheat, as the main food crop.*

**Key words:** common winter wheat, old varieties, climate change, structural elements.

**INHERITANCE AND COMBINING ABILITY  
FOR FIBER LENGTH IN F<sub>1</sub> DIALLEL  
COTTON CROSSES (*Gossypium hirsutum* L.)**

**Valentina DIMITROVA, Minka KOLEVA**

Agricultural Academy, Field Crops Institute,  
2 G. Dimitrov Blvd, Chirpan, Bulgaria

Corresponding author email: m\_koleva2006@abv.bg

***Abstract***

*The aim of this study was by means of diallel analysis of fiber length of F<sub>1</sub> cotton hybrids to establish some genetic parameters and inheritance indexes necessary for specifying the breeding strategy by this character and breeding value of parental forms. The hybrid populations of two diallel combinations, each involving 6 parental components, were studied. A half diallel crossing scheme was used including the parents and one set of F<sub>1</sub> hybrids from direct crosses. Each diallel combination was tested in replicated trials in two consecutive years. It was found that additive and non-additive gene effects participated in the genetic control of fiber length. The main component of genetic variance was of non-additive type (dominance and epistasis). The varieties Darmi, Mytra and Dorina, from the 1<sup>st</sup> diallel combination, and Natalia, from the 2<sup>nd</sup> diallel combination, were identified as good general combiners for this trait.*

**Key words:** cotton; *G. hirsutum* L., diallel analysis, fiber length, genetic variances, combining ability.

## THE BEHAVIOR OF SOME LOCAL AND FOREIGN COWPEA GENOTYPES IN THE CONDITIONS OF CLIMATE CHANGES IN THE SOUTH OF OLTENIA

Reta DRĂGHICI, Milica DIMA, Alina Nicoleta PARASCHIV,  
Maria Florentina BĂJENARU, Cristina BÎRSOGHE

Research Development Station for Plant Culture on Sands Dabuleni,  
217 Petre Banita Street, Dolj, Calarasi, Romania

Corresponding author email: milicadima@yahoo.com

### **Abstract**

*The research was carried out in the period 2021-2022 at the Research Development Station for Plant Culture on Sands, Dăbuleni, Romania with the objective of the behavior of 16 cowpea genotypes (*Vigna unguiculata* L. Walp), in the conditions of sandy soils in the south of Oltenia. The obtained results highlighted the specificity of the cowpea for thermohydric stress, the plant tolerating very well the specific microclimate created by the recent climate changes. Thus, the tested cowpea genotypes recorded at plant maturity a number of 7.7-15.7 pods/plant and grain production values in the range of 1413.5-3065.5 kg/ha, highlighting a distinct correlation significant between the two components ( $r=0.703^{**}$ ). The cowpea lines 27-B-3a, 27/2 and 25-A1-3 stood out, with the highest grain productions (2928.6-3065.5 kg/ha).*

**Key words:** sandy soil, cowpea genotypes, physiology, productivity, quality.

## **BREEDING OF THE FIRST BULGARIAN VARIETY OF SWEET SORGHUM 'SHUMEN SWEET'**

**Stanimir ENCHEV, Tzvetan KIKINDONOV**

Agricultural Academy, Agricultural Institute, Shumen,  
3 Simeon Veliki Blvd, Shumen, Bulgaria

Corresponding autor email: [stanimir\\_en@abv.bg](mailto:stanimir_en@abv.bg)

### ***Abstract***

*On the background of the increased interest in the organic plant production in in the Agricultural Institute - Shoumen was created the first for the last 50 years Bulgarian variety of sweet sorghum. Shoume Sweet is developped after many years studies of local populations from the North-Eastern region of Bulgaria. Assessment and selection of perspective progenies were carried out for consolidation of stabilized population with high productivity of stem mass in technical maturity as a row material for extraction of juice with 11-15% of sugars - sucrose, fructose and glucose. The preliminary tests in comparative variety trials confirm the high and stable productive potential for extraction of juice with optimal qualities for production of concentrated sweet syrups. After tests in the system of IASAS the Shoumen Sweet variety has been certified by the agency in 2020.*

**Key words:** *sweet sorghum, variety, breeding, selection.*



## **PARTIAL RESULTS CONCERNING THE INFLUENCE OF THE SEED RATE AND FOLIAR FERTILIZATION ON THE BEHAVIOR OF SOME MILLET GENOTYPES IN THE PEDOCLIMATE CONDITIONS OF S.C.D.A. SECUIENI**

**Andreea ENEA<sup>1</sup>, Teodor ROBU<sup>2</sup>, Simona-Florina ISTICIOAIA<sup>1</sup>,  
Alexandra LEONTE<sup>1</sup>, Paula-Lucelia PINTILIE<sup>1</sup>**

<sup>1</sup>Agricultural Research and Development Station Secuieni,  
371 Principala Street, Secuieni, Neamt, Romania

<sup>2</sup>University of Life Science “Ion Ionescu de la Brad” from Iasi,  
3 Mihail Sadoveanu Alley, Iasi, Romania

Corresponding author email: andra29nt@yahoo.com

### ***Abstract***

*Starting with 2022 at the Secuieni Agricultural Research-Development Station, millet (*Panicum miliaceum* L.) was introduced for study. In this paper are presented partial results obtained regarding the behavior and yields obtained with two millet genotypes experimented with different rates of seeds and foliar fertilization applied products. The obtained results showed that the millet has a good adaptability to the Secuieni pedoclimatic condition registered in 2022. Thus, the millet average yields was of 3144 kg/ha when it was sown with a seed rate of 10 kg/ha, 3324 kg/ha at a seed rate of 14 kg/ha and 3517 kg/ha when the seed rate was 18 kg/ha. Regarding the foliar fertilization of the millet crop, the yields values, both the highest and the lowest, were recorded for the Marius variety sown with a seed rate of 10 kg/ha and foliar fertilized with the commercial product Terra Sorb (2.0 l/ha) (3687 kg/ha), respectively with the commercial product Albit (0.04 l/ha) (3048 kg/ha).*

***Key words:*** millet, adaptability, yields, foliar fertilization, seed rate.

**PRELIMINARY STUDIES REGARDING  
THE POTENTIALLY EFFECT OF EXTRACTS  
FROM *Citrullus lanatus* PEELS ON SOME CEREAL'S  
AND FRUIT'S PATHOGENS**

**Indira GALIT<sup>1,2</sup>, Nicoleta RADU<sup>1</sup>, Narcisa BĂBEANU<sup>1</sup>**

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>National Agricultural Research and Development Institute Fundulea,  
1 Nicolae Titulescu Street, Fundulea, Calarasi County, Romania

Corresponding author email: [nicoleta.radu@biotehnologii.usamv.ro](mailto:nicoleta.radu@biotehnologii.usamv.ro)

***Abstract***

*The attack of phytopathogens specific to the main cereal types must be limited because it can lead to increasing mycotoxins levels in the plants and grains, above the limit allowed by the legislation in force. In this regard, at the present, there are intense concerns regarding the use of specific product types for plant protection, in favor of natural (green technologies) products, to avoid the use of fungicidal products obtained by chemical synthesis. In this regard, the present study investigated the effect generated in vitro by some dried peel (ethanolic) extracts, obtained from different varieties of *Citrullus lanatus*, on pathogens specific to *Triticum aestivum* and *Zea mays*. The bioproducts obtained from these varieties were tested on the pathogenic microorganisms for cereals such as *Fusarium culmorum*, *Fusarium verticillioides*, *Fusarium graminearum*, and also on the pathogenic microorganisms for fruits such as *Penicillium expansum*, and/or *Penicillium digitatum*. The results performed "in vitro" revealed that the tested bioproducts exhibit local/moderate antifungal activities, recommending them as potential candidates for obtaining natural bioproducts with antifungal activities.*

**Key words:** *Citrullus lanatus* peels extracts, antifungal effect, cereals, fruits.

## **OIL CONTENT OF SATURATED AND UNSATURATED FATTY ACIDS IN TRIBENURON-METHYL RESISTANT SUNFLOWER HYBRIDS, DEPENDING ON THE AMOUNT OF MACRONUTRIENTS IN THE SOIL**

**Adelina GARAPOVA, Hristofor KIRCHEV**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: adelina\_garapova@abv.bg

### ***Abstract***

*In the experimental field of the Department of Crop Science at the Agricultural University - Plovdiv for three years, a field experiment has been conducted. The experiment has been carried out by the method of split-plots in four replications after the predecessor triticale. Five tribenuron-methyl resistant sunflower hybrids (main plots) have been studied: P64LE25 (standard); LG 59.580 SX; Subaru HTS; ES Arcadia SU and Magma SU. The effect of two soil nutrition regimes - lower and higher has been investigated (split-plots). The oil content of the seeds has been studied. The fatty acid composition of the oil has been investigated. It has been found that the hybrids can be arranged in the following descending order regarding the average oil content of the seeds: P64LE25> Subaru> LG 59.580> Magma> Arcadia. The hybrids contain an average of 15% saturated and 85% unsaturated fatty acids. The lowest content of saturated and the highest content of unsaturated fatty acids have been found in hybrid Magma, and the highest content of saturated and lowest content of unsaturated - in hybrid Subaru.*

**Key words:** *sunflower, tribenuron-methyl resistant, saturated and unsaturated fatty acids.*

**RESEARCHES CONCERNING THE EVOLUTION  
OF THE WESTERN CORN ROOTWORM  
(*Diabrotica virgifera virgifera* Leconte)  
IN THE SOUTH-EAST OF ROMANIA**

**Emil GEORGESCU<sup>1</sup>, Maria TOADER<sup>2</sup>, Lidia CANĂ<sup>1</sup>,  
Roxana ZAHARIA<sup>3</sup>, Andrei TEODORU<sup>3</sup>**

<sup>1</sup>National Agricultural Research Development Institute Fundulea,  
1 Nicolae Titulescu Street, Fundulea, Calarasi, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>3</sup>Institute of Research-Development for Plant Protection, 8 Ion Ionescu  
de la Brad Blvd, District 1, Bucharest, Romania

Corresponding author email: emilgeorgescu2013@gmail.com

***Abstract***

*The western corn rootworm [*Diabrotica virgifera virgifera* (Leconte, 1868)] is an important pest of the maize crops in Romania, where it was first detected in 1996 in the western part of the country. The fly of the western corn rootworm adults in the maize crops from the National Agricultural Research and Development Institute, Fundulea, Călărași County, southeast of Romania, has been monitored since 2016. The first detection of this pest in the pheromone traps was in 2017. This study has presented the results of western corn rootworm fly monitoring, at NARDI Fundulea, between 2020 and 2022. It has used pheromone traps, KLPfero+ type, from Csalomon®. The first captures of the western corn rootworm males were at the end of June in 2020 and 2022, while in 2021, it registered on 5 July. From all years from this study, the highest fly peek was recorded on 7 July 2020, with an average of 150.75 captures. In the next two years, fly peeks were lower than in 2020. This study shows an increase in the western corn rootworm populations in the maize crops, in the southeast of Romania, in the last years.*

***Key words:*** maize, western corn rootworm, monitoring.

**RESEARCHES CONCERNING THE EFFECTIVENESS  
OF THE PHEROMONES IN MONITORING  
OF THE PEA MOTH (*Cydia nigricana* F.)  
IN THE SOUTH-EAST OF ROMANIA**

**Emil GEORGESCU<sup>1</sup>, Iuliana VASIAN<sup>2\*</sup>, Maria TOADER<sup>3</sup>,  
Lidia CANĂ<sup>1</sup>, Ștefania Maria TÖTÖS<sup>2</sup>, Monica GORGAN<sup>2</sup>**

<sup>1</sup>National Agricultural Research Development Institute Fundulea,  
1 Nicolae Titulescu Street, Fundulea, Calarasi, Romania

<sup>2</sup>“Raluca Ripan” Institute for Research in Chemistry, Babes-Bolyai University,  
30 Fantanelele Street, Cluj-Napoca, Romania

<sup>3</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: iulianavasian@yahoo.com

**Abstract**

*The pea moth [*Cydia nigricana* (Fabricius, 1794)] is a pest of the pea in Romania that sometimes can damage this crop. This study's purpose is to evaluate the effectiveness of the pheromones, produced at “Raluca Ripan” Institute for Research in Chemistry, Cluj Napoca, Romania, in monitoring the pea moth fly in climatic conditions from southeast Romania. The first tested variant active ingredient is (E, E)-8,10-Dodecadienyl acetate in a dose of 0.1 mg/bait, while the second variant is a mixture of two active ingredients, (E, E)-8,10-Dodecadienyl acetate in an amount of 0.1 mg/bait+(E)-10-Dodecenyl acetate in a dose of 0.9 mg/bait. The experience was carried out between 2019 and 2021 with a pea crop from the experimental field located at the National Agricultural Research and Development Institute, Fundulea, Călărași County, Romania. In 2019 and 2020, the mixture of the two active ingredients had high effectiveness in capturing the adults of the pea weevils, comparing variant with a single active ingredient. In 2021 the differences between the two variants were lower. The maximum number of captures was recorded on 9 June 2020 at a variant with two active ingredients (60.33 moths/trap). In all years from this study, the first pea moth captures appeared more early than was mentioned in the Romanian literature.*

**Key words:** sunflower, moth, fly peek, monitoring.

**INFLUENCE OF THE SEEDING RATE ON SOME  
PARAMETERS OF THE GROWTH AND DEVELOPMENT  
OF *Triticum monococcum* L. IN THE CONDITIONS  
OF ORGANIC PRODUCTION IN BULGARIA**

**Tonya GEORGIEVA, Yordan YORDANOV, Malgozhata BEROVA**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: [tonia@au-plovdiv.bg](mailto:tonia@au-plovdiv.bg)

***Abstract***

*The purpose of the study is to establish the growth and development of *Triticum monococcum* L. in organic farming conditions. The main factors of the study were: year (2018-2019; 2019-2020 and 2020-2021) and seeding rate (500, 700 and 900 germinated seeds/m<sup>2</sup>). A three-year field experiment was conducted at the Agricultural University - Plovdiv, using the block method, with a plot of 15 m<sup>2</sup>, in 4 repetitions. Phenological development was analysed. Vegetation takes place for 230-233 days. With increasing seeding rate, the number of sprouted plants/m<sup>2</sup> has been proven to increase, reaching up to 506 plants/m<sup>2</sup> at 900 germinated seeds (g.s.)/m<sup>2</sup>. The plants develop a height of up to 102.4 cm at a seeding rate of 700 g.s./m<sup>2</sup>. With an increase in the seeding rate from 500 to 900 g.s./m<sup>2</sup>, the productive tillering decreases from 4.1 to 3.9 number of tillers/plant. The number of productive stems/m<sup>2</sup> varies from 902 (at 500 g.s./m<sup>2</sup>) to 968 numbers/m<sup>2</sup> (at 700 g.s./m<sup>2</sup>). The year affects all tested factors, as proven - with worse conditions for developing *Triticum monococcum* L., 2018-2019 stands out.*

**Key words:** *Triticum monococcum* L., growth, phenophases, seeding rate.

## IMPACT OF CLIMATE CHANGE ON MAIZE PRODUCTION IN THE PEDOCLIMATIC CONDITIONS AT ARDS BRAILA

**Alin-Ionel GHIORGHE<sup>1,3</sup>, Gabriela Alina CIOROMELE<sup>2,3</sup>,  
Daniela TRIFAN<sup>3</sup>, Nicoleta AXINTI<sup>2,3</sup>, Luxița RÎȘNOVEANU<sup>4,3</sup>,  
Marian BRĂILĂ<sup>3</sup>, Emanuela LUNGU<sup>3</sup>**

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>“Dunarea de Jos” University of Galati, 47 Domneasca Street, Galati, Romania

<sup>3</sup>Agricultural Research Development Station Braila,  
km 9 Viziru Street, Braila, Romania

<sup>4</sup>Bucharest University of Economic Studies, 6 Piata Romana Street,  
Bucharest, Romania

Corresponding author email: [alin.ghiorghie@scdabraila.ro](mailto:alin.ghiorghie@scdabraila.ro)

### **Abstract**

*During the agricultural years 2020-2022 at SCDA Braila, experiments with maize hybrids have been placed in which the growth and development processes as well as the productivity of Felix, Iezer and F423 maize hybrids have been followed. In the climatic context of 2020, the growing cycle was staggered over a period of 159 days (10.04.2020-16.09.2020), during which time precipitation totalled 162.4 mm, accumulating a useful temperature of 3254 °C. In 2021, the growing cycle was staggered over a period of 147 days (05.05.2021-29.09.2021), during which period rainfall totalled 335.5 mm, accumulating a useful temperature of 3038.6 °C, and under the conditions of this year, 2022, maize sown on 28.04.2022, covered 151 days to reach harvest maturity on 26.09.2022 under the conditions of accumulating a useful temperature required to cover the growth and development phenotypes of 3270°C. Yields recorded in the three crop years for the three hybrids ranged from 7.24 t/ha to 11.66 t/ha for hybrid Felix, from 7.48 t/ha to 9.95 t/ha for hybrid Iezer and from 8.96 t/ha to 11.80 t/ha for hybrid F423.*

**Key words:** maize, climatic conditions, precipitation, temperature, yields.

## EFFECT OF FUNGICIDES ON DEOXYNIVALENOL CONTENT IN WINTER WHEAT (*Triticum aestivum* L.)

Adelina HARIZANOVA, Vanya IVANOVA

Agricultural University of Plovdiv, 12 Mendeleev Blvd,  
Plovdiv, Bulgaria

Corresponding author email: aharizanova@yahoo.com

### **Abstract**

*The aim of the present study was to analyze the effect of four fungicidal products on Gibberella ear rot (*Fusarium graminearum*) on yield quality and quantity of winter wheat (*Triticum aestivum* L.), cv. Venka 1 and choose the more appropriate application rate. The field experiment was performed in 2022 in Ruse region, Bulgaria. A local variety of winter wheat sensitive to *Fusarium* ear rot was chosen. The test product (Prothioconazole 174 g/l + Pydiflumetofen 60 g/l) was applied in three dose rates – 0.9, 1.2, and 1.5 l/ha. As reference products, three registered fungicides were selected: Prosaro 420 SC (Prothioconazole 210 g/l + Tebuconazole 210 g/l) – 1 l/ha, Delaro (Prothioconazole 125 g/l + Trifloxystrobin 125 g/l) – 1 l/ha, and Input (Prothioconazole 160 g/l + Spiroxamine 300 g/l) – 1 l/ha and 1.25 l/ha. Nine variants, including untreated inoculated control and seven different treatments, were analyzed. The results showed a significant decrease in the disease severity and incidence after applying all the products and a reduction of deoxynivalenol content in the grain. The yield of all the fungicide treated plots increased.*

**Key words:** fungicide, *Fusarium graminearum*, mycotoxins, winter wheat, yield.



## EFFICIENCY OF WINTER WHEAT CULTIVATION AFTER SPRING BARLEY IN THE NORTHERN STEPPE OF UKRAINE

Iryna HASANOVA<sup>1</sup>, Marharyta YERASHOVA<sup>1</sup>, Nataliia NOZDRINA<sup>2</sup>,  
Oleksandr PEDASH<sup>1</sup>, Alla KULYK<sup>1</sup>

<sup>1</sup>State Establishment Institute of Grain Crops of National Academy  
of Agrarian Sciences of Ukraine, 14 Volodymyr Vernadsky Street,  
Dnipro, 49009, Ukraine

<sup>2</sup>Dnipro State Agrarian and Economic University,  
25 Serhii Yefremov Street, Dnipro, 49000, Ukraine

Corresponding author email: natalija\_87@ukr.net

### **Abstract**

*The influence of environmental conditions and mineral fertilizers on the efficiency of growing winter wheat after spring barley was revealed. It was found that nitrogen feedings after stubble previous crop in the spring-summer period of growing season does not lead to an increase in plant productivity in dry years. In favorable years in terms of moisture supply yields and economic indicators of cultivation increased. Thus, on average for 2016-2018, the highest yield and net income from the growing winter wheat after spring barley were obtained in the experimental variants, where feeding with ammonium nitrate  $N_{60}$  on the background of  $N_{60}P_{60}K_{30}$  was carried out on freeze-thawed soil or in two terms:  $N_{60}$  on freeze-thawed soil and  $N_{30}$  locally at the end of the tillering stage of plants. According to the fertilization variant, the yield and net income varied within 4.78-5.47 t/ha and 16,041-19,949 UAH/ha, as well as 5.03-5.62 t/ha and 16,752-21,347 UAH/ha.*

**Key words:** winter wheat, variety, previous crop - spring barley, nitrogen feedings, yield, economic efficiency.

## RESEARCH ON THE INFLUENCE OF PROCAINE TREATMENT ON POTATO PRODUCTION AND QUALITY

**Ioana Alina HÎNDA, Ștefan Laurențiu BĂTRÎNA,  
Ilinca Merima IMBREA, Lucian BOTOȘ, Florin IMBREA**

University of Life Sciences "King Michael I" from Timisoara,  
119 Calea Aradului Street, Timisora, Romania

Corresponding author email: stefan.batrina@usab-tm.ro

### **Abstract**

*The response of agricultural crops to the application of biostimulators depends on the climatic conditions, the type of soil and cultivated variety. While knowing the role of biostimulators on the growth and development of crops, as well as on quantitative and qualitative increases in the scientific field, the aim of this research is to follow the influence of procaine treatments on the level of production and quality of two potato varieties (Armonia and Gared), depending on planting density ( $55 \times 10^3$  and  $70 \times 10^3$  tubers/ha). The tubers were treated with procaine by immersion, for two hours, prior to planting, in a 10 mg/l solution. The research was carried out in the period 2019-2022, in the pedoclimatic conditions of the Almaj Depression, on a semi carbonate eutric alluvial type soil, located in the meadow area, with loamy-sandy texture, slightly alkaline soil reaction, pH 7.67, and a medium humus content (2.72%). The researched area has a moderate continental temperate climate, with Mediterranean and oceanic influences, which give a special nuance to the depression, with multiannual average of atmospheric precipitation varying between 670-750 mm. Fertilization of the crop was achieved by incorporating under ploughing 25 t/ha of manure and 600 kg/ha of 15:15:15 complex fertilizers. The results obtained highlight the positive effect of the treatment with procaine on the tubers before planting, on average on the two tested varieties and the two densities, expressed in production increases of 7%.*

**Key words:** procaine, potato variety, crop planting density.

## ANALYSIS OF THE AGRONOMIC TRAITS OF 15 MAIZE HYBRIDS CULTIVATED IN THE WESTERN PART OF ROMANIA

Marinel Nicolae HORABLAGA<sup>1,2</sup>, Codruța CHIS<sup>2</sup>,  
Ștefan Laurențiu BĂTRÎNA<sup>2</sup>, Ioana HÎNDA, Ilinca Merima IMBREA<sup>2</sup>,  
Adina HORABLAGA<sup>2</sup>, Florin IMBREA<sup>2</sup>

<sup>1</sup>Lovrin Agricultural Research and Development Station,  
200 Principala Street, Lovrin, Romania

<sup>2</sup>University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: [codruta\\_chis@usab-tm.ro](mailto:codruta_chis@usab-tm.ro)

### **Abstract**

*This paper presents the analysis of 15 cultivated maize hybrids for further selection of the hybrids that present a high yield potential and favourable agronomical traits, in the context of actual climate change. The analysis and interpretation of the obtained results was performed with the help of the IBM Spss statistical software. Descriptive characteristics were calculated: average, median, standard deviation, minimum values and maximum values. In order to analyse the significant differences, the ANOVA and Duncan statistical test was applied, respectively Kruskal Wallis and Mann-Whitney. For the study of the links between the variables, the Pearson correlation coefficients and the regression lines were determined. The results are indicating the existence of significant differences between the analysed parameters. Also, the results are correlated to the meteorological data, registered during the corresponding development phase of the plants.*

**Key words:** maize hybrids, agronomic characteristics, climate change.

## STUDY OF AGRONOMIC CHARACTERISTICS OF SOME CORN LINES CREATED AT SCDA LOVRIN

**Marinel Nicolae HORABLAGA<sup>1,2</sup>, Corduța CHIȘ<sup>1</sup>,  
Ștefan Laurențiu BĂTRÂNA<sup>1</sup>, Ilinca Merima IMBREA<sup>1</sup>,  
Adina HORABLAGA<sup>1</sup>, Florin IMBREA<sup>1</sup>**

<sup>1</sup>University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

<sup>2</sup>Lovrin Agricultural Research and Development Station,  
200 Principala Street, Lovrin, Romania

Corresponding author email: [codrutachis@gmail.com](mailto:codrutachis@gmail.com)

### ***Abstract***

*The aim of this research was to analyse the agronomic characteristics of a maize variety consisting of 20 inbred lines, which are used as germplasm sources for hybrid maize production at SCDA Lovrin. The statistical analysis and interpretation of the results were carried out using IBM SPSS software. Descriptive statistics, including mean, median, standard deviation, minimum, and maximum values, were calculated. To evaluate the significance of the differences, ANOVA and Duncan's multiple range tests, as well as Kruskal-Wallis and Mann-Whitney U tests, were performed. Pearson correlation coefficients and regression lines were determined to study the relationships between variables. The results indicate significant differences between the studied traits, such as leaf color, leaf orientation, anther color (tassel), silk color, ear position (degree), total number of leaves, number of leaves up to the main ear, and number of tassel branches. Additionally, a linear correlation was observed between the number of growing degree days (GDD) to flowering/silking and the total accumulated GDD until flowering/silking.*

***Key words:*** maize inbred line, agronomical traits.

## WINTER WHEAT VARIABILITY UNDER ETHYLMETHANSULFONATE ACTION

Vladislav HORSHCHAR, Mykola NAZARENKO

Dnipro State Agrarian and Economic University,  
25 S. Efremova Street, Dnipro, Ukraine

Corresponding author email: [nik\\_nazarenko@ukr.net](mailto:nik_nazarenko@ukr.net)

### ***Abstract***

*The object of research was the hereditary variability of a group of genotypes, selected in order to maximally characterize the existing biological diversity of winter wheat cultivated in Ukraine. Winter wheat dry seeds of eight varieties were acted with water (control) and EMS (ethylmethansulfonate) action in concentrations of 0.025%, 0.05%, 0.1%. An extremely high general mutation rates and variability in the spectra of changes was observed. The level of variability showed that the concentration of 0.05% was more promising in terms of the number of altered traits; it was also successful in inducing predominantly agronomical-valuable traits. (earliness, forms with long well-grained spike, short stem, semidwarf, with high photosynthetic ability, lines with high grain productive. New promising lines were identified with improved plant architecture, optimal ratio between grain and vegetative part of the plant (index of economic value). A further increase in the concentration of the mutagen to 0.1% only led to a decrease in variability and a smaller number of valuable forms. However, it can be used to obtain dwarf forms and forms with systemic changes in the spike.*

**Key words:** *winter wheat, chemical mutagenesis, ethylmethansulfonate, mutation, plant improvement.*

## **DRY PERIODS INFLUENCE UPON MORPHOLOGICAL CHARACTERS OF TURDA 248 MAYZE HYBRID COBS**

**Nicolae IONESCU, Oana Daniela BADEA, Diana Maria POPESCU,  
Mariana Cristina NICOLAE**

Agricultural Research and Development Station Pitesti,  
5 Pitesti-Slatina Road, 117030, Pitesti, Romania

Corresponding author email: nicolaeionescu50@gmail.com

### ***Abstract***

*The current characteristics of maize plant are evolving by new breeding tolerance for dry season during vegetation period. The habit of the plant in general, but also the cobs prove true productive performances. However, the expression of the specific characteristics of the cobs is closely related to the natural provision of water. Being a moisture-loving plant, it is not uncommon to encounter periods of deficiency, especially during the deposition of dry matter in the grain. The intensity of these periods of drought causes some depressions in the morphology of the cobs and grains. The present study compares the cobs of the hybrid Turda 48 obtained in three different years, namely a relatively normal one and two years with obvious drought accents. From the data obtained, the cobs affected by the drought were 3 cm shorter and 0.2 cm thicker. The weight of the cobs decreased by 40-60 g, the number of grains on a cob decreased by 150, and the mass of the grains also decreased by 40-60 g. Grain percent of the cobs was reduced by 1-3 %. The grains formed were 0.5-1 mm shorter, the width remained at the same level, and the grain thickness was smaller by 0.6-0.8 mm. The mass of a thousand grains decreased by 20-40 g.*

***Key words:*** cobs, grains, maize, morphological characters, variability.

## MICOFLORA ASSOCIATED WITH WHEAT SEEDS

Laura Mihaela IOSUB<sup>1</sup>, Elena Ștefania IVAN<sup>2</sup>, Mădălin RADU<sup>1</sup>,  
Costel MIHALAȘCU<sup>1</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Research Center for Studies of Food Quality and Agricultural Products,  
University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: lorimihaela@yahoo.com

### **Abstract**

*The research followed the identification in laboratory conditions of the microflora associated with wheat seeds. The biological material was represented by caryopsis from the Glosa and Boema varieties, used in the experiments monitored in our research. For both varieties, we worked with the PDA and malt agar culture medium variants and untreated seeds, seeds disinfected with distilled water and 70% ethanol solution. Each variant was represented in three repetitions. In the case of the Glosa variety, the most common micromycetes belonged to the genera Alternaria and Stemphylium, and in the case of the Boema variety, micromycetes from the genera Penicillium and Alternaria were detected. In both varieties, in the untreated(control) and disinfected with distilled water variants, Rhizopus spp. was established. The poorest microflora was detected in the variant disinfecting the seeds with 70% ethanol solution. Seed germination was not affected.*

**Key words:** wheat, mycoflora, seeds, varieties.

## THE INFLUENCE OF STORAGE CONDITION ON MYCOTOXIN LOAD ON MAIN FEED INPUTS IN SOUTHEAST ROMANIA

**Elena Ștefania IVAN, Silviu-Ionut BEIA, Costel MIHALASCU,  
Roxana CICEOI**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: elena.ivan@qlab.usamv.ro

### ***Abstract***

*Mycotoxins are toxic compounds for animals and humans, naturally produced by different types of fungi. Exposure to mycotoxins through the consumption of contaminated food or feed leads to gastrointestinal and renal disorders to the point of immune deficiency and cancer. Most mycotoxins are chemically stable and persist in food processing. Fusarium graminearum is a dangerous pathogen of the cereals producing mycotoxins (trichothecene and zearalenone) harmful for human and animal health. Given the implementation of the requirements of the European Green Deal, especially those related to organic products, and in the context of climate change, especially the fluctuations in temperature and humidity, the increase of the presence of mycotoxins in food and feed is expected. In these conditions, the evaluation of the degree of mycotoxin contamination in different steps on the food chain, with fast and accurate methods, is very important. The aim of this work was to investigate the dynamics of fungi and related mycotoxins on wheat, maize and sunflower during cereal storage in vertical and classic silos.*

**Key words:** *wheatcorn, sunflowers, feed contamination, mycotoxins.*



## **EFFECT OF SPOTLIGHT PLUS ON DESICCATION IN SOYBEAN**

**Atanas IVANOV, Adelina HARIZANOVA**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: [ativanov@icloud.com](mailto:ativanov@icloud.com)

### ***Abstract***

*The present study aims to evaluate the effect of different doses of the selective herbicide Spotlight Plus on desiccation in soybean. The field experiment was set up in 2022 in the region of Knezha, Northern Bulgaria. Seven treatments, including untreated control, four experimental doses of the selective product Spotlight Plus, and two dose rates of the non-selective product Beloukha with a broad spectrum action, were analyzed. The products were applied with an experimental sprayer Pulvexper at BBCH stage 87. The results showed that using the selective product Spotlight Plus containing 60 g/l carfentrazone-ethyl as a desiccator does not negatively affect the crop's yield quantity or oil content. The application with both of the tested products increased the desiccation rate on pods, stems, and leaves in comparison to the untreated plots and enhanced the crop yield.*

**Key words:** *carfentrazone-ethyl, desiccation, herbicide, soybean, yield.*

**MYCOTOXIN CONTENT IN MAIZE IN THE CASE  
OF FUSARIUM GRAMINEARUM INOCULATION IS  
REDUCED AFTER FUNGICIDAL TREATMENT**

**Atanas IVANOV, Adelina HARIZANOVA**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: [ativanov@icloud.com](mailto:ativanov@icloud.com)

***Abstract***

*The present study aims to investigate the effect of two pesticide products against Gibberella ear rot (Fusarium graminearum) on yield quality and quantity of maize (Zea mays L.) and choose the more appropriate application dose and time. Three field experiments were performed in the period 2019-2021 in the Plovdiv region, Bulgaria. Three different varieties of maize were used. The pesticides used were Propulse 250 SE (prothioconazole 125 g/l + fluopyram 125 g/l) - applied in two doses - 0.6 l/ha or 1 l/ha and Prosaro 420 SC (prothioconazole 210 g/l + tebuconazole 210 g/l) – applied in only one dose – 1 l/ha. Seven variants, including untreated control and six different treatments, were analyzed. The treatments were divided into two groups. To understand which application moment was more appropriate, half of the plots were treated before the inoculation, and the others – during the sporulation phase of the pathogen. The results showed a significant reduction in the disease severity and incidence after the application of both products. There were also differences in yield quantity and thousand kernel weight, hectoliter mass, and the content of deoxynivalenol.*

***Key words:*** deoxynivalenol, gibberella ear rot, maize, prothioconazole, yield.

## PRODUCTIVITY OF DURUM WHEAT VARIETIES IN THE SOIL AND CLIMATE CONDITIONS OF PLOVDIV REGION

**Tanko KOLEV, Zhivko TODOROV**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: tanko\_kolev@yahoo.co.uk

### ***Abstract***

*Field experience was carried out in 2017-2020 at the Educational Experimental and Implementation Base of the Agricultural University of Plovdiv. The following new varieties of Durum wheat selected at the Institute of Field Crops in the city of Chirpan were tested: Kehlibar, Reyadur, Tserera and Trakiets. They are compared to the standard of productivity variety Predel. The aim of the study is to establish the productivity of Durum wheat variety Kehlibar, Reyadur, Tserera and Trakiets under the soil and climatic conditions of the Plovdiv region. The field experiment was conducted using the block method in four replications with a harvest plot size of 15 m<sup>2</sup>. As a result of the three-year study, it was found that the productivity of Durum wheat variety Reyadur was the highest 4.520 t/ha with 0.455 t/ha (11.2%) higher grain yield compared to the standard variety Predel. Followed by Kehlibar variety 4.328 t/ha with 0.263 t/ha (6.5%); variety Trakiets 4.209 t/ha with 0.144 t/ha (3.5 %) and variety Tserera 4.146 t/ha with 0.081 t/ha (2.0 %) more grain compared to variety Predel. The higher productivity of the new varieties of Durum wheat is the result of the increased values of the structural components of the grain yield: productive tillering, number of grains and weight of grains per ear.*

**Key words:** durum wheat, varieties, productivity, grains yield.

## TESTING OF RETARDANTS ON DURUM WHEAT

**Tanko KOLEV, Zhivko TODOROV**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: tanko.kolev@abv.bg

### ***Abstract***

*In 2018-2021, the following retardants were tested at the Experimental and Experimental Base of the Agricultural University of Plovdiv, Bulgaria: Medax Top (1000 ml/ha); Baya (1500 ml/ha) and Bogotá (2500 ml/ha). The treatment of Durum wheat (Desf.) variety Saya was carried out in phenological phase BBCH 30-39. It was found that the highest grain yield was obtained when the durum wheat variety Saya was treated with the Medax Top retardant (1000 ml/ha), with an average of 4.632 t/ha or 9.0 % more than the water control over the three-year period. In second place is the Bogota retardant (2500 ml/ha) with a grain yield of 4.507 t/ha or 6.0%, followed by the Bayja 1500 ml/ha retardant with a yield of 4.410 t/ha or 3.7% more than the control.*

***Key words:*** durum wheat, retardants, grain yield.

**THE EFFICIENCY OF THE APPLICATION  
OF PREPARATIONS BASED ON ADHESIVE  
AND SURFACTANT SUBSTANCES AND DESICCANTS  
IN GROWING SESAME SEEDS**

**Vira KONOVALOVA<sup>1</sup>, Volodymyr KONOVALOV<sup>2</sup>,  
Andrii TYSHCHENKO<sup>1</sup>, Olena TYSHCHENKO<sup>1</sup>, Serhii ROI<sup>1</sup>,  
Nadiia REZNYCHENKO<sup>1</sup>, Viktor SHARII<sup>1</sup>, Kateryna FUNDIRAT<sup>1</sup>**

<sup>1</sup>Institute of Climate-Smart Agriculture of the National Academy  
of Agrarian Sciences of Ukraine, 24 Mayatska Doroga Street, sett.  
Khlybodarske, Odesa District, Odesa Region, 67667, Ukraine

<sup>2</sup>Askanian State Agricultural Research Station of the Institute of Climate-  
Smart Agriculture of the National Academy of Agrarian Sciences of Ukraine,  
Tavrichanka Village, Kakhovka District, Kherson Region, 74862, Ukraine

Corresponding author email: [tischenko\\_andriy@ukr.net](mailto:tischenko_andriy@ukr.net)

***Abstract***

*The purpose of the study was to establish the use of various desiccants, preparations based on adhesives and surface-active substances and their combination on the productivity and seed preservation of sesame plants. The research was conducted under irrigation in the arid climatic zone of the Southern Steppe of Ukraine. In these studies, the best option for the use of various desiccants and preparations based on adhesives and surface-active substances was established. Sesame seed productivity and yield structure elements were established; correlation analysis was conducted.*

***Key words:*** *sesame, seeds, desiccant, adhesives and surfactants, yield.*

**EVALUATION OF THE GENETIC VARIABILITY  
OF WINTER PEA VARIETIES (*Pisum sativum* L.)  
FROM THE COLLECTION OF IPGR - SADOVO**

**Velika KUNEVA<sup>1</sup>, Maria SABEVA<sup>2</sup>**

<sup>1</sup>Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

<sup>2</sup>“K. Malkov” Institute for Plant Genetic Resources - Sadovo,  
Agricultural Academy, Sofia, Bulgaria

Corresponding author email: [kuneva.1977@abv.bg](mailto:kuneva.1977@abv.bg)

***Abstract***

*Subjects of the present research paper are 48 pea specimens - winter varieties taken from the collection of the Institute for Plant Genetic Resources - Sadovo. The study aims at establishing the rate of genetic similarity and genetic remoteness of the specimens kept in the national genbank. The specimens are mainly of French and Bulgarian origin. A mathematical approach was used for their group formation - a cluster, correlation and factor analysis using the following indicators - total nitrogen, crude fibres, crude ash, total sugars and tannins. There were established strong negative correlations between: total nitrogen and crude fibres ( $r = -0.896$ ); total nitrogen and crude ash ( $r = -0.853$ ), and total nitrogen and total sugars ( $r = -0.886$ ). The group formation of winter pea varieties allows higher objectivity in evaluation, as well as more possibilities for use of pea collection.*

**Key words:** *peas (*Pisum sativum* L.), total nitrogen, crude fibres, crude ash, total sugars and tannins, genetic similarity and remoteness, correlation, cluster analysis, factor analysis.*

## DETERMINATION OF VARIATION IN THE FATTY ACID COMPOSITION OF DIFFERENT FAR EASTERN WILD SOYBEAN ACCESSIONS AND IDENTIFICATION OF SUPERIOR GENOTYPES WITH OLEIC ACID CONTENT AS HIGH OLEIC POTENTIAL

Cemal KURT<sup>1</sup>, Faheem Shahzad BALOCH<sup>2</sup>

<sup>1</sup>University of Cukurova, Faculty of Agriculture,  
Department of Field Crops, Adana, Türkiye

<sup>2</sup>University of Science and Technology Sivas,  
Faculty of Agricultural Sciences and Technologies, Sivas, Türkiye

Corresponding author email: ckurt@cu.edu.tr

### Abstract

Soybean [*Glycine max* (L.) Merr.] seeds contain 20% oil, 40% protein, and 12% soluble carbohydrates by dry weight. Because of its seed composition, it is one of the most economically important oil crops globally. Soybean is the largest oilseed crop worldwide with over half of the total oilseed production, followed by rapeseed, sunflower, and peanut. Direct progenitor of cultivated soybean [*Glycine max* (L.) Merr.], is wild soybean (*Glycine soja* Sieb. & Zucc.) and it is widely distributed in China, North Eastern Russia, Korea, Japan, and Taiwan. Wild soybean accessions originating from different geographical regions harbour genetic differences. Because of many genetic variations have been lost in the process of domestication of *G. max*, soybean breeders and geneticists are interested in identifying useful genes in *G. Soja* to improve different characteristics of cultivated soybeans. Therefore, it is necessary to collect and conserve the wild soybean from different regions. When soybean is consumed directly as food, polyunsaturated fatty acids such as linoleic and linolenic acid ( $\omega$ -6,  $\omega$ -3) are essential fatty acids. These fatty acids prevent diseases such as inflammation, cardiovascular, and Alzheimer's, as well as promote fetal development. The consumption rate between  $\omega$ -6 and  $\omega$ -3 concentration has an effect on human health. Healthy ratios of  $\omega$ -6 to  $\omega$ -3 fatty acids have been reported to range from 1:1 to 4:1. Generally, the  $\omega$ -6/ $\omega$ -3 ratio in the seed oils of wild (*Glycine soja*) and cultivated soybeans (*G. max*) is 3-4:1 and 6-7:1, respectively. Wild soybeans contain almost twice the  $\alpha$ -linolenic acids (ALA) in their seed oil. Twenty-four wild soybean accessions from three different countries were investigated under field conditions in 2021. The content of oil, oleic acid, linoleic acid, linolenic acid, palmitic acid and stearic acid ranged between 4.13-12.14%, 11.4-49.74%, 29.3-56.08%, 4.81-14.33%, 10.22-13.85% and 3.3-4.64%, respectively. Also ratios of  $\omega$ -6 to  $\omega$ -3 fatty acids varied between 3.368 and 6.091. To conclude, considerable variations in oil content, fatty acid composition,  $\omega$ 6/ $\omega$ 3 ratios were noticed among 24 wild soybean accessions in this study. The Nigata, Japan accession is one of the prominent wild soybean accession in the study with high oleic acid content (49.74%).

**Key words:** wild soybean, fatty acids,  $\omega$ -6,  $\omega$ -3, high oleic. molecular biology and biotechnology. CABI, Wallingford, UK. p. 165–168.

**ECOLOGICAL PLASTICITY AND STABILITY  
OF WINTER WHEAT VARIETIES IN THE CONDITIONS  
OF SOUTHERN UKRAINE**

**Yurii LAVRYNENKO<sup>1</sup>, Andrii TYSHCHENKO<sup>1</sup>, Halyna BAZALII<sup>1</sup>,  
Vira KONOVALOVA<sup>2</sup>, Andrii ZHUPYNA<sup>1</sup>, Olena TYSHCHENKO<sup>1</sup>,  
Olena PILIARSKA<sup>1</sup>, Tetiana MARCHENKO<sup>1</sup>, Kateryna FUNDYRAT<sup>1</sup>**

<sup>1</sup>Institute of Climate Smart Agriculture of the National Academy  
of Agrarian Sciences of Ukraine, 24 Mayatska Doroga Street, sett.  
Khlybodarske, Odesa District, Odesa Region, 67667, Ukraine

<sup>2</sup>Askanian State Agricultural Research Station of the Institute of Climate  
Smart Agriculture of the National Academy of Agrarian Sciences of Ukraine,  
Tavrchanka village, Kakhovka District, Kherson Region, 74862, Ukraine

Corresponding author email: izz.biblio@ukr.net

***Abstract***

*The aim of the research was to study the ecological plasticity and stability of winter wheat varieties under the arid conditions of the southern steppe of Ukraine. The research was conducted during 2015/16–2019/20 at the Institute of Irrigated Agriculture, NAAS, and the Askanian State Agricultural Research Station, Kherson region, Ukraine. The material for the research was 10 varieties of winter wheat which were sown under conditions of optimal (irrigation) and stress (without irrigation) moistening. The response of winter wheat cultivars to growing conditions was analyzed using regression coefficient, homeostatic parameters, general adaptability, variance of specific adaptability, selection value of genotype and others. The minimum yield of varieties varied from 2.02 t ha<sup>-1</sup> to 3.72 t ha<sup>-1</sup> and the maximum - from 8.10 to 9.81 t ha<sup>-1</sup>. The obtained results are a contribution to the study of both theoretical and practical aspects of wheat drought resistance and can be used as elements of selection programs.*

***Key words:*** irrigation, natural moistening, eco gradient, homeostatic, yield.



## THE IMPACT OF THE PEA SEED TREATMENTS WITH BIO-FERTILIZERS AND BIO-AGENTS ON THE LEVEL OF PLANT NITROGEN SYMBIOTIC FIXATION

**Svitlana LEMISHKO, Mykola KHARYTONOV,  
Valentina PASHOVA, Yurii TKALICH**

Dnipro State Agrarian and Economic University,  
25 Serhii Yefremov Street, Dnipro, Ukraine

Corresponding author email: kharytonov.m.m@dsau.dp.ua

### ***Abstract***

*Main objective was to estimate impact of the pea seed treatments with bacterial fertilizers and bio-agents on the symbiotic nitrogen fixation process in the soil-plant system. Treatments of pea seed with bacterial preparations and bio-agents had different effects chemosynthesis with using nitrification energy derived from reactions involving inorganic chemicals in the rhizosphere of pea. The highest level of soil nitrification energy in the pea rhizosphere was recorded after phosphorus solubilization bacteria (PSB) + Paenibacillus polymyxa (PP) treatment option in the topsoil. The introduction of mineral fertilizers into the soil inhibited the growth of nitrification energy in the pea rhizosphere slightly. The highest pea seeds inoculation effect was observed when phosphorus-mobilizing bacteria (PSB) were combined with Paenibacillus polymyxa (PP). The maximum level of symbiotic nitrogen fixation was noted after pea seed treatments with bio- agent Agat-25 K and PGR Reacom-C.*

**Key words:** *seed treatments; pea varieties; bio-fertilizers; bio-agents; nitrogen symbiotic fixation.*

**RESEARCH ON THE INFLUENCE OF DIFFERENT  
DOSES OF NITROGEN AND PHOSPHORUS ON YIELD  
AND QUALITY INDICES ON CORN SEEDS, UNDER  
PEDOCLIMATIC CONDITIONS AT A.R.D.S. SECUIENI**

**Alexandra LEONTE<sup>1</sup>, Simona Florina ISTICIOAIA<sup>1</sup>, Paula PINTILIE<sup>1</sup>,  
Adina Cătălina DRUȚU<sup>2</sup>, Andreea ENEA<sup>1</sup>, Sabina EȘANU<sup>1</sup>**

<sup>1</sup>Agricultural Research and Development Station Secuieni,  
371 Main Street, Commune Secuieni, Neamt, Romania

<sup>2</sup>"Ion Ionescu de la Brad" Technological High School Horia - Neamt,  
115 Alexandru cel Bun Street, Commune Horia, Neamt, Romania

Corresponding author email: andreeapintilie62@gmail.com

***Abstract***

*The experience was in the experimental field of the A.R.D.S. Secuieni, and it was a bifactorial experience, of the 5x5 type, in five repetitions so that A factor was represented by different doses of phosphorus (a1 - P<sub>0</sub>; a2 - P<sub>40</sub>; a3 - P<sub>80</sub>; a4 - P<sub>120</sub>; a5 - P<sub>160</sub> kg P<sub>2</sub>O<sub>5</sub>/ha), and B factor was represented by different doses of nitrogen (b1 - N<sub>0</sub>; b2 - N<sub>40</sub>; b3 - N<sub>80</sub>; b4 - N<sub>120</sub>; b5 - N<sub>160</sub>, kg N/ha). On average, during the ten years of testing, the productions varied within quite wide limits, from 6252 kg·ha<sup>-1</sup>, in the variant in which no dose of fertilizer was applied (control - N<sub>0</sub>P<sub>0</sub>), and the maximum was recorded in the variant in which the dose of fertilizer administered was N<sub>160</sub>P<sub>160</sub> active substance, whose production was 9319 kg·ha<sup>-1</sup>. As for the protein content, it was different from one year to another, the minimum was obtained in the N<sub>0</sub>P<sub>40</sub> variant, in 2019, being 8.1%, and the maximum was obtained in the variant for which the applied dose of fertilizer was N<sub>160</sub>P<sub>120</sub>, with a protein content of 13.8%.*

***Key words:*** corn, fertiliser, nitrogen, phosphorus, yield.

## RESEARCH ON THE PROTECTION OF RAPESEED CROP AGAINST DISEASES, WEEDS AND PESTS

Steluța LIPIANU, Cristinel Relu ZALĂ, Rada ISTRATE,  
Mali-Sanda MANOLE, Costică CIONTU

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marăști Blvd, District 1, Bucharest, Romania

Corresponding author email: stelutazana@yahoo.com

### **Abstract**

*Rapeseed (Brassica napus L.) is an important oilseed crop in Europe and in Romania because of their ability to germinate and grow at low temperatures in the temperate regions. Rapeseed is primarily used to produce edible vegetable oil and meal for animal feed. Rapeseed production is negatively influenced by several diseases, arthropod pests and weeds. Chemical control is still an indispensable method in effective rapeseed protection against these harmful organisms in Romania. The work falls into integrated management strategy for rapeseed harmful organisms based on risk assessment, monitoring and management of the rapeseed crop that can be used as a framework by growers to manage rapeseed bioaggressors with reduced plant protection products inputs is required. The research was carried out during the vegetation period of 2021 and 2022 in Poșta Călnău commune, Buzău county.*

**Key words:** rapeseed, protection, diseases, weeds, pests.

**WINTER WHEAT (*T. aestivum* L.) YIELD DEPENDING  
ON THE DURATION OF AUTUMN VEGETATION  
AND THE TERMS OF SPRING VEGETATION  
RECOVERY: 50-YEARS STUDY IN UKRAINE**

**Mykola LOZINSKIY<sup>1</sup>, Larysa BURDENYUK-TARASEVYCH<sup>1</sup>,  
Mykola GRABOVSKYI<sup>1</sup>, Tetiana GRABOVSKA<sup>1</sup>, Hynek ROUBÍK<sup>2</sup>**

<sup>1</sup>Bila Tserkva National Agrarian University, Sq. Soborna 8/1,  
Bila Tserkva, 09100, Ukraine

<sup>2</sup>Czech University of Life Sciences Prague, Czech Republic

Corresponding author email: [nikgr1977@gmail.com](mailto:nikgr1977@gmail.com)

**Abstract**

*The grain yield of the national soft winter wheat standards for 1967-2018 in Ukraine was analyzed and its connection with the duration of the autumn vegetation and the time of spring vegetation recovery was established. Significant effects of climate change have been identified on the cessation of autumn vegetation, the duration of winter dormancy and the duration of the growing season of soft winter wheat. Based on the analysis of yield and cessation of autumn vegetation for 50 years, it was found that soft winter wheat forms mostly higher yields (6.13 t/ha) under the late cessation of vegetation (from 19 November to 29 November). During the very early (until 28 October) and early cessation (from 28 October to 07 October) of autumn vegetation, the yield decreased slightly and amounted to 5.77 and 5.45 t/ha, respectively. The calendar dates for the cessation of autumn vegetation have a clear tendency to change to later dates. With a slight difference in the recovery time of spring vegetation over 10-year periods, its significant variability was observed during the research years from 90 days (2013) to 150 days (1990). The highest grain yield (7.26 t/ha) of winter wheat was obtained with early (until 03 March) recovery of spring vegetation. The lowest grain yield was in wheat (5.00 t/ha) with a late and very late (4.50 t/ha) recovery of spring vegetation. On the basis of the data analysis, it was established that duration the late stop of the autumn vegetation (45-55 days), winter wheat plants accumulate the optimal amount of plastic substances, which contributes to their better overwintering and the growth of grain yield.*

**Key words:** winter wheat, autumn vegetation, spring vegetation, yield, climate change.

## MICROGRANULAR STARTER FERTILIZER EFFECTS ON GROWTH AND PRODUCTIVITY OF A HIGH-YIELD MAIZE HYBRID CULTIVATED UNDER CLIMATIC CONDITIONS OF ILFOV COUNTY

Roxana Maria MADJAR<sup>1</sup>, Cosmin Alexandru IANCU<sup>1, 2</sup>,  
Gina VASILE SCAETEANU<sup>1</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>SC Picmar Prod Com SRL, Gradistea, Ilfov County, Romania

Corresponding author email: [gina.scaeteanu@agro-bucuresti.ro](mailto:gina.scaeteanu@agro-bucuresti.ro)

### **Abstract**

*The researches presented in this paper were carried out during agricultural year 2019 in Grădiştea, Ilfov County and the main objective was investigation of the variability of yield for maize hybrid P0268 under application of a starter microgranular fertilizer with a 25 kg·ha<sup>-1</sup> dose. The chosen hybrid is characterized by high yield, resistance to drought and high temperatures, being suitable for all types of soils, including those with low level of organic matter. The selected microgranular fertilizer for experiment ensures fast start of crops, accelerating the germination and influence positively the development of root system. The efficiency of microgranular fertilizer was evidenced at all maize vegetation stages and consisted in more vigorous and intense green colored plants, well developed radicular system and stems in comparison with unfertilized control variant. At harvest time, the grain yield in the case of fertilized variant was with 229 kg·ha<sup>-1</sup>, higher in comparison with control. This experiment reveals the efficacy of microgranular fertilizer application on maize yield, but under climatic conditions of the agricultural year 2019, economic efficiency was low.*

**Key words:** maize, microgranular fertilizer, yield.

## EFFECT OF THE ROW SPACING AND PLANT DENSITY ON THE YIELD QUALITY AT SUNFLOWER

Victorița MARIN, Viorel ION

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: victorita\_chiriac@istis.ro

### **Abstract**

*The yield quantity and quality are the two parameters that insure the sale of the yield and the sale price, these being important for both the seller and the buyer. The yield quality is important also for establishing the yield destination and the storage and transport conditions. Generally, the yield quality is expressed through different parameters. In the case of the sunflower yield, among these parameters are counting the oil content of the seeds and the specific weight. These parameters are influenced by different factors, climatic and technological. Taking into account these aspects, the objective of this paper is to present the results regarding the effect of the row spacing and plant density on the yield quality at sunflower expressed through the oil content of the seeds and the specific weight. For reaching this objective, field experiments were performed under rainfed conditions in four locations in South and Est of Romania. Researches were carried out in three years (2019, 2020, and 2021), four sunflower hybrids being studied at three row spacing (70, 60, and 50 cm) and at three plant densities (50,000, 60,000, and 70,000 plants/ha).*

**Key words:** sunflower, yield quality, row spacing, plant density.

## **ROW SPACING AND PLANT DENSITY EFFECT ON YIELDING COMPONENTS OF THE SUNFLOWER HEAD**

**Victorița MARIN, Viorel ION**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: victorita\_chiriac@istis.ro

### ***Abstract***

*Matching the optimum spacing between rows and plants with the growing conditions for the different categories of hybrids is a matter of actual and future concern, this being of great interest for sunflower growers. In this context, the objective of this paper is to present the results regarding the yield components of the sunflower head (head diameter, number of grains per head, and grain weight per head) obtained at different row spacing and plant density conditions. Researches were performed in field conditions in four locations in South and Est of Romania, in three years (2019, 2020, and 2021). In each location and experimental year, a number of four sunflower hybrids were studied at three row spacing (70, 60, and 50 cm) and at three plant densities (50,000, 60,000, and 70,000 plants/ha). The increasing of plant density decreased the values of all the yield components, while for the row spacing the results were specific for the yield component.*

**Key words:** sunflower, yield components, row spacing, plant density.

## CONTROL OF RYE PESTS AND PATHOGENS ON SANDY SOILS IN SOUTH OF ROMANIA

Gheorghe MATEI<sup>1</sup>, Valentin Nicolae VLĂDUȚ<sup>2</sup>, Otilia COTUNA<sup>3,4</sup>,  
Veronica SĂRĂȚEANU<sup>3</sup>, Marius PARASCHIVU<sup>1</sup>, Lorena Diana POPA<sup>5</sup>

<sup>1</sup>University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Dolj County, Romania

<sup>2</sup>National Institute of Research-Development for Machines and Installations  
Designed to Agriculture and Food Industry-INMA, 6 Ion Ionescu de la Brad  
Blvd, 013813 Bucharest, Romania

<sup>3</sup>University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

<sup>4</sup>Agricultural Research and Development Station Lovrin, Timis County,  
Romania

<sup>5</sup>Agricultural Research and Development Station Secuieni, Neamt County,  
Romania

Corresponding author email: otiliacotuna@yahoo.com

### **Abstract**

*Due to climate change and human activity, biotic constrainers are anticipated to expand to regions where they were previously irrelevant. This will present new management challenges for crops, particularly in cropping systems dependent on minor cereals diversification. In Central and Eastern Europe, Secale cereale is a minor cereal that contributes to the diversity of crop species, particularly in marginal areas where wheat cultivation is unfavourable. During 2020-2021, using different chemical and biological pesticide formulations, a plant-pest-pathogen interaction profile was observed on Suceveana rye genotype in a randomized complete block design with three replications in dry area from South of Romania. The best protection against leaf rust (*Puccinia recondita* f.sp. *secalis*) was provided by Poliversum (*Pythium oligandrum* M1,  $1 \times 10.000.000$  oospors/g product) for the 1st assessment - attack degree = 0,65% and for the 2nd assessment - attack degree = 1.42%, while against pests was provided by Bioinsekt and deltametrin (0,75 ml/ha). Negative and significant correlation of leaf rust attack with grain yield ( $r = -0.8561^{***}$ ) and pests attack with grain yield ( $r = -0.8631^{***}$ ) were found during 2020-2021 cropping season.*

**Key words:** *Secale cereale, attack degree, leaf rust, pesticides formulation, pests.*



**RESEARCHES CONCERNING THE INFLUENCE  
OF THE MAIZE HYBRID MATURITY AND  
THE IRRIGATION REGIME ON THE THOUSAND  
KERNEL WEIGHT AND HECTOLITER MASS**

**Viorel MIRCEA, Celzin AEDIN, Doru Ioan MARIN**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: mirceaviorel8@yahoo.com

***Abstract***

*The scientific data presented in this paper were obtained in an experiment unfolded in 2017, 2018 and 2019 at ARDS Marculesti, Călărași County, Romania. The experiment was set up using the two-factor subdivided plot method, the A-factor was the corn hybrid and B factor-irrigation regime. The subdivisions of A factor have been: a1- P9175 (FAO 330), a2 - KWS BELLAVISTA (FAO 330), a3 - KWS SMARAGD (FAO 350), a4 - KWS KASHMIR (370 FAO) and a5 - KWS DURANGO (FAO 480). The subdivisions of B factor have been: b1 - rainfed; b2 - stressed at and after flowering; b3 - stressed before flowering and b4 - full irrigated throughout the vegetation period. The highest hectoliter mass values, as average, were obtained by the Bellavista hybrid and the lowest by the P9175 hybrid. As regard HLM, no significant values between irrigation treatments were recorded. The lowest TKW values were recorded in the Bellavista and Smaragd hybrids. The mass of one thousand grains registered very significantly positive differences between rainfed and irrigated, with very large amplitudes, close to 100 g.*

**Key words:** *the thousand kernel weight (TKW), the hectoliter mass (HLM), corn hybrids, irrigation regimes.*

## OPPORTUNITIES FOR CHEMICAL CONTROL OF SOME WEEDS IN WHEAT

**Anyo Mitkov**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: anyomitkov@abv.bg

### ***Abstract***

*In 2021 and 2022, a field experiment with the winter wheat variety 'Enola' was conducted. The trial was performed on the experimental field of the Agricultural University of Plovdiv, Bulgaria. The efficacy and selectivity of the following five herbicides was under evaluation - Pontos (240 g/l flufenacet + 100 g/l picolinafen) – applied in three rates, Pallas 75 WG (75 g/l piroxulam), Axial One (45 g/l pinoxaden + 5 g/l florasulam), Atlantis Flexx 20,25 WG (45 g/kg mesosulfuron + 67,5 g/kg propoxycarbazon-potassium + 90 g/kg mefenpir-dietil), and a tank mixture of Biathlon 4 D (714 g/kg tritosulfuron + 54 g/kg florasulam) and Axial 050 (50 g/l pinoxaden). The herbicidal treatments were compared with untreated control. The natural weed infestation was presented by the weeds corn chamomile, common poppy, wild mustard, wild radish, ivy-leaved speedwell, annual raygrass, and wild oat. Biological yield was reported for both years of the experiment. The highest average yield of the two experimental years was found for the variant treated with the tank mixture of Biathlon 4 D + Axial 050- 6.31 t/da.*

**Key words:** wheat, weeds, herbicides, efficacy, selectivity.

**SYMBIOTIC PLANT GROWTH-PROMOTING  
MICROORGANISMS ASSOCIATED  
WITH CANCER BUSH IN LIMPOPO PROVINCE**

**Thobile Perseverance MKHWANAZI, Rivoningo UBISI,  
Mmagadima SEBATI, Zakheleni DUBE,  
Terence SUINYUY, Abby MASENYA**

University of Mpumalanga, Cnr R40 and D725 Roads,  
Mbombela 1200, n, Nelspruit, South Africa

Corresponding author email: mkhwanazithobile5@gmail.com

**Abstract**

*Cancer bush (Sutherlandia frutescens) belonging to Leguminosae is one of the many traditional medicinal plants recommended for conservation action in South Africa due to overharvesting that causes extinction. To effectively preserve the plant through commercial production, an understanding of the symbiotic relations with other organisms in the rhizosphere is required. The objective of this study therefore was to characterise, soilborne symbionts of cancer bush from two natural populations in Limpopo Province. Twenty isolates were phenotypically characterized on basis of colony morphology, and molecular analysis. Fourteen different species belonging to 11 genera were isolated. Of the 14 species, three belong to Stenotrophomonas, two Leucobacter, and one species each from Alcaligenes, Enterobacter, Microvirga, Rhizobium, Sphingobacterium, Serratia, Brucella, Bacillus, and Cellulosimicrobium. All the species were plant growth promoters through nitrogen fixation. This is the first comprehensive documentation of symbionts of cancer bush in South Africa. The report indicates that cancer bush in Limpopo is colonised by a vast number of symbiotic bacteria. The isolates can be used as bio-fertilizer candidates to improve soil fertility and are a better alternative of agrochemicals.*

**Key words:** 16S rDNA gene, growth promotion, nitrogen fixing, plant growth-promoting rhizobacteria (PGPR), symbiosis.

**THE RESEARCH METHODOLOGY USED REGARDING  
THE BEHAVIOR OF SOME SORGHUM HYBRIDS IN  
TERMS OF PRODUCTIVITY AND ADAPTABILITY  
UNDER THE CONDITIONS AT BRĂILA AGRICULTURAL  
AND RESEARCH AND DEVELOPMENT STATION**

**Florin MOCANU, Costică CIONTU**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: mocanufiorinn24@gmail.com

***Abstract***

*The plant that was the object of the research was represented by the sorghum plant (Sorghum bicolor, var. eusorghum) and the aim of the work was to be able to observe the behavior of some hybrids in the pedo-climatic conditions of the Brăila Agricultural Research and Development Station. It is known about grain sorghum that it presents some physiological characteristics that allow it to be cultivated in restrictive pedo-climatic conditions. These conditions refer to the presence of poor soils and areas where temperatures are higher than average and water supplies are poor. Under such conditions it is more difficult for the maize crop to provide economically profitable production. In this situation, growers can use sorghum as a safe option for obtaining profitable productions. In this paper it will be discussed the adaptability and productivity, two important elements for this crop.*

***Key words:*** sorghum, adaptability, productivity, pedo-climatic conditions.

**EFFECT OF CORIANDER (*Coriandrum sativum* L.)  
ESSENTIAL OIL CULTURE ON SOIL BIOGENICITY  
AND DETERMINATION OF ITS ANTIMICROBIAL  
ACTIVITY AGAINST *Escherichia coli***

**Pavlina NASKOVA<sup>1</sup>, Boyka MALCHEVA<sup>1</sup>,  
Dragomir PLAMENOV<sup>2</sup>, Dimitar NIKOLOV<sup>3</sup>**

<sup>1</sup>University of Forestry, 10 Kliment Ohridski Blvd, Sofia, Bulgaria

<sup>2</sup>Technical University - Varna, 1 Studentska Street, Varna, Bulgaria

<sup>3</sup>General Toshevo Municipality - chief architect,  
5 V. April Street, General Toshevo, Bulgaria

Corresponding author email: boika.malcheva@gmail.com

***Abstract***

*Soil microbiological and agrochemical indicators were analyzed during biological cultivation of coriander, in greenhouse conditions, as main indicators of good plant development, studied for antimicrobial activity against E. coli, by testing different variants of plant extracts (decoction, tincture, medicinal wine, medicinal vinegar, medicinal oil). The results of the agrochemical analysis show that coriander does not have a major impact on the dynamics of macronutrients in the soil, while the biogenicity and activity of enzymes cellulase and catalase increased in soils with coriander culture compared to the no-vegetation control. Positive antimicrobial activity against the pathogenic microorganism E. coli was reported for all variants of coriander extracts, differing for individual parts of the plant and individual variant extracts. Root and whole plant extracts showed higher antimicrobial activity compared to leaf and stem extracts. The strongest antimicrobial activity of the plant extracts was found in the medicated oil and medicated vinegar variants and the weakest in the `decoction` variants. The choice of solvent and exposure time likely influence the diameter of the retention zone.*

***Key words:*** coriander, soil microorganisms, cellulase, catalase, antimicrobial activity.

**THE INFLUENCE OF THE APPLIED MANAGEMENT  
ON THE PHYTODIVERSITY OF A  
*Festuca valesiaca* Schleich. EX GAUDIN PERMANENT  
MEADOW**

**Adrian-Ilie NAZARE<sup>1</sup>, Mihai STAVARACHE<sup>2</sup>, Costel SAMUIL<sup>1</sup>,  
Culiță SÎRBU<sup>1</sup>, Vasile VÎNTU<sup>1</sup>**

<sup>1</sup>University of Life Sciences “Ion Ionescu de la Brad” from Iasi,  
3 Mihail Sadoveanu Alley, Iasi, Romania

<sup>2</sup>Research and Development Station of Meadows, Vaslui, Romania,  
256 Stefan cel Mare Street, Vaslui, Romania

Corresponding author email: [adrian.nazare@uaiasi.ro](mailto:adrian.nazare@uaiasi.ro)

**Abstract**

*The problem of diversity has reached the top of current concerns, because modern agriculture has recently been focused on the development of methods and procedures that allow the administration of a relatively small number of species, with the aim of immediate economic interest. The objective of this study was to determine the effect of the applied management on the phytodiversity of a Festuca valesiaca permanent meadow in the Moldovian forest-steppe. The experimental factor was: fertilization with seven graduations: V<sub>1</sub>- unfertilized (control), V<sub>2</sub>- N<sub>50</sub>P<sub>50</sub> kg/ha annually, V<sub>3</sub>- N<sub>75</sub>P<sub>75</sub> kg/ha annually, V<sub>4</sub>- N<sub>100</sub>P<sub>100</sub> kg/ha annually, V<sub>5</sub>-10 t/ha sheep manure annually, V<sub>6</sub>-20 t/ha annually and V<sub>7</sub>-30 t/ha annually sheep manure applied at two years. The applied fertilizers influenced the floristic composition, producing, quantitative and qualitative changes in the vegetal cover. The dominance and frequency of the species, as well as the variation of the Shannon diversity index, were largely influenced by the amount of mineral N, the amount of manure, but also by the number of years of the fertilization period.*

**Key words:** permanent grasslands, organic and mineral fertilization, plant diversity, species frequency.

## OPTIMAL DOSES AND CONCENTRATIONS OF MUTAGENS FOR WINTER WHEAT BREEDING PURPOSES. GRAIN QUALITY

**Mykola NAZARENKO, Olexander IZHBOLDIN,  
Inna LIADSKA, Nataliia PASHCHENKO**

Dnipro State Agrarian and Economic University,  
25 S. Efremova, Dnipro, Ukraine

Corresponding author email: [nik\\_nazarenko@ukr.net](mailto:nik_nazarenko@ukr.net)

### ***Abstract***

*In addition to increasing grain yield, a promising direction in the use of mutagens is to obtain complex changes that increase the content and quality of grain protein. The main purpose of investigation is to develop possibilities of difference mutagen agents in induction mutants by protein content and quality, bread-making technological qualities and pathways for obtaining forms with combination of good grain production and qualities parameters. From 13 perspective high grain productive mutant lines 3 were separated out by combination of good grain quality and grain productivity on the level no less than national standard. Medium dose of gamma-rays (100 Gy) and concentrations of nitrosomethylureas (0.0125%) are effectively for mutation breeding on grain productivity and quality in complex. It is planned to conduct research for the optimal doses and concentrations of mutagens to obtain forms which are tolerant to abiotic stresses.*

**Key words:** *grain quality, mutagenesis, mutation breeding, protein content, winter wheat.*

**GROWTH, DEVELOPMENT, AND WEED  
SUPPRESSION CAPACITY OF *Camelina sativa* (L.)  
CRANTZ GROWN AS SOLE AND MIXED CROP  
WITH LEGUMES: PRELIMINARY RESULTS**

**Nesho NESHEV, Marina MARCHEVA, Plamen ZOROVSKI,  
Georgi STANCHEV, Yordan YORDANOV, Vladislav POPOV**

Agricultural University of Plovdiv, 12 Mendeleev Blvd,  
Plovdiv, 4000, Bulgaria

Corresponding author email: n\_neshev85@abv.bg

***Abstract***

*Camelina sativa* (L.) Crantz is a valuable crop with good drought resistance and has been proposed for cultivation in Organic farming system. The development stages of camelina, pea, and vetch grown as sole and mixed crops, and the existing weeds *S. halepense* and *S. viridis* in a field plot experiment were under evaluation. The trial was stated in the experimental field of the Agricultural University of Plovdiv, Bulgaria. On the last reporting date the camelina genotypes 'Luna' and 'Lenka' entered the beginning of the flowering stage, and the Bulgarian landrace showed better development and was in the full flowering stage. The pea and vetch were in the full flowering stage as well. The development stages of the mixed cropping systems were the same as the growing stages of their sole crops. The mixed cropping system of the well-developed Bulgarian camelina landrace grown in a mixed cropping system with pea and vetch suppressed the growth and development of the weeds reported. In the sole crops, the reported weeds developed faster and accumulated a greater amount of biomass.

**Key words:** *Camelina sativa*, intercrops, growth, development, weeds.



## CLIMATE CHANGE AND ITS IMPACT ON WATER CONSUMPTION IN THE MAIN AGRICULTURAL CROPS OF THE ROMANIAN PLAIN AND DOBROGEA

Oana Alina NIȚU<sup>1</sup>, Elena Ștefania IVAN<sup>2</sup>, Daniel Sorin NIȚU<sup>1</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Research Centre for Study of Food Quality and Agricultural Products,  
University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: oanaalinanitu1111@gmail.com

### **Abstract**

*Drought is the limiting factor that manifests itself on the largest agricultural area. The agricultural areas most vulnerable to soil water scarcity are those of Dobrogea, the south of the Romanian plain, the south-east and east of Moldova, as well as the west of the Tisei Plain. The purpose of the research was to calculate the moisture deficit and the need for water for irrigation based on climate scenarios made with different global climate models, as well as determining the water consumption of irrigated crops according to the expected climate change in the Romanian climate regime. In order to predict the effects of climate change, it was followed in the areas served by Constanta and Tecuci weather stations the modification of the elements of the irrigation regime in case of possible increases in average temperatures by 2°C respectively 5°C. The management of irrigation water in a given area was established according to the estimated moisture deficit as the difference between water consumption and useful rainfall during the growing season of crops.*

**Key words:** *limited water supplying, watering rate, irrigation norm, water consumption.*

**RESEARCH ON VEGETATION INDICATORS  
IN *Primula officinalis* Hill. SPECIES  
USING FIELDSCOUT CM 1000 NDVI METER**

**Sorina NIȚU (NASTASE)<sup>1</sup>, Răzvan-Damian NIȚU<sup>2</sup>,  
Emilia CONSTANTINESCU<sup>3</sup>**

<sup>1</sup>National Institute of Research and Development for Potato and Sugar Beet  
Brasov, 2 Fundaturii Street, 500470, Brașov, Brasov County, Romania

<sup>2</sup>Faculty of Agriculture, University of Agricultural Sciences and Veterinary  
Medicine of Cluj-Napoca, 3-5 Calea Manastur Street,  
400372, Cluj-Napoca, Romania

<sup>3</sup>University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Dolj County, Romania

Corresponding author email: emiliaconst2000@yahoo.com

***Abstract***

*Studies were carried out during the growing season of Primula officinalis Hill., to obtain information on the health status of the plants and the influence of the measurement date on NDVI values. The FIELDSCOUT® CM1000 NDVI Meter measures the NDVI differentially in the presence of light at 660 nm and 840 nm wavelengths. Three determinations in dynamics were made. Three plants were analysed for each variant/repeat/row, with each plant having three readings on three different leaves, resulting in a total of 729 readings and 243 plants analysed in each determination. The study of the influence of the measurement date on the NDVI values in leaves of Primula officinalis Hill. in 2018 shows a slight increase in the values measured on 03.05.2018 by 0.08 units, which is distinctly significant compared to the first measurement, considered as a control. The results on the interaction of the two factors on NDVI values in 2019 showed that on 20.05.2019 all planting variants had distinctly significant and highly significant values relative to the control.*

**Key words:** measurements, NDVI, *Primula officinalis* Hill., vegetation index.

## PRODUCTION OF STRAW CEREALS UNDER THE INFLUENCE OF SOIL TILLAGE AND CLIMATE CONDITIONS, FROM SOUTH-EAST ROMANIA

Daniela OPREA<sup>1,2</sup>, Luxița RÎȘNOVEANU<sup>3,4</sup>, Alin Ionel GHIORGHE<sup>2,3</sup>,  
Maria JOIȚA-PĂCUREANU<sup>1,5</sup>, Gabriel-Florin ANTON<sup>1</sup>,  
Denisa PAUN-CIOBOTARU<sup>1,2</sup>

<sup>1</sup>National Agricultural Research and Development Institute  
Fundulea, 1 Nicolae Titulescu Street, 915200, Calarasi, Romania

<sup>2</sup>University of Agronomic Science and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>3</sup>Agricultural Research Development Station Braila, Viziru km 9 Street,  
Braila County, Romania

<sup>4</sup>Bucharest University of Economic Studies, Faculty of Agri-food &  
Environmental Economics, Research Center for Sustainable Development,  
6 Piata Romana Street, 010374, Bucharest, Romania

<sup>5</sup>Center for Studies and Research for Agroforestry Biodiversity,  
Acad. “David Davidescu”, Romanian Academy, Bucharest, Romania

Corresponding author email: luxita\_risnoveanu@yahoo.co.uk

### **Abstract**

*Supplying the necessary food to the global population is threatened by how pollution affects food quality. Pollution manifests itself through the defective management of natural resources and the instability of environmental factors. These variations in temperatures and rainfall become problematic with each passing year. The worrisome predictions of climate change and particularly its repercussions on agriculture and the survival of mankind challenge researchers to constantly look for solutions regarding crop technology and the type of cultivated plants so that the impact on the environment is minimum while obtaining rich and qualitative harvests. This paper aims to observe and analyze the adaptability of straw cereal species to the types of tillage that characterize the dry-farming work system under different conditions of abiotic stress recorded between 2019-2022. The triticale crop showed positive yield increases compared to the control tillage in all specific conservation agriculture tillages during the three-year study, while the rye crop showed instability regarding yields.*

**Key words:** *staw cereals, adaptability, conservative agriculture, yields.*

**A STUDY ON THE GERMINATIVE CAPACITY  
AND HERBA YIELD OF *Hyssopus officinalis* L.**

**Magdalena Cristina OSINCEANU, Ilinca Merima IMBREA,  
Alina NEACȘU, Ștefan Laurențiu BĂTRÎNA, Ioana Alina HÎNDA,  
Florin IMBREA, Georgeta POP**

University of Life Sciences “King Mihai I” from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: [ilince\\_imbrea@usab-tm.ro](mailto:ilince_imbrea@usab-tm.ro)

***Abstract***

*Hyssopus officinalis* L. has a long and rich history as a medicinal plant due to the health benefits transmitted from generation to generation of usage as a carminative, antiseptic, and cough reliever. These benefits have drawn the attention of the researchers, whom, in the last years, have started to fundament scientific elements of the hyssops crop technology. This study aims to follow and report the germinative capacity and both fresh and dry herba yield of three hyssops varieties (white, blue and pink). The assessing of herba yield, was done at SCDA Lovrin and the germinative capacity of the studied varieties was determined in the Laboratory for Seed Quality from the Faculty of Agriculture from Timisoara. The results are highlighting significant differences between the varieties regarding germinative capacity, the mass of 1000 grains and both dry and fresh herba yield.

**Key words:** *hyssop, herba yield, medicinal plants, germinative capacity.*

## MODELING DRIP-IRRIGATED RICE YIELD USING NORMALIZED DIFFERENCE VEGETATION INDEX: A PRELIMINARY STUDY

Oleg OSINNII<sup>1</sup>, Oleksandr AVERCHEV<sup>1</sup>, Sergiy LAVRENKO<sup>1</sup>,  
Pavlo LYKHOVYD<sup>2</sup>

<sup>1</sup>Kherson State Agrarian and Economic University, 23 Stritenska Street,  
73006, Kherson, Ukraine

<sup>2</sup>Institute of Climate Smart Agriculture of the National Academy of Agrarian  
Sciences, 9 Mykhailo Omelianovych-Pavlenko Street, 01010, Kyiv, Ukraine

Corresponding author email: pavel.likhovid@gmail.com

### **Abstract**

*Rice is one of the major food crops with a growing demand on the global market. The need for water-saving and environmentally friendly technologies presses current agricultural science to look for alternative ways of rice irrigation. The most prospective one is drip irrigation. Yield prediction is also of great importance for sustainable agriculture. The goal of the study was to create a pilot model for drip-irrigated rice yield prediction in the conditions of the South of Ukraine using spatial normalized difference vegetation index. The index values were taken from OneSoil AI platform for the drip-irrigated rice cultivated in 2016-2017 within the framework of cultivation technology studies. The highest index value was recorded in the stage of “tillering-heading” and applied for the regression and neural network-based models. It was established that the performance of various regression models was quite similar in fitting quality and accuracy, while neural network-based one provided significantly higher precision. It is reasonable to simulate drip-irrigated rice yield with a good accuracy (MAPE<15%) using simple linear regression model. Further improvement of predictions is expected through the increase of the sample size.*

**Key words:** artificial neural network, regression, remote sensing, statistics, yielding scale.

**ASSESSMENT OF LEAF RUST  
(*P. recondita* f. sp. *secalis*) ATTACK IN MARGINAL  
AREAS FROM SOUTHERN ROMANIA**

**Mirela PARASCHIVU<sup>1</sup>, Otilia COTUNA<sup>2,3</sup>, Veronica SĂRĂȚEANU<sup>2</sup>,  
Gheorghe MATEI<sup>1</sup>, Reta DRĂGHICI<sup>4</sup>, Alina Marinela PRIOTEASA<sup>1</sup>**

<sup>1</sup>University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Romania

<sup>2</sup>University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

<sup>3</sup>Station of Research and Development for Agriculture Lovrin,  
200 Principala Street, Lovrin, Romania

<sup>4</sup>Research and Development Station for Plant Culture on Sands,  
Dabuleni, 217 Petre Banta Street, Dolj County, Romania

Corresponding author email: veronica.sarateanu@gmail.com

**Abstract**

*Worldwide abiotic stress factors such as excessive temperature, precipitation, drought, salinity, soil pH, greenhouse gases, ultraviolet (UVB) radiation, and air pollution pose a persistent threat to both diseases and plants affecting host-pathogen relationship depending on geographical and temporal distribution of inoculum amount and cultivars susceptibility. Leaf rust of rye, which is caused by Puccinia recondita f. sp. secalis (Roberge ex. Desmaz) has become one of the most important limiting factors for rye production in Central and Eastern Europe. During 2020-2021 growing season, a plant-pathogen interaction profile was observed on four rye genotypes in a randomized complete block design with three replications in dry area from Research and Development Station for Plant Culture on Sands Dăbuleni in south of Romania. Adult plant partial resistance was assessed through host response and epidemiological parameters as final rust severity (FRS), area under the disease progress curve (AUDPC), relative area under the disease progress curve (rAUDPC), coefficient of infection (CI) and infection rate (IR). The response of rye genotypes to leaf rust included different variation in resistance reaction ranging from moderately resistant to very susceptible. A negative and highly significant correlation of AUDPC with grain yield ( $r = -0,9222^{***}$ ) was found during 2020-2021 cropping season.*

**Key words:** leaf rust, adult plant partial resistance, *Puccinia recondita* f. sp. *secalis*, epidemiological parameters.

## WHEAT YIELD AND QUALITY UNDER THE INFLUENCE OF SOWING DATE, PLANT DENSITY AND VARIETY IN SOUTH OF ROMANIA

Elena PARTAL<sup>1</sup>, Cătălin Viorel OLTENACU<sup>2</sup>, Mirela PARASCHIVU<sup>3</sup>,  
Otilia COTUNA<sup>4</sup>, Laura Elena CONTESCU<sup>1</sup>

<sup>1</sup>National Agricultural Research Development Institute Fundulea,  
1 Nicolae Titulescu Street, Fundulea, Romania

<sup>2</sup>Scientific Research-Development Baneasa, 1 Ion Ionescu de la Brad Blvd,  
Bucharest, Romania

<sup>3</sup>University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Dolj County, Romania

<sup>4</sup>University of Life Sciences "King Michael I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: [ela\\_partal@yahoo.com](mailto:ela_partal@yahoo.com)

### **Abstract**

*The efficiency of the autumn wheat crop requires the application of some general technologies, but improved with innovative and specific technological sequences, depending on the evolution of the vegetation cycle and the expected production components. The researches were performed during the 2020-2022, in the experimental field of NARDI Fundulea and aimed to study the influence of agrotechnical practices on the yields and quality of wheat. The paper presents the results obtained in experiences with sowing dates and plant density, under non-irrigation condition, in the south of the country. Recording a stable and high production of autumn wheat is possible if a good sowing quality is ensured and the optimal sowing interval and plant density per m<sup>2</sup> are observed. The variability of individual productivity of wheat plants can increase with the delay of the sowing date by up to 10-20% for the number of grains/plant and between 10-25% for the weight of grains/plant, and these lead to a decrease for production per hectare with 1000-3000 kg/ha. The variation of climatic conditions influenced negatively wheat yield and quality.*

**Key words:** wheat, yield, quality, sowing date, plant density, variety.

**BIOSYNTHETIC AND BIOCONTROL POTENTIAL  
OF ENDOPHYTIC YEAST STRAINS YP6  
AND YBS14 FOR IMPROVEMENT THE GROWTH  
AND DEVELOPMENT OF SOLANACEAE PLANTS**

**Mariana PETKOVA<sup>1</sup>, Slaveya PETROVA<sup>1,2</sup>,  
Velichka SPASOVA-APOSTOLOVA<sup>3</sup>,  
Mladen NAYDENOV<sup>1</sup>, Veselina MASHEVA<sup>4</sup>**

<sup>1</sup>Agricultural University of Plovdiv, Department of Microbiology  
and Environmental Biotechnology, Bulgaria

<sup>2</sup>Plovdiv University Paisii Hilendarski, Departments of Ecology  
and Environmental Conservation, Bulgaria

<sup>3</sup>Agricultural Academy, Tobacco and Tobacco Products Institute,  
Markovo, Bulgaria

<sup>4</sup>Agricultural Academy, Institute of Plant Genetic Resources  
“Konstantin Malkov” - Sadovo, Bulgaria

Corresponding author email: vilispasova-apostolova@abv.bg

***Abstract***

*YP6 was isolated from Triticum aestivum L. seeds and YBS14 was isolated from the roots of Helichrysum italicum L. Partial sequence analysis of ITS5-5.8-ITS4 region of the nuclear ribosomal DNA with universal primers identified YP6 as Pichia fermentans and YBS14 as Saccharomyces cerevisiae. Both yeast strains produced indole-3-acetic acid when cultivated in a medium supplemented with 0.2 % L-tryptophan. The antimicrobial activity of yeast strains against plant pathogenic fungi was determined. YP6 and YBS14 were tested for endophytic colonization of Solanaceae plants by soil drenching and leaf spraying. To establish colonization in the various tissues of tested plants, samples were taken and explants were inoculated on yeast malis agar. The effect of the microbial endophytes on photosynthesis, stomatal conductivity, and transpiration intensity was analyzed by using the portable photosynthetic system for CO<sub>2</sub> analysis in plants. In all treated plants photosynthesis was intense and growth stimulation was observed. The final aim of the present study is to evaluate endophytic yeast and demonstrate their PGP activity.*

*Key words: endophytic yeast, Solanaceae, biosynthetic potential, physiological parameters, antimicrobial activity.*



## QUALITATIVE CHARACTERISTICS OF FODDER FROM LEGUME AND GRASS CROPS IN PURE AND MIXED GRASS STANDS

**Magdalena PETKOVA, Tatyana BOZHANSKA,  
Biser BOZHANSKI, Minko ILIEV**

Agricultural Academy, Research Institute of Mountain Stockbreeding and  
Agriculture, 281 Vasil Levski Street, 5600 Troyan, Bulgaria

Corresponding author email: [magdalena.s.petkova@abv.bg](mailto:magdalena.s.petkova@abv.bg)

### ***Abstract***

*The data from the analysis indicate that T. pratense in a pure crop shows the highest resistance and adaptability in foot-hill conditions, and in mixed with L. perenne maintains the highest presence. Grass stands of T. repens had the highest CP content (210.9 g kg<sup>-1</sup>). The excess was by 9.6% (compared to L. corniculatus), 16.6% (compared to T. pratense) and 32.1% (compared to the average value). It is the crop with the lowest content of CFr (a decrease of 27.2% compared to the average value). The highest protein content was found in the biomass of L. perenne with T. pratense (151.5 g kg<sup>-1</sup>), followed by the mixture with L. corniculatus (144.8 g kg<sup>-1</sup>) and T. repens (129.7 g kg<sup>-1</sup>). Grass stands of L. corniculatus and its mixtures with L. perenne had the highest content of DM. T. repens (63.7 g kg<sup>-1</sup>) and the mixture of L. perenne with T. pratense (63.4 g kg<sup>-1</sup>) had the highest ash content.*

**Key words:** *legume and grass fodder crops, two-component mixtures, fodder quality.*

**THE INFLUENCE OF FERTILIZATION  
ON THE YIELD AND QUALITY OF SOME  
ROMANIAN WINTER WHEAT VARIETIES UNDER  
THE CONDITIONS OF CENTRAL MOLDOVA**

**Andreea-Sabina PINTILIE, Andreea ENEA, Alexandra LEONTE,  
Paula Lucelia PINTILIE, Roxana Georgiana AMARGHIOALEI,  
Lorena Diana POPA**

Agriculture Research-Development Secuieni,  
377 Principala Street, Secuieni, Neamt, Romania

Corresponding author email: andreeasabina97@yahoo.com

***Abstract***

*Breeding research for the common wheat crop has focused on quality and yield. These are closely related to each other because high yield without adequate quality or good quality without satisfactory production are not profitable for the farmer. At A.R.D.S. Secuieni, in the period 2019-2022, Romanian winter wheat varieties were tested in order to establish their yield and quality. These were influenced by the variety, the climatic conditions but also by the phase fertilization applied. On average in the three years studied, the productions had values between 7108 kg/ha (Pitar) and 8442 kg/ha (Semnal) in the case of fertilized variants and between 6201 kg/ha (Miranda) and 7669 kg/ha (Abundent) in the case of unfertilized variants. Regarding the quality of common wheat varieties, the content in protein, starch and gluten was monitored.*

***Key words:*** quality, wheat, yield.

**RESEARCH ON THE ATTACK PRODUCED BY  
*Tanymecus dilaticollis* Gyll (Coleoptera: Curculionidae)  
IN THE CONDITIONS OF CENTRAL MOLDOVA,  
ROMANIA**

**Paula Lucelia PINTILIE, Elena TROTUȘ,  
Roxana Georgiana AMARGHIOALEI, Alexandra LEONTE,  
Andreea ENEA, Andreea Sabina PINTILIE**

Agricultural Research-Development Station Secuieni,  
377 Principala Street, Secuieni, Neamt, Romania

Corresponding author email: [andra29nt@yahoo.com](mailto:andra29nt@yahoo.com)

***Abstract***

*One of the most polyphagous pests encountered in maize crops is *Tanymecus dilaticollis* Gyll. which, are consuming the plants foliage in the first phenophases of vegetation and reduce the crop density. Between 2018 and 2021, the series of research carried out in the Center of Moldova concerning the *T. dillaticollis* Gyll. pest continued and consisted in monitoring the insect attack produced at: (I) maize sown in different sowing timing and (II) different Romanian and foreign maize genotypes. The maize seeds were treated with systemic insecticide from the neonicotinoid class (imidacloprid 600 g/l) according to the disclaimers received year after year from the Ministry of Agriculture in Romania. In the experimented period, the lowest degree of attack was recorded in the late sowing time, at the beginning of May and in mid-May compared to the optimal sowing time, and the most affected by the attack of hibernating adults was the maize sown early. Regarding the attack produced in Romanian and foreign maize genotypes, it was found five of the hybrids experimented registered attack below the average experience. The results show that sowing time and maize genotype have a smaller role as opposed to spring weather conditions which are influencing the attack size and adult density in the maize crop.*

***Key words:*** maize genotype, sowing time, maize weevil.

## WHEAT YIELD RESULTS UNDER THE INFLUENCE OF N, P, K FERTILIZATION AND CLIMATIC CONDITION

**Cecilia Iuliana POP, Ștefan Laurențiu BĂTRÎNA,  
Ilinca Merima IMBREA, Georgeta POP,  
Lucian Florin BOTOS, Florin IMBREA**

University of Life Sciences “King Mihai I” from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: stefan.batrina@usab-tm.ro

### ***Abstract***

*The aim of the work was to carry out a study on the influence of climatic conditions and fertilization with chemical fertilizers on wheat production in the specific conditions of Didactical Farm (SDE) of the University of Life Sciences “King Mihai I” from Timisoara (ULST). A Fundamental contribution to the increase of the yield per unit area is made by the level of N, P, K fertilization and optimal soil and climatic conditions for exploiting the productive potential of the cultivated variety. The high ecological plasticity of wheat and its constant productions means that farmers are still very interested in this crop. Growers are also interested in the crop with the highest yield per unit area. The aim of this paper is to highlight the yield results of Ciprian wheat variety, obtained in the soil and climatic conditions of SDE during 2019-2020, under the influence of nitrogen, phosphorus and potassium fertilization in order to determine the growers to choose an optimal wheat fertilization option. Wheat yield obtained was determined by nitrogen fertilizer application from the control variant as follows:  $N_{30}$ - 485gk/ha,  $N_{60}$ -584 kg/ha,  $N_{90}$ -605 kg/ha, at all four rates the differences are statistically assured as highly significant.*

**Key words:** cultivars, fertilization, soil and climatic conditions, yield components.

## RESEARCH ON FOLIAR DISEASES OF BARLEY, MURIGHIOL LOCATION, TULCEA COUNTY

Siviu-Eugen POPESCU<sup>1</sup>, Elena Ștefania IVAN<sup>2</sup>, Stelica CRISTEA<sup>1</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
Research Center for Studies of Food Quality and Agricultural Products,  
59, Marasti Blvd, 011464, Bucharest, Romania

Corresponding author email: eugen.silviu.popescu@gmail.com

### ***Abstract***

*The research followed the evolution of the mycosis attack of autumn barley cultivated in the classical culture and during the conversion period to switch to the ecological culture, in the agricultural year 2021-2022, in Tulcea county. The frequent micromycetes were Pyrenophora teres, Pyrenophora graminea, Puccinia hordei, Rhynchosporium secalis and Blumeria graminis f.sp. hordei. In the barley cultivated in the two systems, the incidence of attack by Pyrenophora teres and Puccinia hordei was 100%. The frequency of the Pyrenophora graminea attack was 5% and 6% in the control variants. The powdery mildew attack was more sensitive to barley in the conventional culture and the Rhynchosporium secalis attack was subunit in both culture systems. The application of the treatment in the conventional system ensured an effectiveness of over 64%.*

**Key words:** barley, pathogens, diseases, degree of attack, conversion period.

**WEEDS CONTROL IN INDUSTRIAL HEMP  
(*Cannabis sativa* L.) BY USING HERBICIDES  
IN PRE-EMERGENCY AND POST-EMERGENCY**

**Ioan PUIU<sup>1</sup>, Loreana-Diana POPA<sup>2</sup>, Carmen Simona GHITAU<sup>1</sup>,  
Costel SAMUIL<sup>1</sup>, Constantin LUNGOCI<sup>1</sup>, Laurențiu PINTRIJEL<sup>3</sup>**

<sup>1</sup>University of Life Sciences “Ion Ionescu de la Brad” from Iasi,  
3 Mihail Sadoveanu Alley, Iasi, Romania

<sup>2</sup>Agricultural Research and Development Station Secuieni,  
377 Principala Street, Secuieni, Romania

<sup>3</sup>Brado Agri SRL, FN, Vascauti, Romania

Corresponding author email: ioan.puiu@uaiasi.ro

***Abstract***

*The impressive production potential of industrial hemp (*Cannabis sativa* L.) is limited by the lack of herbicides authorized for use in this crop in Romania. The aim of this research was to establish the tolerance of industrial hemp to herbicides applied in preemergence and postemergence to control dicotyledonous weeds: *Amaranthus retroflexus*, *Atriplex patula*, *Chenopodium album*, *Polygonum convolvulus*, *Sinapis arvensis*, *Xanthium strumarium*, respectively monocotyledonous: *Echinochloa crus-galli*, *Setaria* spp., *Sorghum halepense* and *Poa annua*. A number of 13 herbicides were tested, and the results demonstrate that monocotyledonous weeds can be controlled very well by the active substances clethodim and fluazifop-P-butyl (90% efficiency), and dicotyledonous weeds are effectively combated by acifluorfen (80%) applied in pre-emergence and oxyfluorfen (85%) applied pre-emergence, but oxyfluorfen causes phytotoxicity in 15% of the treated hemp plants. Also, the good effect of clopiralid on *Xanthium strumarium* and other weeds from the Asteraceae family should be mentioned.*

***Key words:*** herbicides, industrial hemp, phytotoxicity, weed control.

**CONTRIBUTIONS TO THE DEVELOPMENT  
OF THE CULTIVATION TECHNOLOGY  
OF CASTOR HYBRIDS (*Ricinus communis* L.)**

**Ioan PUIU, Teodor ROBU, Carmen Simona GHITAU,  
Constantin LUNGOCI**

University of Life Sciences “Ion Ionescu de la Brad” from Iasi,  
3 Mihail Sadoveanu Alley, Iasi, Romania

Corresponding author email: ioan.puiu@uaiasi.ro

***Abstract***

*Castor bean is cultivated in Romania as an ornamental plant and very little for its seeds rich in oil used in the textile and chemical industry or in pharmacy and cosmetics. Castor oil is at the same time a good melliferous and energetic plant. In 1989, 26,300 ha of castor were cultivated in Romania, and currently insignificant areas are cultivated. Interest in this culture has grown a lot in recent years due to the development of castor hybrids with clearly superior productions compared to the old varieties. The research aimed at the development of an economically efficient cultivation technology, in the pedoclimatic conditions of the north of Moldova. A number of 6 castor hybrids of French origin were tested, cultivated in rows at a distance of 70 cm, using precision seeders from corn in 3 variants of spacing per row: 70 cm, 100 cm and 130 cm. The highest seed productions were for the hybrid LS-CB-18-04 (4,871 kg/ha) and hybrid LS-CB-18-02 (4,774 kg/ha), at a sowing distance of 130 cm per row (10,989 plants/ha).*

***Key words:*** castor bean, hybrid, cultivation technology.

## INFLUENCE OF SOWING TIME ON MORPHOLOGICAL CHARACTERISTICS OF SUNFLOWER PLANTS

Ioan RADU<sup>1,2</sup>, Lorena-Roxana GURAU<sup>1,2</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, 011464, Bucharest, Romania

<sup>2</sup>Research and Development Institute for Plant Protection, 8 Ion Ionescu  
de la Brad Blvd, District 1, 013813, Bucharest, Romania

Corresponding author email: raduioan1999@gmail.com

### ***Abstract***

*Morphological characteristics of six sunflower hybrids with different precocity were assessed to notice the effect of sowing time (ST). ST was set taking into account the Celsius degrees at the soil depth of 7 cm at 7 a.m.: ST1 at 5°C, ST2 at 7°C and ST3 at 9°C. The research was performed in the field experiments in Tulcea County in 2021 under rainfed conditions. The number of leaves per plant increased upon the sowing delay from 27.7 at ST1 to 30.9 at ST3, while the number of days from sowing to flowering decreased from 62.7 at ST1 to 48.5 at ST3. Stem diameter had the highest value at ST2. The average plant height for the five hybrids increased from ST1 to ST3. ST2 provide the highest head diameter (19.8 cm) followed by ST1 (19.3 cm) and ST3 (18.5 cm).*

**Key words:** *sowing time, morphological characteristics, sunflower plants.*



**EFFECTS OF NITROGEN AND PHOSPHORUS FERTILIZERS  
ON GRAIN YIELD OF WHEAT ON THE REDDISH  
PRELUVOSOIL OF CENTRAL PART OF OLTENIA**

**Valeriu Lucian RADU, Georgeta Loredana POPESCU,  
Gheorghita Liliana PISCANU**

Agricultural Research and Development Station Şimnic - Craiova,  
54 Balcesti Road, Dolj County, Romania

Corresponding author email: [lilianapiscanu96@gmail.com](mailto:lilianapiscanu96@gmail.com)

***Abstract***

*This paper presents the effects of different doses of nitrogen (0, 40, 80, 120 and 160 kg N/ha) and phosphorus (0, 40, 80, 120 and 160 kg P<sub>2</sub>O<sub>5</sub>/ha) applied separately or combined on grain production of wheat in field conditions, over three years of study (2016-2018). The data comes from the long-term experiences of Agricultural Research and Development Station Şimnic (ARDS Şimnic) on the reddish preluvosoil. The obtained results showed that with the separate use of nitrogen or phosphorus fertilizers, the biggest increases in production (compared to the non-fertilized variants P0 or N0) were recorded when applying the dose of 160 kg P<sub>2</sub>O<sub>5</sub>/ha (31.9 q/ha) or of 160 kg N/ha (31.6 q/ha). The biggest increases in production were obtained with the combined application of chemical fertilizers with nitrogen and phosphorus in the treatments with 160 kg P<sub>2</sub>O<sub>5</sub>/ha + 120-160 kg N/ha (53.8-54.9 q/ha). The agronomic efficiency recorded high values of 37.5 kg/kg with the separate application of phosphorus (P40), 43.0 kg/kg with the separate application of nitrogen and 37.7 kg/kg with the combined application of 40 kg P<sub>2</sub>O<sub>5</sub>/ha + 40 kg N/ha. In conclusion, combined application of 40 kg P<sub>2</sub>O<sub>5</sub>/ha + 40 kg N/ha gave the optimum economic wheat average grain yield of 45.4 q/ha and is therefore recommended for reddish preluvosoil.*

**Key words:** *nitrogen, phosphorus, fertilizers, wheat, grain.*

## THE IMPACT OF CROP ROTATION ON THE DENSITY OF CORN CROP PESTS

Alexandru RANTEȘ

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: alex\_rantes@yahoo.com

### **Abstract**

*Due to its high production capacity and its adaptability, the maize crop has become one of the main crops grown by farmers. Although the main problems in corn culture were weed control, in recent years pest control has become as important a problem as weeds. Due to the long monoculture, farmers are faced with very high densities of pests, which leads to a reduction in production but also in its quality, in extreme cases completely compromising the crop, making it necessary to reseed the plot. Pests of the corn crop target its entire vegetation period, therefore farmers are subject to higher production costs by applying additional treatments with insecticides. The purpose of the work is to present the main pests of the corn crop, the presentation of the mode of attack and the periods in which they are present in the crop and the influence of crop rotation on the pest densities. The researches were performed under field conditions in South Romania (Giurgiu County, Putineiu location) in 2022.*

**Key words:** corn, *Tanymecus dilaticollis*, *Helicoverpa armigera*, *Ostrinia nubilalis*, crop rotation, crop protection, pests.

**TESTING THE INSECTICIDAL ACTIVITY  
OF PLANT EXTRACTS FOR THE CONTROL  
OF ECONOMICALLY IMPORTANT ENEMIES  
OF RAPE FROM THE ORDER *Coleoptera***

**Stefan RASHEV<sup>1</sup>, Nedyalka PALAGACHEVA<sup>2</sup>,  
Stoyan GEORGIEV<sup>1</sup>**

<sup>1</sup>Field Crops Institute Chirpan, Agricultural Academy Bulgaria,  
2 Georgi Dimitrov Blvd, Chirpan Bulgaria

<sup>2</sup>Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author: [stogeorgiev@abv.bg](mailto:stogeorgiev@abv.bg)

***Abstract***

*Rapeseed is attacked by a number of enemies, of which the rapeseed weevil (*Meligethes aeneus* F.) and the pod borer (*Ceutorhynchus assimilis* Payk.) are of important economic importance. They damage the generative organs, which is why mining is directly dependent on the organization and effectiveness of the fight against them. In recent years, the mass use of chemical means to combat them leads to the development of resistance, the destruction of useful species and pollinators of cultivated plants. In order to limit their application, alternative means of control are sought to avoid the negative consequences of the use of chemical preparations. In this regard, the efficacy of plant extracts from: walnut (*Juglans regia* L.), wild walnut (*Ailanthus altissima* Swing.) and tobacco (*Nicotiana tabacum* L.) against the adult forms of the rape blossom borer and the pod beetle was tested under laboratory conditions. The attempt was made in four variants and three repetitions. The obtained results show that the compounds contained in the plant extracts exhibit efficacy against the adults of the rape flower borer and the pod borer. The obtained results are a prerequisite for the application of the plant extracts in the integrated systems to combat the enemies of rape.*

**Key words:** *Meligethes aeneus* F., *Ceutorhynchus assimilis* Payk., plant extracts, insecticide activity.

**PRELIMINARY RESULTS ON MAIZE BIOMASS  
UNDER THE INFLUENCE OF TILLAGE  
IN THE CONTEXT OF CLIMATE CHANGE**

**Luxița RÎȘNOVEANU<sup>1,2</sup>, Daniela OPREA<sup>3,4</sup>,  
Maria JOIȚA-PĂCUREANU<sup>5,3</sup>**

<sup>1</sup>Agricultural Research Development Station Braila,  
Viziru km 9 Street, Braila County, Romania

<sup>2</sup>Bucharest University of Economic Studies, Faculty of Agri-food &  
Environmental Economics, Research Center for Sustainable Development,  
6 Piata Romana Street, 010374, Bucharest, Romania

<sup>3</sup> National Agricultural Research and Development Institute, Fundulea,  
1 Nicolae Titulescu Street, 915200, Calarasi, Romania

<sup>4</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>5</sup>Center for Studies and Research for Agroforestry Biodiversity,  
Acad. "David Davidescu", Romanian Academy, Bucharest, Romania

Corresponding author email: [opreadanieladaria@gmail.com](mailto:opreadanieladaria@gmail.com)

***Abstract***

*Environmental pollution has reached such an advanced stage that no measure can effectively stop the adverse effects shortly. The effort of many future generations is necessary globe wide to be able to restore within normal limits the damage that has been reached at present. Agriculture must contribute to these remedies by recycling plant residues, improving cultivation technologies to make them as environmentally friendly as possible, using biological pesticides and alternative methods of fighting harmful organisms, as well as redirecting farmers to choose new crops that can complete the range and diversify it to practice sustainable agriculture. The purpose of this research was to observe the quantity of maize biomass depending on the type of tillage by comparing specific conservative agriculture tillage with the classic soil tillage - plowing in drought and heat conditions of 2021-2022. The maximum values of green biomass (37.04 Mg ha<sup>-1</sup>) and dry biomass (10.57 Mg ha<sup>-1</sup>) were recorded in the scarified plot - L3, and the minimum values of 22.63 Mg ha<sup>-1</sup> respectively 6.93 Mg ha<sup>-1</sup>, in the control plot L1 - plowed.*

***Key words:*** biomass, corn, conservative agriculture, plant residues, drought.

**PHOTOSYNTHETIC PROCESSES AND  
USES DIFFERENT FORMS OF FATTY ACIDS  
IN CORN PLANTS DURING THE PERIOD OF INTENSIVE  
GROWTH AND UNDER THE INFLUENCE OF  
FERTILIZER AND GROWTH REGULATOR**

**Yosyp RIVIS<sup>1</sup>, Vasyl FEDAK<sup>1</sup>, Oksana MAMCHUR<sup>2</sup>,  
Volodymyr BALKOVSKIY<sup>3</sup>, Ivan SHUVAR<sup>3</sup>, Olena BEZALTYCHNA<sup>4</sup>,  
Bogdan GUTYJ<sup>5</sup>, Olha STADNYTSKA<sup>1</sup>,  
Hanna KORPITA<sup>3</sup>, Antin SHUVAR<sup>1</sup>, Khrystyna LESKIV<sup>5</sup>**

<sup>1</sup>Institute of Agriculture of the Carpathian Region of NAAS of Ukraine,  
5 Grushevskogo Street, Obroshino, 81115, Ukraine

<sup>2</sup>Ivan Franko National University of Lviv, 1 Universytetska Street,  
Lviv, 79000, Ukraine

<sup>3</sup>Lviv National Agrarian University, 1 V. Velykiho Street, Dublyany,  
80381, Ukraine

<sup>4</sup>Odessa State Agrarian University, 13 Panteleymonyvska Street,  
Odessa, 65012, Ukraine

<sup>5</sup>Stepan Gzhytskyi National University of Veterinary Medicine and  
Biotechnologies Lviv, 50 Pekarska Street, Lviv, 79010, Ukraine

Corresponding author email: [bvh@ukr.net](mailto:bvh@ukr.net)

***Abstract***

*The aim of the research was to identify quantitative changes in the processes of photosynthesis and fatty acid composition of the maize plants vegetative mass during ontogenesis and under the influence of mineral fertilizers and growth regulators. It is established that the functional activity of the photosynthetic apparatus in the leaves of maize plants increases with their age and depends on soil fertilizer and the influence of growth regulators. It was found that the increase in the functional activity of the photosynthetic apparatus of maize plants in the phase of intensive growth is accompanied by an increase in the concentration of esterified fatty acids and an increase in the ratio of more valuable linolenic polyunsaturated fatty acid to less valuable linoleic polyunsaturated fatty acid in stems and leaves. It is established that the formation of generative organs of maize plants leads to a gradual decrease in the concentration of esterified fatty acids and a decrease in the ratio of linolenic polyunsaturated fatty acid to linoleic polyunsaturated fatty acid in the stem and leaves.*

**Key words:** corn, phases of vegetation, fertilizer, regulator of growth, photosynthetic processes.

## HERBICIDES APPLICATION FOR WEED CONTROL IN WINTER BARLEY (*Hordeum vulgare* L.)

Atanas SEVOV, Nesho NESHEV, Mariyan YANEV,  
Anyo MITKOV, Nikolina SHOPOVA

Agricultural University - Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: asevov@yahoo.com

### **Abstract**

*An uncontrolled weed flora can decrease winter barley's grain yield and quality. Winter barley (*Hordeum vulgare* L.) variety 'Emon' field trial was conducted in the growing seasons 2020/2021 and 2021/2022. The trial was stated in the experimental field of the Agricultural University-Plovdiv, Bulgaria. The experiment aimed to study the efficacy of herbicides for broadleaf weed control in barley. The following herbicides efficacy was evaluated: Sekator OD - 0.15 l ha<sup>-1</sup>; Axial One - 1.00 l ha<sup>-1</sup>; Biathlon 4 D - 55 g ha<sup>-1</sup>; Granstar 75 DF - 15 g ha<sup>-1</sup>; Aminopielik 600 SL - 2.00 l ha<sup>-1</sup>. The herbicides were applied in spring at the phenophase end of tillering - the beginning of spindling of the crop (BBCH 29-31). The herbicide efficacy was recorded by the 10-score visual scale of EWRS (European Weed Research Society). At the particular infestation with *Sinapis arvensis* L., *Anthemis arvensis* L., *Galium aparine* L., *Consolida regalis* Gray., and *Viola arvensis* L. the highest overall efficacy and highest yield were recorded when Biathlon 4 D - 55 g ha<sup>-1</sup> was applied.*

**Key words:** barley, weeds, control, yield, herbicide.

**TECHNOLOGICAL SOLUTIONS FOR COMMON  
SUNFLOWER (*Heliantus annuus*) GROWING  
IN A CHANGING CLIMATE CONDITION**

**Atanas SEVOV<sup>1</sup>, Veska GEORGIEVA<sup>2</sup>**

<sup>1</sup>Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

<sup>2</sup>National Institute of Meteorology and Hydrology, Sofia, Bulgaria

Corresponding author email: veska.georgieva@meteo.bg

***Abstract***

*Climatic changes in recent years have adversely affected the development of a number of crops. Especially the spring ones suffer, since the development phases in which the yield is formed take place during the periods most strongly influenced by climate change. In the present study, the different climate components during the period 1991-2020 that most strongly influence sunflower development are characterized. It was established that the unfavorable trends of changes in agrometeorological conditions in the studied area are related to a decrease in summer precipitation and an increase in temperatures during the same period. As a result, the last two months of the sunflower growing season are in a moisture deficit. Temperatures in the region during the studied period have increased, with positive deviations in all months, except for December. No differences were recorded in the dates of the transition of the air temperature through 5°C. During the researched period, they increased by 167°C compared to the previous one. During the studied period, precipitation in summer decreased at the expense of its increase in autumn, compared to the previous one.*

**Key words:** *climate change, climate conditions, sunflower.*

## EVALUATION OF THE IMPACT OF SOWING SEASON AND WEATHER CONDITIONS ON MAIZE YIELD

**Alina ȘIMON, Adrian CECLAN, Voichița HAȘ, Andrei VARGA,  
Florin RUSSU, Felicia CHEȚAN, Marius BĂRDAȘ**

Agricultural Research and Development Turda,  
27 Agriculturii Street, Cluj County, Romania

Corresponding author email: [adi.ceclan@gmail.com](mailto:adi.ceclan@gmail.com)

### ***Abstract***

*Climate change has become the biggest global challenge to agriculture and food production. In the context of current environmental changes, the aim of this study is to identify the optimal sowing season that leads to obtaining high and constant yields. The study followed the reaction of 7 native maize hybrids to cultivation in 3 different sowing seasons, over a period of 3 years. The data obtained show us that the best yield results are obtained on mid-early hybrids (9327-9843 kg/ha). Sowing maize too early, are obtained lower yields than for maize sown at 10°C in the soil, with a very significant difference of 1337 kg/ha. Favorable climatic conditions in 2020 and 2021 emerge from the average yields obtained in the two years, 10343 kg/ha (2020) respectively 9424 kg/ha (2021). The climatic conditions of 2022 were less favorable, summer drought having a negative effect on average maize yield, which was around 6924 kg/ha.*

**Key words:** *sowing season, maize hybrids, yields, climate change.*



## EVALUATION OF THE EFFICIENCY OF A BIOSTIMULANT CONTAINING ORGANIC SUBSTANCES BY USING LABELED NITROGEN $^{15}\text{N}$

**Carmen SÎRBU, Traian CIOROIANU, Nicoleta MARIN,  
Daniela MIHALACHE**

National Research and Development Institute for Soil Science,  
Agro-chemistry and Environment Protection-RISSA,  
61 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: [carmene.sirbu@yahoo.ro](mailto:carmene.sirbu@yahoo.ro)

### ***Abstract***

*Fertilizers with foliar application or those containing substances that have a nutrient-stimulating effect have indicated that the use of biostimulants alone in crop treatment often does not lead to significant effects on yield and quality. The carried out research aimed to establish, using the labeled nitrogen  $^{15}\text{N}$  as a tracer, the contribution of complex foliar fertilizers containing natural organic substances, to increase the efficiency of using different forms of nitrogen from the soil applied fertilizer. The degree of recovery from soil to plant was evaluated using the sunflower test plant (*Helianthus annuus*). The procedure was performed under foliar application conditions of two fertilizers containing macronutrients, secondary elements and microelements with / without organic substances (protein hydrolyzate). Stable  $^{15}\text{N}$  isotopes have been used to examine nitrogen ( $^{15}\text{N}$ ) uptake from soil-applied chemical fertilizers. Depending on the nitrogen species applied, an increase of the  $^{15}\text{N}/\text{N}$  ratio was observed as follows: amide nitrogen ( $-\text{NH}_2$ ) < ammoniacal nitrogen ( $-\text{NH}_4$ ) < nitric nitrogen ( $-\text{NO}_3$ ).*

**Key words:** *foliar fertilizers, labeled nitrogen  $^{15}\text{N}$ , protein hydrolysate, sunflower, biostimulants.*

**USE OF ACETAMIPRID IN THE MANAGEMENT  
OF ATHALIA ROSAE POPULATION  
FROM OILSEED RAPE AGROECOSYSTEM**

**Ramona ȘTEF, Ioana GROZEA, Otilia COTUNA,  
Veronica SARATEANU, Alin CARABET,  
Anișoara DUMA COPCEA, Dan MANEA**

University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: [alin70599@yahoo.co.uk](mailto:alin70599@yahoo.co.uk)

***Abstract***

*Athalia rosae* larvae attack can lead to complete defoliation of the plant leaving untouched the main veins. Knowing these aspects, in the western part of Romania, research was carried out aiming to reduce the population of *Athalia rosae* using acetamiprid applied in four doses (0.04 kg/ha; 0.06 kg/ha; 0.08 kg/ha; 0.1 kg/ha). The effectiveness of the treatments in respect of larval population reduction was determined at 3, 6 and 9 days after application. At the time of treatments spraying, the population level of *Athalia rosea* showed close and statistically undifferentiated values, between 0.23 and 0.4 larvae/plant. It was observed that, both, the period and the treatment, had a real influence on the number of larvae during the study. Six days after the treatment, the number of larvae was significantly reduced, followed by a increases in the next period. During the study, the treatment applied at 0.08 kg/ha exerted the highest efficiency in terms of *Athalia rosea* larvae control, registering values of 95.70 and 90.18% after six and nine days after application.

**Key words:** *Athalia rosae*, acetamiprid, oilseed rape, management.

## MINERAL FERTILIZATION, FOLIAR APPLICATION AND VARIETIES AS A FACTORS INFLUENCING TRITICALE (*X Triticosecale* Witt.) PRODUCTIVITY

Stefka STEFANOVA-DOBREVA, Angelina MUHOVA

Agricultural Academy, Field Crops Institute, 2 Georgi Dimitrov Blvd,  
6200, Chirpan, Bulgaria

Corresponding author email: stefanovadobreva@gmail.com

### **Abstract**

*The aim of the study was to investigate the productive possibilities and the structural elements of the yield depending on the variety, the applied fertilizer rate and the import of foliar treatment for winter triticale. The study was conducted in 2019/2020-2020/2021. Colorit, Attila and Boomerang varieties were tested. Nitrogen fertilization was at rates: 0; 60 and 120 kg ha<sup>-1</sup>. A foliar treatment was performed in the tillering and stem elongation phases. Mineral fertilization was a major impact on the values of all studied parameters and only for the number of grains per spike the variety has a stronger influence. The rate of 120 kg N ha<sup>-1</sup> was the most productive for the observed traits. The foliar treatment was a stronger effect in the stem elongation phase, except for the plant height, where no differences were found between the two phases. Boomerang was the highest grain yield (45.0%), plant height (23.3%) and number of spikelet per spike (11.5%), Attila was the longest spike (23.4%), and Colorit was the highest number and heaviest grains per spike, 37.9% and 51.72%, respectively, compared to control.*

**Key words:** foliar application, mineral fertilization, triticale, varieties.

## REGRESSION BETWEEN YIELD AND GROWTH INDICATORS OF COTTON VARIETIES

Antoniya STOYANOVA<sup>1</sup>, Georgi STOYANOV<sup>2</sup>, Svetla Kostadinova<sup>2</sup>

<sup>1</sup>Trakya University, Faculty of Agriculture, Stara Zagora, 6000, Bulgaria

<sup>2</sup>Agricultural University of Plovdiv, 12 Mendeleev Blvd., 4000, Bulgaria

Corresponding author email: toni\_1219@abv.bg

### **Abstract**

*The aim of the study is to evaluate the relationship between yield and growth indicators in three cotton varieties through regression analysis. The research was conducted in the field of experience of the Department of Crop Science, Faculty of Agriculture at Trakia University, Stara Zagora in the period 2018-2020. The field experience is derived using the method of fractional graphs. The influence of both factors (fertilization and irrigation) on the development and productivity of the three cotton varieties was investigated. A linear multiple regression with variables for the rate of nitrogen fertilization was applied for a quantitative characterization of the dependencies between the factor characteristic level of nitrogen fertilization and the performance indicators yield, height by development phase, elements of yield, biomass and nitrogen export in cotton varieties. The regression model shows that the increase in the values of most indicators depending on nitrogen fertilization occurs with a delay. Under irrigated conditions, the dispersion in average yields of non-irrigated cotton by varieties is more pronounced than under non-irrigated conditions. In Helius, between 25% (2018) and 99.9% (2020) of the total variation in cotton yield can be explained by applied nitrogen fertilization. For the Darmi variety, the rate of nitrogen fertilization provides between 67.9 (2019) and 98.6% (2020), and for Isabel - from 65.4 (2020) to 95.7% (2018). For the three varieties in 2020, a linear positive regression of yield was established.*

**Key words:** cotton, irrigation, fertilization, yield, regression.

## **AGRONOMIC RESPONSE OF RAPESEED SEED AND OIL YIELD ON DIFFERENT MINERAL FERTILIZING SCHEME**

**Petrișoara Florina ȘUVET, Ștefan Laurențiu BĂTRÎNA,  
Laura Iosefina SMULEAC, Lucian Florin BOTOȘ,  
Adrian BORCEAN, Ilinca IMBREA, Florin IMBREA**

University of Life Sciences “King Mihai I” from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: stefan.batrina@usab-tm.ro

### ***Abstract***

*Rapeseed is a crop that has a significant agronomic response in terms of seed yield and oil content and yield. This study aims to assess the influence of fertilizer type, quantity and the combined effect of them on both seed and oil yield in the pedoclimatic conditions of Western Plain in Romania. The research was carried out on a chernozem soil with a weak acidic reaction and for biological material, it consisted of one rapeseed hybrid developed by Limagrains company, Astronom. The experimental field was uniformly fertilized at the same time with sowing with 200 kg/ha of 27:13.5:0 complex fertilizer and in order to assess the influence of fertilizers, in the spring, three graduations of fertilizers were used, as follows: a1 - E34 (10:24:0 + 0.1Zn + 0.1Br +20 SO<sub>3</sub>); a2 - DAP (18:46:0) and a3 - 20:20:0. The results highlight the increase of both seed and oil yield, depending on the type of the fertilizer, with as much as 20% compared to the field average.*

***Key words:*** rapeseed, oil, yield, fertilizers.

## STUDY REGARDING INFLUENCE OF VARIETY, BIOLOGICAL MATERIAL AND NUTRIENT SPACE ON POTATO MINITUBERS PRODUCTION

**Andreea TICAN, Mihaela CIOLOCA, Monica POPA**

Institute of Research and Development for Potato and Sugar Beet Brasov,  
2 Fundaturii Street, Brasov, Romania

Corresponding author email: tican\_andreea@yahoo.com

### ***Abstract***

*The main purpose of this research was to follow the minituberization process for 3 Romanian potato varieties, created at NIRDPSB Brasov. The biological material called "minitubers" is part of the first links of the national system of potato production for seed. The trifactorial experience of this research (3x2x2), on 3 repetitions, included the following factors: experimental factor A: variety, with three gradations: a1 - Marvis; a2 - Castrum; a3 - Ervant (considered control); experimental factor B: biological material used for planting, with two gradations: b1 - plantlets (considered control); b2- microtubers; experimental factor C: the volume of the nutrition space, with two gradations: c1-1.5 l (considered control) and c2- 2 l. The determinations were made for number and weight of minitubers/plant, in function of experimental factors. The average number of minitubers obtained/nutrition space was between 5.75 (Marvis variety) and 10.25 (Ervant variety), and the weight of minitubers ranged from 28.22 g (Ervant variety) to 93.53 (Castrum variety). By increasing nutrition is noted very significant positive differences for both analysed parameters.*

**Key words:** *genotype, microtubers, minitubers, plantlets, potato, rapid multiplication, seed.*

**SOME BIOLOGICAL PECULIARITIES AND THE  
BIOMASS QUALITY OF COMMON BUCKWHEAT,  
*Fagopyrum esculentum*, GROWING UNDER THE  
CONDITIONS OF THE REPUBLIC OF MOLDOVA**

**Victor ȚÎȚEI**

“Alexandru Ciubotaru” National Botanical Garden (Institute),  
18 Padurii Street, MD 2002, Chisinau, Republic of Moldova

Corresponding author email: vic.titei@gmail.com

**Abstract**

*Common buckwheat - Fagopyrum esculentum Moench, Polygonaceae family, is a short-season crop, cultivated for its grain-like seeds and as a melliferous and cover crop, enabling more complete adaption to its environment than other traditional crops. The goal of this research was to evaluate some biological peculiarities and the biomass quality of common buckwheat Fagopyrum esculentum cultivated in the experimental sector of the “Alexandru Ciubotaru” National Botanical Garden (Institute), Chisinau, Republic of Moldova. The prospects of using harvested biomass as forage and substrates for biomethane production were assessed. We found that whole-plant dry matter, cut in the early flowering stage, contained 15.4% CP, 9.4% ash, 37.5%CF, 39.1% ADF, 57.7% NDF, 6.6% ADL, 32.5% Cel, 18.1% HC, 6.9% TSS, with nutritive and energy values: 584 g/kg DDM, RFV= 95, 11.74 MJ/kg DE, 9.51 MJ/kg ME and 5.54 MJ/kg NEL, but in seed formation stage - 10.8% CP, 8.0% ash, 36.2% CF, 38.3% ADF, 58.9% NDF, 6.9% ADL, 31.4% Cel, 21.6% HC, 10.1% TSS, with nutritive and energy values: 591 g/kg DDM, RFV= 93, 11.88 MJ/kg DE, 9.62 MJ/kg ME and 5.62 MJ/kg NEL. The quality of the silage prepared from whole plants cut in the seed formation stage was: pH= 3.76, 39.9g/kg lactic acid, 0.2g/kg butyric acid, 10.9 g/kg acetic acid, 226/kg DM with 9.6% CP, 7.7% ash, 35.5% CF, 36.2% ADF, 55.5% NDF, 5.5% ADL, 30.7% Cel, 24.5% HC, 8.4% TSS, with nutritive and energy values: 607 g/kg DDM, RFV= 102, 12.00 MJ/kg DE, 9.85 MJ/kg ME and 5.87 MJ/kg NEL. It has been estimated that the green mass substrates for anaerobic digestion, have C/N=20.5-29.5, optimal amount of lignin and hemicelluloses, the biochemical methane potential reaches 292-305 l/kg ODM, but in ensiled substrate - C/N=33.3 and biochemical methane potential 314 l/kg ODM.*

**Key words:** biochemical composition, biological peculiarities, biomass, biomethane, *Fagopyrum esculentum*, green mass, silage.

**PRODUCTIVE CAPACITY OF RAPESEED  
HYBRIDS GROWN IN THE CONDITIONS  
OF CENTRAL SOUTH BULGARIA**

**Zhivko TODOROV**

Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

Corresponding author email: [jivko99999@abv.bg](mailto:jivko99999@abv.bg)

***Abstract***

*This study was conducted in the course of three years (2017-2020) in the EEIB (Educational and Experimental Implementation Base) of the Department of Plant-growing at the Agricultural University of Plovdiv. The experiment was implemented according to the block method in 4 repetitions with the size of the experimental plot 20 m<sup>2</sup>, on a meadow lightly solonetz soil. Subject of the experiment are the hybrids PT234, PT225, PT271 and PT264. The purpose of the study is to determine their productivity when grown in the conditions of Central South Bulgaria. Regardless of the different weather conditions during the years of the experiment, the highest seed yield was reported for hybrid PT 234.*

***Key words:*** rapeseed, hybrids, yield.



## COMPARATIVE TESTING OF OLD WINTER WHEAT VARIETIES UNDER CHANGING CLIMATIC CONDITIONS

Zlatina UHR<sup>1</sup>, Evgeniy DIMITROV<sup>1</sup>, Rangel DRAGOV<sup>2</sup>,  
Radoslav CHIPILSKI<sup>1</sup>, Teodora ANGELOVA<sup>1</sup>

<sup>1</sup>Institute of Plant Genetic Resources, 2 Druzhba Street, Sadovo,  
Agricultural Academy, Bulgaria

<sup>2</sup>Field Crops Institute, 2 G. Dimitrov Street, Chirpan,  
Agricultural Academy, Bulgaria

Corresponding author email: dragov1@abv.bg

### **Abstract**

*The experiment was conducted in the experimental field of IRGR - Sadovo in the period 2018-2020. The sixteen old varieties of common winter wheat, created in IRGR, were tested in yield for two years. The yield, plant height and physical properties of the grain were obtained: 1000 g kernel weight and test weight (kg/hl). The obtained data are processed by statistical methods - dispersion, variation and analysis of the main components. The results show that the influence of the genotype, environment and their interaction has been proven in all monitored traits. All varieties have significantly higher yields than the standard. The highest grain yield was reported for the varieties Joanna, KM 135, Diamand and Guinness. There is no significant higher 1000 kernel weight and the test weight of only two varieties is significantly higher than the standard. The aim of the study is to test the effect of climate change on the grain yield, plant height and physical properties of old varieties of common winter wheat, as the main food crop, and to assess their resilience to climate change.*

**Key words:** *old varieties, winter wheat, resistance, climatic changes, yield.*

**RESEARCH ON THE INFLUENCE OF DISTANCE  
BETWEEN ROWS AND FERTILIZATION  
ON SOME MORPHOPRODUCTIVE ELEMENTS  
IN *Bromus inermis* Leyss. SPECIES**

**Elena-Manuela VACARCIUC<sup>1</sup>, Cristian-Sorin GAVRILĂ<sup>1</sup>,  
Mihai STAVARACHE<sup>1</sup>, Simona DUMITRIU<sup>1</sup>,  
Ioan PUIU<sup>2</sup>, Costel SAMUIL<sup>2</sup>**

<sup>1</sup>Research and Development Station for Meadows, Vaslui, Romania

<sup>2</sup>University of Life Sciences “Ion Ionescu de la Brad” from Iasi,  
3 Mihail Sadoveanu Alley, Iasi, Romania

Corresponding author email: [vacarciucelenamanuela@yahoo.ro](mailto:vacarciucelenamanuela@yahoo.ro)

***Abstract***

*The research conducted during the period 2021-2022, at the Research and Development Station for Meadows, Vaslui (46°40'-36°10' north latitude and 27°44'-20°40' east longitude) followed the influence of fertilization and the distance between rows on the plants height (cm), shoots number (shoots·m<sup>-2</sup>), panicle length (cm), number of nodes per inflorescence, number of branches per inflorescence and seed production (kg·ha<sup>-1</sup>) for smooth brome (*Bromus inermis* Leyss.). The organized experience was bifactorial, 3x5 type, it was placed according to the method of subdivided plots, with the plot harvestable area of 20 m<sup>2</sup> (2m x 10 m), in three replications, and the studied factors were: A - the distance between rows with three graduations and B - fertilization with five graduations. Following the study, it was found that by applying mineral fertilizers and by sowing at bigger distances between rows higher plants were obtained, with a higher number of shoots·m<sup>-2</sup>, also the panicle length, the number of nodes per inflorescence and number of branches per inflorescence and seed production were higher.*

**Key words:** *plants height, shoots number, panicle length, number of nodes per inflorescence, number of branches per inflorescence, seed production, Bromus inermis L.*

## WINTER BARLEY GRAINS QUALITY VARIATION UNDER WATER-LIMITING CONDITIONS

Liliana VASILESCU<sup>1</sup>, Eugen PETCU<sup>1</sup>, Lidia CANĂ<sup>1</sup>,  
Elena PETCU<sup>1</sup>, Cătălin LAZĂR<sup>1</sup>, Alexandrina SÎRBU<sup>2</sup>,  
Silviu VASILESCU<sup>1</sup>, Lenuța Iuliana EPURE<sup>3</sup>, Maria TOADER<sup>3</sup>

<sup>1</sup>National Agricultural Research-Development Institute Fundulea,  
1 Nicolae Titulescu Street, Fundulea, Romania

<sup>2</sup>"Constantin Brancoveanu" University of Pitesti, FMMAE Ramnicu Valcea,  
39 Nicolae Balcescu Blvd, Ramnicu Valcea, Romania

<sup>3</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, București, Romania

Corresponding author email: svvasilescu@gmail.com

### **Abstract**

*The variation of some grain quality parameters has been caused by the use of a desiccant within a set of 16 winter barley genotypes (varieties and advanced lines), which led to the characterization of the indices, namely the one thousand kernel weight (TKW), protein content (P), starch content (S) and seed size (S I+II). These induced drought conditions have provided results regarding the possibility of growing certain genotypes under restrictive water conditions (field conditions) that can register both high yield and appropriate grain quality parameters. The performed analysis of the results revealed significant differences between genotypes, in terms of the influence of treatment applied and also the interaction between genotype and treatment. Results have been obtained regarding the identification of valuable genetic resources for the translocation of assimilates in water-limiting conditions but also the characterization of genotypes concerning the high stability of quality indices. These genotypes have a high content of carbohydrates in the stem and leaves at the beginning of the grain-filling period but also a high rate of translocation to the grains.*

**Key words:** winter barley varieties, quality indices, drought, desiccation.

**YIELD COMPONENTS AND GRAIN YIELD  
OF TEN GENOTYPES OF WINTER WHEAT  
(*Triticum aestivum* L.) CULTIVATED  
UNDER CONDITIONS OF A.R.D.S. SECUIENI**

**Cornelia VOINEA<sup>1,2</sup>, Leonard ILIE<sup>2</sup>**

<sup>1</sup>Saaten Union, 1-5 General Praporgescu Street, District 2, Bucharest, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: voineacornelia@yahoo.com

***Abstract***

*Straw cereals, especially wheat (*Triticum aestivum* L.), are the most widely cultivated plant in the world, grown in over 100 countries, and are a prime commercial source. In this respect, the study was carried out in the growing season 2021-2022, in the agro technology conditions of Secuieni area, Neamț County, Romania, where 10 genotypes of winter wheat (*Triticum aestivum* L.) were studied, including 9 wheat varieties cultivars (Trublion, Centurion, Katarina, Glosa, Aspekt, Izvor, Avenue, Solehio, Alcantara) and 1 wheat hybrids variety (Hyxperia). We have used a sowing density of 500 germinable grains /sm, 360 germinable grains/sm and 250 germinable grains /sm. In this paper are presented data concerning grain yield related to the unit area (kg/ha) and yield components represented by the plant density after emergence (plants/sm), plant density in spring (main shoots and tillers/ sm), head plant density at the harvest time (ears/ sm), the weight of the grains in the spikes (g/ear), as well as main physical indices related to the quality, i.e. thousand kernels weight (TGW) and hectolitre mass (HLM).*

**Key words:** grains yields, HLM, sowing rate, TGW, wheat varieties.

**MODELS OF QUANTITATIVE ASSESSMENT  
OF THE INFLUENCE OF ELEMENTS OF TECHNOLOGY  
ON SEED YIELD OF PARENTAL COMPONENTS OF  
MAIZE HYBRIDS UNDER IRRIGATION CONDITIONS**

**Raisa VOZHEHOVA<sup>1</sup>, Tetiana MARCHENKO<sup>1</sup>, Yurii LAVRYNENKO<sup>1</sup>,  
Olena PILIARSKA<sup>1</sup>, Viktor SHARII<sup>1</sup>, Vira BOROVIK<sup>1</sup>,  
Andrii TYSHCHENKO<sup>1</sup>, Liubov KOBYZIEVA<sup>2</sup>,  
Olga GORLACHOVA<sup>2</sup>, Serhii MISHCHENKO<sup>3</sup>**

<sup>1</sup>Institute of Climate-Smart Agriculture of the National Academy  
of Agrarian Sciences of Ukraine, 24 Mayatska Doroga Street, sett.  
Khlybodarske, Odesa District, Odesa Region, 67667, Ukraine

<sup>2</sup>Plant Production Institute n.a. V. Ya. Yuriev, National Academy of Agrarian  
Sciences of Ukraine, 142 Heroiv Kharkova Ave, Kharkiv, 61060, Ukraine

<sup>3</sup>Institute of Bast Crops, National Academy of Agrarian Sciences of Ukraine,  
45 Tereshchenkiv Street, Hlukhiv, Sumy Region, 41400, Ukraine

Corresponding author email: izz.biblio@ukr.net

**Abstract**

*The results of research on establishing the correlation-regression dependence of the assimilation surface area of plant leaves of inbred lines-parental components of corn hybrids of different FAO groups and seed yield depending on the density of plants and treatment with the drug Retengo® are highlighted. The research is based on a comparative assessment of three parent lines of different FAO groups: DK247 (FAO 290), DK205710 (FAO 380), DK445 (FAO 420). The effectiveness of the application of the fungicide with growth-stimulating action Retengo® at different plant densities was determined. The yield calculation showed that the realization of the seed yield potential for each inbred line depends on the genotype, in accordance with the established individual parameters of the optimum leaf surface and phytocenosis density in the crop. The use of the fungicide with growth-stimulating action Retengo® strengthens the correlation of the area of leaves of plants of lines and the yield of seeds.*

**Key words:** maize, lines - parental components, plant density, fungicide, leaf area, seed yield.

## TANK MIXTURE OF PLANT PROTECTION PRODUCTS WITH BIOSTIMULANT IN WINTER RYE (*Secale cereale* L.)

Mariyan YANEV<sup>1</sup>, Nesho NESHEV<sup>1</sup>, Anyo MITKOV<sup>1</sup>,  
Todor MANILOV<sup>1</sup>, Maya DIMITROVA<sup>1</sup>, Cveta MOSKOVA<sup>2</sup>

<sup>1</sup>Agricultural University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

<sup>2</sup>University of Forestry, 10 Kliment Ohridski Blvd, Sofia, Bulgaria

Corresponding author email: marlanski@abv.bg

### **Abstract**

*The application of various chemical products for plant protection and plant biostimulants increases financial costs, which is a prerequisite for their combined application in tank mixtures. During 2021 and 2022 on the experimental field of the Agricultural University of Plovdiv, Bulgaria, a field experiment with the rye variety "Milenium" was performed. The aim of the trial was to study the application of plant protection products in tank mixture with biostimulant and its influence to the rye grain yield and quality. The trial included the following treatments: 1. Untreated control; 2. Granstar 75 DF - 15 g ha<sup>-1</sup> (herbicide); 3. Granstar 75 DF - 15 g ha<sup>-1</sup> + Zantara 216 EC - 1.25 l ha<sup>-1</sup> (fungicide); 4. Granstar 75 DF - 15 g ha<sup>-1</sup> + Amino Expert Impuls - 3.00 l ha<sup>-1</sup> (biostimulant); 5. Granstar 75 DF - 15 g ha<sup>-1</sup> + Zantara 216 EC - 1.25 l ha<sup>-1</sup> + Amino Expert Impuls - 3.00 l ha<sup>-1</sup>. The highest rye grain yield, absolute and hectoliter seed mass, grain wet gluten and crude protein for treatment 5 were recorded.*

**Key words:** rye, yield, quality, pesticides, tank mixture.

## APPLICATION OF HERBICIDES FOR WEED CONTROL BEFORE GERMINATION AND IN THE EARLY VEGETATION IN MAIZE

**Mariyan YANEV**

Agricultural University of Plovdiv, 12 Mendeleev Blvd,  
Plovdiv, Bulgaria

Corresponding author email: marlanski@abv.bg

### **Abstract**

*In 2020 and 2021, a field trial with the maize hybrid P 9241 in the experimental field of the Agricultural University - Plovdiv, Bulgaria was conducted. The herbicidal products Stomp Aqua - 4.00 l ha<sup>-1</sup> and Gardoprim Plus Gold - 3.50 l ha<sup>-1</sup> applied to soil, as well as Adengo - 0.44 l ha<sup>-1</sup> and Camix - 2.50 l ha<sup>-1</sup> applied in the 1st - 2nd leaf stage of maize were evaluated. The efficacy of the studied products by the 10-score visual scale of EWRS was reported. Selectivity was also assessed using the 9-score scale of EWRS. The highest herbicidal efficacy against *Amaranthus retroflexus* L., *Xanthium strumarium* L., *Abutilon theophrasti* Medik., *Solanum nigrum* L., *Sorghum halepense* (L.) Pers. developed from seeds was reported after the application of Adengo. Of the studied herbicides, the highest control against *Chenopodium album* L. was reported for Camix. The biological yields of maize, as well as the structural elements of the maize yield were the highest after the application of Adengo and Camix applied in 1st - 2nd leaf stage of the crop.*

**Key words:** maize, herbicides, weeds, efficacy, yield's structural elements.

**BIOLOGICAL POTENTIAL OF ENDOPHYTIC BACTERIA AGAINST LATE BLIGHT CAUSED BY PHYTOPHTORA INFESTANS (MONT. DE BARRY) ON TOMATO (*Solanum lycopersicum* L.)**

**Diane YIMTA YOUMBI<sup>1</sup>, Pierre EKE<sup>2</sup>, Vanessa NYA DINANGO<sup>1</sup>,  
Beatrice IACOMI<sup>3</sup>**

<sup>1</sup>University of Yaounde, 1, ngoa-ekele, Yaounde, Camerun

<sup>2</sup>University of Bamenda, Bamendankwe 1, Bamenda, Camerun

<sup>3</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: [youmbi\\_diane@yahoo.fr](mailto:youmbi_diane@yahoo.fr)

**Abstract**

*Tomato late blight caused by Phytophthora infestans (mont.) hampers tomato production worldwide including Cameroon. Endospore-forming Bacilli could provide biological solution. Herein, we screened suppressive traits of selected Bacilli from desert spurge; Euphorbia antiquorum against Phytophthora infestans. Out of the ten endophytic strains, screen in vitro for their antagonist activity, six exhibited direct and indirect antibacterial potentials with MIC ranging 1000 to 31.25 µg/mL and 62.5 to 7.812µg/mL for their culture filtrates and ethyl acetate-based extracts respectively have completely suppressed growth of Phytophthora infestans. These strains also produce some cell wall degradative, plant growth promoting factor's, with different concentration depending the bacteria strain. The binary application of B. amyloliquefaciens CBa\_BFL2 and B. amyloliquefaciens CBa\_RA37 (CBa\_BFL2/CBa\_RA37) promoted the shoot and root growth. As well, the consortium CBa\_BFL2/CBa\_RA37 stood out by suppressing wilt incidence and severity by 90% and 89%, respectively. This investigation demonstrated that endophytic bacteria from E. antiquorum L. with ability to both improve the growth and protect tomato plants could be further develop as potential biopesticide.*

**Key words:** late blight, *Phytophthora infestans*, *Bacillus*, biocontrol, tomato.



**INFLUENCE OF FERTILIZATION ON SOME  
PARAMETERS OF GROWTH AND DEVELOPMENT  
OF *Triticum monococcum* L. IN THE CONDITIONS  
OF ORGANIC FARMING IN BULGARIA**

**Yordan YORDANOV, Tonya GEORGIEVA, Malgozhata BEROVA**

Agricultural University of Plovdiv, 12 Mendeleev Blvd,  
Plovdiv, Bulgaria

Corresponding author email: j.jordanov72@gmail.com

***Abstract***

*The purpose of the study is to determine the influence of fertilization on the growth and development of *Triticum monococcum* L. A three-year field experiment was conducted at the Agricultural University - Plovdiv. A block method was used in four replications, with a plot area of 15 m<sup>2</sup>. The main factors of the study are: year (2018-2019; 2019-2020 and 2020-2021), and fertilization (Control - no fertilization; Italpolina - soil fertilizer, Naturamin WSP - foliar fertilizer. The phenological development of the crop was analyzed, as well as interphase periods. The growing season was 231 days in which they accumulated 1512.2°C effective temperature sums. Growth in height is highly dependent on the year. Plants reach sizes of 81.19 to 113.18 cm. The year has a strong influence on tillering - the most number of tillers per plant (4.4-4.6) develop in the second and third years. Italpolina - soil fertilizer has a better effect on this indicator. The influence of soil fertilizer is stronger compared to foliar fertilizer both on the number of productive tillers/plant and on the number of productive stems/m<sup>2</sup>.*

**Key words:** *Triticum monococcum* L., growth, phenophases, fertilization, organic farming.

# **MISCELLANEOUS**

## SOME SEEDS CHARACTERISTIC AND BIOMASS QUALITY OF SOME *Brassicaceae* AND *Fabaceae* SPECIES IN MOLDOVA

Alexei ABABII<sup>1</sup>, Valerian CEREMPEI<sup>1,2</sup>, Victor ȚÎȚEI<sup>1</sup>,  
Ana GUȚU<sup>1</sup>, Natalia CÎRLIG<sup>1</sup>, Mihai GADIBADI<sup>1</sup>, Liliana MARDARI<sup>1</sup>,  
Veaceslav DOROFTEI<sup>1</sup>, Serghei COZARI<sup>1</sup>, Andreea ANDREOIU<sup>3</sup>,  
Nina GARȘTEA<sup>1,2</sup>, Veaceslav MAZĂRE<sup>4</sup>

<sup>1</sup>"Alexandru Ciubotaru" National Botanical Garden (Institute),  
18 Padurii Street, MD 2002, Chisinau, Republic of Moldova

<sup>2</sup>Technical University of Moldova, Studentilor Street, Chisinau,  
Republic of Moldova

<sup>3</sup>Research-Development Institute for Grassland, 5 Cucului Street,  
500128, Brasov, Romania

<sup>4</sup>University of Life Sciences "King Mihai I", from Timisoara, 119 Calea Aradului  
Street, Timisoara, Romania

Corresponding author email: vic.titei@gmail.com

### Abstract

*The goal of our research was to fulfil the potential of traditional, underutilized and less known plant species of the families Brassicaceae and Fabaceae, which grow in the experimental plots of the "Alexandru Ciubotaru" National Botanical Garden (Institute), Chisinau, Republic of Moldova. The seeds and biomass of these plant species have high potential for use as food, forage and raw material for circular economy, including bioenergy production. The determination of physical and mechanical properties of seeds and agricultural products is important in the design of harvesting, handling and processing equipment. Our research revealed that the characteristic dimensions of seeds of the studied Brassicaceae species varied in the following ranges  $\ell:b:\delta \approx (1.98-12.60) : (1.67-3.67) : (1.63-2.05)$  mm; the angle of repose  $\alpha = 24.6^\circ-30.6^\circ$  and the flow angle on steel is  $\alpha_1 = 15.8^\circ-31.7^\circ$ , on wood  $\alpha_1 = 18.1^\circ-37.3^\circ$  and on enamelled surface  $\alpha_1 = 15.3^\circ-30.5^\circ$ ;  $M_{1000} = 4.30-9.73$  g and bulk seed density  $88.3-766.9$  kg/m<sup>3</sup>. The seeds characteristic of the studied Fabaceae species was  $\ell:b:\delta \approx (1.53-8.00) : (1.20-5.47) : (1.47-5.01)$  mm; the angle of repose  $\alpha = 21.5^\circ-33.0^\circ$ , flow angle on steel is  $\alpha_1 = 14.3^\circ-27.7^\circ$ , on wood  $\alpha_1 = 14.7^\circ-29.8^\circ$  and on enamelled surface  $\alpha_1 = 14.2^\circ-27.3^\circ$ ;  $M_{1000} = 1.35-170.04$  g and bulk seed density  $370.8-830.0$  kg/m<sup>3</sup>. The harvested green mass from studied Brassicaceae species is characterized by 16.1-23.5%CP, 63.2-69.9% DMD, RFV=117-162, 10.21-11.20 MJ/kg ME, 5.18 -6.76 MJ/kg NEL and from Fabaceae species 14.2-23.4%CP, 58.4-69.5% DMD, RFV=91-168, 9.51-11.15MJ/kg ME, 5.53-7.17 MJ/kg NEL. The biochemical biomethane potential from vegetal substrates is 305-379 L/kg of organic matter.*

**Key words:** biomass quality, Brassicaceae species, Fabaceae species, methane potential, nutritive value, seed characteristic.

## THE MAIN CHARACTERISTICS OF THE GENETIC SYSTEM IN SOME FOREST TREE SPECIES

Elena BONCIU<sup>1</sup>, Aurel Liviu OLARU<sup>1</sup>, Joanna ŚLUSARCZYK<sup>2</sup>

<sup>1</sup>University of Craiova, Faculty of Agronomy, 19 Libertatii Street, Craiova, Romania

<sup>2</sup>Jan Kochanowski University, Institute of Biology, Kielce, Poland

Corresponding author email: elena.agro@gmail.com

### **Abstract**

*The genetic system represents the genetic pathway of organisms for organizing and transmitting genetic material that determines the balance between coherence, gene recombination, and control over the amount and type of gene combinations. The objective of this paper is to present the main characteristics of the genetic system of several species of forest trees, namely: Picea abies, Abies alba, Larix decidua, Pinus sylvestris and Quercus robur. The main characteristics of the genetic system taken into account refer to: the mode of reproduction; population dynamics type; chromosomal cycle; recombination index; presence or absence of chromosomal genetic polymorphism, etc. The used methods included searching of the various databases with the latest publications in the field and identification of some relevant results. In the case of forest trees, the genetic systems present a special situation, compared to other higher plants; is about a particular configuration of the systems components. An optimal genetic system of long-lived species, such as forest trees, is characterized by a high recombination index and cross-pollination; however it is possible to change the rate of genetic recombination through selection.*

**Key words:** genetic system, forest tree, recombination, chromosomal cycle.

## **BIOCHAR - A PRODUCT WITH VALUABLE APPLICATIONS**

**Traian CIOROIANU, Carmen SÎRBU, Daniela MIHALACHE**

National Research and Development Institute for Soil Science,  
Agro-chemistry and Environment Protection - RISSA, 61 Marasti Blvd,  
District 1, Bucharest, Romania

Corresponding author email: [carmene.sirbu@yahoo.ro](mailto:carmene.sirbu@yahoo.ro)

### ***Abstract***

*Biochar, a product manufactured through a technology with negative emissions obtained through the valorisation and superior use of agro-wastes, proves to have multiple uses (agriculture, environment, industry). The use in agriculture as an amendment or in the composition of some fertilizers that improve their nutrient supply properties contributes to the decrease of farmers` dependence on chemical fertilizers and the reduction of their application doses. This technology of using biochar supports farmers by combating soil degradation, increasing carbon content, simultaneously decreasing leached nutrients (especially nitrogen) and greenhouse gases, and decreasing the content of contaminants in agricultural products through the retention effect in the biochar structure of pesticides and heavy metals, which affect the production and quality of crops. At the same time, biochar represented a means of combating climate change, improving the physico-chemical properties of the soil and offering benefits to agricultural crops*

**Key words:** *Biochar, agriculture, soil, carbon, fertilizer.*

**THE EVALUATION OF THE BIOMASS QUALITY  
OF *Spartina pectinata* AND PROSPECTS  
OF ITS USE IN MOLDOVA**

**Serghei COZARI<sup>1</sup>, Victor ȚÎȚEI<sup>1</sup>, Alexei ABABII<sup>1</sup>,  
Veaceslav DOROFTEI<sup>1</sup>, Ana GUȚU<sup>1</sup>, Natalia CÎRLIG<sup>1</sup>,  
Andreea ANDREOIU<sup>2</sup>, Vasile BLAJ<sup>2</sup>, Veaceslav MAZĂRE<sup>3</sup>,  
Radu LÎȘÎI<sup>1</sup>, Dragos COVALCIUC<sup>1</sup>,  
Mihai GADIBADI<sup>1</sup>, Valerian CEREMPEI<sup>1</sup>**

<sup>1</sup>“Alexandru Ciubotaru” National Botanical Garden (Institute), Chisinau,  
18 Padurii Street, Republic of Moldova

<sup>2</sup>Research-Development Institute for Grassland, 5 Cucului Street,  
500128, Brasov, Romania

<sup>3</sup>University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: csv2007@yahoo.com

**Abstract**

*Prairie cordgrass - Spartina pectinata Bosc ex Link, Poaceae family, is a warm-season, C<sub>4</sub> perennial rhizome grass native to North America. The main objective of this research was to evaluate the quality indices of green and ensiled mass substrate, solid dry biomass of the introduced taxa of Spartina pectinata, grown in monoculture in the collections of the National Botanical Garden (Institute), Chișinău. It was established that Spartina pectinata fresh mass substrate used for anaerobic digestion contained 43 g/kg CP, 66 g/kg ash, 437 g/kg Cel, 301 g/kg HC, 59 g/kg ADL, 55 g/kg TSS, with C/N= 74 and biochemical methane potential 299 l/kg, but the ensiled substrate - 44 g/kg CP, 76 g/kg ash, 473 g/kg Cel, 323 g/kg HC, 57 g/kg ADL, with C/N= 72 and biochemical methane potential 303 l/kg, respectively. It has been determined that prairie cordgrass solid dry biomass harvested in winter period contained 453 g/kg Cel, 294 g/kg HC, 82 g/kg ADL, the estimated theoretical ethanol yield averaged 543 L/t. The prepared solid fuel, briquettes and pellets, had significantly higher net calorific value than perennial sorghum and corn stem fuel. The investigated introduced taxa of prairie cordgrass, may be used as multi-purpose feedstock for renewable energy production in Moldova.*

**Key words:** biochemical composition, biomass, biomethane, cell wall components, solid fuel, *Spartina pectinata*, theoretical ethanol potential.

**STUDY REGARDING THE INFLUENCE  
OF SOME NUTRIENT SUBSTRATES ON THE FRUITS  
QUALITY IN BLACKBERRY AT MOARA DOMNEASCĂ  
(ILFOV COUNTY) AREA CONDITIONS**

**Mihaela DOGARU, Mircea MIHALACHE**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: dog67cecilia@gmail.com

***Abstract***

*The paper presents data related to the evolution of blackberry variety Triple Crown, grown on different nutrient substrates in the farm belonging to FRDS Băneasa, located in N-E of Bucharest in Afumați, Ilfov County, in the Vlasiei Plain, a subunit of the Roman Plain. Blackberries are an important commercial fruit crop, widely grown. The studied plantation was established in the spring of 2020, the plantation scheme being 1.0m/3m, and the results presented refer to the fruits harvested in 2022. The crop combines different nutritive substrates, that were applied to the soil, as: manure, forest compost, semi-fermented compost and spent mushroom substrate (SMS). The research was based on both the monitoring of the physico-chemical characteristics of the soil and the monitoring of the biometric indicators of the fruits. This paper presents results of research conducted in order to study the possible influence of nutrient substrates on the quality of blackberries fruits. The results obtained in 2021 of these indicators was compared with the results of 2022. The study will continue so that statistical analyzes can be performed.*

**Key words:** *blackberry cultivation, biometric indicators, physico-chemical characteristics.*

**PRELIMINARY ANALYSIS OF A BEE POLLEN  
SAMPLE COLLECTED DURING AUTUMN  
IN THE CORNETU AREA (ILFOV COUNTY)**

**Mirela DRĂGAN<sup>1</sup>, Monica ENACHE<sup>1</sup>,  
Silvana Mihaela DĂNĂILĂ-GUIDEA<sup>1, 2</sup>, Ștefana JURCOANE<sup>1, 2, 3</sup>**

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Microbial Biotechnology Centre-BIOTEHGEN, 59 Marasti Blvd,  
District 1, Bucharest, Romania

<sup>3</sup>Academy of Romanian Scientists, 54 Splaiul Independentei, 050094,  
Bucharest, Romania

Corresponding author email: mirela.dragan78@yahoo.it

***Abstract***

*The present study describes the results of a pollen analysis carried out using light microscopy of a sample of bee pollen collected from a stationary apiary situated in the commune of Cornetu (Ilfov County) in October 2022, during a period with low temperature during the night, and after a summer characterized by very hot weather and severe drought conditions. To determine the preference of pollen sources by the honey bee colony, identification of melliferous plants in the apiary vicinity and up to the periphery of the commune of Cornetu was carried out. Cultured crops such as artichoke, buckwheat, cabbage, common vetch, mustard, phacelia, rape and several autumn-flowering garden plants were blooming at the moment when the current study was carried out. Also, uncultivated areas colonized by allergenic plants were identified in the foraging area around the beehive. After sorting the pollen pellets based on colour, the results indicated several origins of pollen, including pollen of Brassicaceae, Asteraceae, Rosaceae, Portulaca and also pollen of the highly allergenic anemophilous species ragweed - *Ambrosia artemisiifolia*, known as a popular source of pollen for bees.*

**Key words:** *autumn pollen; bee pollen; optical microscope; pollen morphology, stationary apiary.*



## THE EVOLUTION OF WEED CONTROL METHODS – REVIEW

**Maria-Marinela DRAGNEA, Cătălin Viorel OLTENACU,  
Florentina DOBRINESCU, Mihai GÎDEA**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: maria.banca95@yahoo.com

### ***Abstract***

*Weeds have always been a problem in all crops because they can affect production, while also reducing product quality due to competition for natural resources. On the other side, weeds can be considered valuable indicators of biodiversity due to their role in providing ecosystem services. In this sense, it is necessary to carry out an effective and sustainable process of weed management, integrating the different control methods (mechanical and chemical) in a harmonious way, without harming the entire ecosystem. This review aims to look at how weed control systems have evolved and highlight which of these systems are best suited to the current context. The most known and widespread methods are the chemical ones and are considered effective, but they have been found to have negative effects on the environment and biodiversity. The resistance that some weed biotypes have to herbicides is a major concern today and needs to be addressed. On the other side, the recent development of weed control technologies can promote higher levels of food production, reduce the amount of inputs required and reduce damage to the environment, invariably moving us closer to more sustainable agricultural systems.*

**Key words:** *weeds, control, herbicides, biodiversity.*

## STUDIES ON THE DYNAMICS OF THRESHING APPLIANCES OF CEREAL HARVESTING COMBINES

Anișoara Claudia DUMA COPCEA, Casiana Doina MIHUȚ,  
Lucian Dumitru NIȚĂ, Daniela Nicoleta SCEDEI, Okros ADALBERT,  
Sorin BUNGESCU, Lia Sanda ROTARIU, Constanța Corina SÎRBU

University of Life Sciences "King Mihai I" from Timisoara,  
300645, 119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: [anisoaradumacopcea@usab-tm.ro](mailto:anisoaradumacopcea@usab-tm.ro)

### *Abstract*

*The present paper presents a comparative study of the threshers that equip different types of self-propelled combines for cereal harvesting. Particular attention is paid to the problems related to the exploitation of the threshers, focusing on some more important aspects, including those regarding the technological adjustments, the organization and management of the harvesting chain, the execution of the harvesting works and their quality control. We measured the constructive and functional parameters of each threshing device and determined the hourly productivity of each combine and the consumption of diesel per ton of harvested wheat. This shows that worldwide harvesting combines tend to use double-flow threshers with tangential flow due to the following advantages: both threshing and separation of the grains from the straw are done, both length of the thresher and vibrations are reduced because there is no shaking for separation, the percentage of non-threshed ears is reduced by the fact that the material is trained in rotary motion inside the threshing device.*

**Key words:** *thresher, self-propelled combines, harvesting works, constructive parameters, technological adjustments.*

## THE IMPACT OF MONITORING THE STATE OF VEGETATION OF LAVENDER CROPS USING ANALYSIS DRONES

**Cristinel FERTU<sup>1</sup>, Zanet VITALII<sup>1</sup>, Daniela Lavinia BALASAN<sup>1</sup>,  
Silvius STANCIU<sup>1</sup>, Daniela NENCIU (COADA)<sup>2</sup>,  
Raluca-Beatrice COSTEA (VOINEA)<sup>1</sup>**

<sup>1</sup>“Dunarea de Jos” University of Galati, 47 Domneasca Street, Galati, Romania

<sup>2</sup>University of Life Sciences “Ion Ionescu de la Brad” from Iasi,  
3 Mihail Sadoveanu Alley, Iasi, Romania

Corresponding author email: cristi\_fertu@yahoo.com

### ***Abstract***

*Agriculture evolves from day to day, so that, among the traditional crops, whole fields of lavender have appeared. Apart from its decorative uses, lavender has many other uses, both in the cosmetic and food industries. Lavender growing can become a profitable business for farmers, entrepreneurs and gardeners alike. Lavender is often grown for the benefits of the products it produces. Lavender is a perennial plant that is rarely attacked by pests. As it is considered a niche business, lavender is often grown on small areas. Analysis of the state of vegetation and condition of agricultural crops is done using multispectral drone cameras. These combine data from several separate sensors, so that it is possible to quickly analyse the evolution of the plants, the presence of weeds and insects, the lack of water, etc. In this article we will highlight the impact of using a drone analysis for the purpose of monitoring the state of vegetation as well as the opportunities in finding solutions to control pests and other factors on a field cultivated with lavender in Campia Romana.*

**Key words:** *unmanned aerial vehicle (UAV), precision agriculture, normalized difference vegetation index (NDVI), green normalized difference vegetation index (GNDVI).*

**EVALUATION OF THE QUANTITATIVE  
INDICATORS OF WHEAT CROPS IN ROMANIA  
IN THE PERIOD 1961-2021**

**Valeria GAGIU<sup>1</sup>, Mihaela CAIAN<sup>2</sup>, Antoanela DOBRE<sup>2</sup>,  
Oana Alexandra OPREA<sup>2</sup>, Elena MATEESCU<sup>2</sup>, Nastasia BELC<sup>1</sup>**

<sup>1</sup>National Research & Development Institute for Food Bioresources  
(IBA Bucharest), 5 Baneasa Ancuta Street, Bucharest, Romania

<sup>2</sup>National Meteorological Administration (METEO-Romania),  
97 Bucharest-Ploiesti Avenue, Bucharest, Romania

Correspondence author email: [valeria.gagiu@bioresurse.ro](mailto:valeria.gagiu@bioresurse.ro)

***Abstract***

*The paper aims to evaluate the temporal evolution of the quantitative indicators (harvested area, production and productivity) of wheat in Romania in the period 1961-2021 (60 years). The evaluation uses official data for Romania, which were downloaded from the database of the Food and Agriculture Organization (FAO). The statistical and temporal analysis of the crop indicators of wheat showed a varied evolution, with a decrease in harvested area and an increase in production and productivity in 1962-1989 (post-collectivization, agricultural industrialization), followed by a decline in 1991-2000 (Revolution in December 1989, abolition of state agricultural enterprises), and a significant development after joining the European Union in 2007. A major influence on the wheat indicators had the external financing that allowed the purchase of modern technologies, the early loan repayment and the extreme weather events. The quantitative indicators of wheat were correlated with trade indicators and the climatic conditions in Romania.*

***Key words:*** *agricultural collectivization and industrialization, abolition of state agricultural enterprises, wheat crop indicators, wheat trade indicators, climate change.*

## EVALUATION OF STICKINESS OF PLANTS PROTECTION PRODUCTS IN THE LABORATORY CONDITIONS

**Donyo GANCHEV, Atanas IVANOV**

Agricultural University of Plovdiv, 12 Mendellev Blvd, Plovdiv, Bulgaria

Corresponding author email: donyo@abv.bg

### ***Abstract***

*The stickiness of the plant protection products, means their ability to sustain washing out from sprayed plant surfaces from rain, is one of the most critical and important attributes, especially for protective action non-systemic pesticides. Lack or insufficient stickiness will cause a greatly dropping in effectiveness, especially during rainy weather (seasons), which on the other side, will prove favourable conditions for spreading pests on plants. Therefore selecting plant protection products with good rain retention ability is critical for achieving a satisfactory level of effectiveness in the case of treatments in such weather conditions. This of course, invokes the need to evaluate of this property, which is the object of the given research. Plant protection products were tested alone and in combinations with sticky and wetness agents for evaluation their stickiness ability. The results shows that stickiness ability can vary greatly for different plant protection products, but addition of sticky agent to the pesticide solution can improve it significantly in most of the cases. Hoverer there was some exceptions.*

**Key words:** *pesticides, stickiness, rain resistance, effectiveness.*

## THE EVOLUTION OF AGRICULTURAL YIELDS. A CASE STUDY ON TIMIS COUNTY

**Loredana GHERASIMESCU, Ștefan Laurențiu BĂTRÎNA,  
Ilinca IMBREA, Lucian BOTOS, Florin CRISTA, Florin IMBREA**

University of Life Sciences “King Mihai I” from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: stefan.batrina@usab-tm.ro

### ***Abstract***

*Over the last period of time, we are witnessing a perturbation of the climate, this having a direct influence over the agricultural yields. Luckily, on one hand Timis county has a soil with a higher quality, suitable for a large span of crops due to the close levels of groundwater, thus granting the crops to overcome more easily long periods of drought. On the hand modern agricultural equipment grants the farmers the usage of specific crop technologies, in order to keep the water into the soil and to prevent erosion and the scarce effects of drought. This study aims to follow the evolution of yield performance over the course of three years – 2018, 2019 and 2020. The performance of agricultural establishments can be appreciated through the results obtained over the course of production process. Although over the course of the three years deviations of both rainfall and temperatures were registered, superior yields were reported for all Timis county.*

**Key words:** *yield, climate change, agricultural production, evolution.*

## EVOLUTION THE CURRENT SITUATION OF GREEN STINK BUGS POPULATIONS IN AGRICULTURAL AREAS OF TIMIS COUNTY AND EFFECTIVE CONTROL STRATEGIES

Ioana GROZEA<sup>1</sup>, Alin CARABET<sup>1</sup>, Ramona ŞTEF<sup>1</sup>,  
Adrian GROZEA<sup>1</sup>, Ionela DOBRIN<sup>2</sup>, Ana Maria VIRTEIU<sup>1</sup>

<sup>1</sup>University of Life Sciences “King Mihai I” from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: ioana\_entomol@yahoo.com

### **Abstract**

*Green stink bugs (as polyphagous pest) are still active in agroecosystems in Romania producing negative effects in various types of agricultural and horticultural areas. In this paper, we focused on the population capacity of the pest in 8 localities belonging to Timis county, each representing a type of area, but also on the monthly dynamics during 5 months (June-October) from 2019-2022. We also focused on testing both chemical and non-polluting control products currently used by farmers and gardeners in the western part of the country. From the ones analysed, we found that in all the monitored localities the pest was present at varying levels from low to high. Regarding the monthly dynamics, the most specimens were observed in August and September, with a maximum recorded in 2020 followed by 2021. The most effective control strategy involves a chemical product applied individually, i.e Karate Zeon (lambda - cihalotrin) but also the Laser 240 SC (spinosad) product, 1-2 applications. Their combination is essential in keeping harmful populations under control.*

**Key words:** control, agroecosystem, green stink bug, populations.

**BIOLOGICAL FEATURES AND BIOMASS QUALITY  
OF SOME *Helianthus* SPECIES UNDER THE CONDITIONS  
OF THE REPUBLIC OF MOLDOVA**

**Ana GUȚU, Victor ȚÎȚEI, Natalia CÎRLIG, Alexei ABABII,  
Dragoș COVALCIUC, Mihai GADIBADI, Veaceslav DOROFTEI,  
Natalia MOCANU, Andrei GUDIMA, Serghei COZARI**

“Alexandru Ciubotaru” National Botanical Garden (Institute),  
18 Padurii Street, MD 2002, Chisinau, Republic of Moldova

Corresponding author email: ag9152633@gmail.com

**Abstract**

*The genus Helianthus Asteraceae family comprising 71 species of annual and perennial plants, most of them native to North America and Central America. The species Helianthus annuus, Helianthus mollis, Helianthus strumosus Helianthus tuberosus, which grow in the “Alexandru Ciubotaru” National Botanical Garden (Institute), Chisinau, Republic of Moldova served as research subjects. It was found that the researched species had different growth and development rates, which affected the accumulation of biomass and nutrients. The harvested green mass of the studied Helianthus species contained 78-121 g/kg CP, 67-103 g/kg ash, 251-382 g/kg CF, 288-404 g/kg ADF, 456-604 g/kg NDF, 41-71 g/kg ADL, 40- 186 g/kg TSS, 239-332g/kg Cel, 164-209 g/kg HC with nutritive and energy value 415-681 g/kg DDM, 376-679 g/kg DOM, RFV = 89-135, 11.43-13.03 MJ/kg DE, 9.38-10.66 MJ/kg ME and 5.40-6.72 MJ/kg NEI. The biochemical methane potential of green mass substrates varied from 282 to 333 l/kg VS. The dehydrated stems of studied Helianthus species contained 474-511 g/kg cellulose, 237-263 g/kg hemicellulose and 102-121 g/kg acid detergent lignin with estimated theoretical ethanol potential 523-559 L/tonne. The energy biomass from Helianthus species is characterized by 46.30-47.04% C, 5.19-5.58% H, 0.25-0.48% N, 0.05-0.06% S, 0.03-0.04% Cl, 1.56-3.18% ash with calorific value 18.05-18.65 MJ/kg GCV and 16.93-17.45 MJ/kg NCV.*

**Key words:** *biochemical composition, biochemical methane potential, biological features, calorific, value Helianthus species, nutritive value, theoretical ethanol potential.*



## AN INVESTIGATION OF THE EFFECTS OF INTRODUCING AN ALTERNATIVE CATTLE FEEDING METHOD ON A DAIRY FARM

George HARGREAVES<sup>1</sup>, Adam ECKERSLEY<sup>1</sup>,  
Philip BOYLE<sup>1</sup>, Lancelot BUTTERS<sup>2</sup>

<sup>1</sup>Myerscough College, Bilsborrow, Preston PR3 0RY, United Kingdom

<sup>2</sup>University of Central Lancashire, Preston, Lancashire,  
PR1 2HE, United Kingdom

Corresponding author email: ghargreaves@myerscough.ac.uk

### **Abstract**

*With the cost of farm labour in the UK remaining stable through 2020 and the cost of milk rising Reeve, (2021) (AHDB, 2022), there is an increasing incentive to capitalise on these unique circumstances. Dairy farms have recognised for years, the vitality of providing the correct sustenance to cattle. It is recognised that correct levels of feed supplied to the cattle has an impact on milk yield. Another factor to consider, when it comes to feed, is the quality of the mix that is produced from a diet feeder. With diesel prices continuing rise, a more fuel efficient alternative to traditional feeding is being sought, without sacrificing quality. This report investigates the financial effects recorded when implementing a self-propelled diet feeder into a 146 cow dairy farm in Lancashire. Using primary research, gathered from a series of tests, carried out between a self-propelled diet feeder and the conventional trailed machine. The results showed the benefits of the self-propelled machine outweighed the negative aspects. Due to the study only being carried out on a single farm the data cannot represent other farms. However, on this farm, the increased value of milk yield exceeded the additional cost of diesel fuel used and time taken by the self-propelled unit. As a conclusion an increased daily income of £61.10, when using the self-propelled, it would take a projected nine years to pay off the machine with current labour, diesel and milk prices.*

**Key words:** farm labour, milk production, self-propelled, diet feeder Lancashire.

**THE IMPACT OF VARIOUS PEST CONTROL OPTIONS  
ON ARTHROPOD STRUCTURE AND DIVERSITY  
IN SWEET POTATO AGRO-ECOSYSTEM  
IN THE CONDITIONS OF SANDY SOILS  
FROM SOUTHERN ROMANIA**

**Maria IAMANDEI<sup>1</sup>, Raluca Gabriela GEORGESCU<sup>1</sup>,  
Ionuț Cristian POPA<sup>1</sup>, Mădălina RĂDULEA<sup>1</sup>,  
Andrei CHIRILOAIE-PALADE<sup>1</sup>, George COTET<sup>2</sup>, Ștefan NANU<sup>2</sup>**

<sup>1</sup>Research-Development Institute for Plant Protection,  
8 Ion Ionescu de la Brad Blvd, 013813, District 1, Bucharest, Romania  
<sup>2</sup>Research and Development Station for Plant Culture on Sands Dabuleni,  
Calarasi Street, Dolj, Romania

Corresponding author email: maria\_iamandei@yahoo.com

***Abstract***

*The paper aimed to evaluate the influence of three different pest control options (chemical, biological and a combination of them) on epigeic fauna diversity in the conditions of sandy soils from southern Romania in two successive years (2021-2022), through the analysis of biological material resulting from the collection of samples in pitfall traps and direct observations at the foliage level. The arthropod fauna was represented by 69 species belonging to a number of 26 families and 13 taxonomic orders: Acarina, Araneae, Collembolla and the insect orders Coleoptera, Dermaptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera, Mantodea, Neuroptera, Orthoptera and Thysanoptera. The composition of the fauna spectrum were dominated by Collembolla species in 2021 and Coleoptera species in 2022. The highest richness of species and values of Shannon-Wiener and Simpson diversity index were found in treatments with biological control either alone or in combination.*

***Key words:*** arthropod structure, arthropod diversity, sweet potato, Southern Romania.

## BIOWASTE COMPOST - AN ALTERNATIVE SOURCE OF NUTRIENTS FOR AGRICULTURAL CROPS

Georgiana-Andreea IGNAT<sup>1</sup>, Mirela DUȘA<sup>1</sup>,  
Nicoleta VRÎNCEANU<sup>2</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, 011464, Bucharest, Romania

<sup>2</sup>National Research and Development Institute of Soil Science,  
Agrochemistry and Environment Protection of Bucharest,  
61 Marasti Blvd, District 1, 011464, Bucharest, Romania

Corresponding author email: georgiana-andreea.ignat@edu.usamv.ro

### **Abstract**

*Important amounts of biowaste are produced daily both in the rural and urban areas of Romania. Composting is the most sustainable way for their treatment, and compost can be used as fertilizer, including in organic agriculture if it meets specific quality standards. The agronomic value of the compost is given by the macronutrient and organic matter content, and its quality by the absence of phytotoxic compounds (heavy metals and other pollutants), and the absence of pathogens for humans, animals and plants. This paper presents part of the results of a study made to characterize the agronomic value of three types of compost (a. poultry manure + cereal straw; b. poultry manure + vegetable food waste; c. biodegradable household waste). Mixtures of compost and soil were made where the compost was integrated in proportions of 25, 50 and 75% g/g. A test plant, oats (*Avena Sativa L.*), was cultivated in the greenhouse, in pots, on the mixtures made. The intake of macronutrients (N, P, K, Mg, Ca) was analyzed in biomass samples, harvested at the grain filling stage.*

**Key words:** *biowaste, composting, macronutrients, sustainable agriculture, agronomic value.*

**STUDY ON AN ECOLOGICALLY FRIENDLY  
METHOD TO FIGHT WITH *Pteridium acuilinum*  
IN MOUNTAIN CONDITIONS**

**Minko ILIEV, Biser BOZHANSKI, Magdalena PETKOVA,  
Tatyana BOZHANSKA**

Agricultural Academy, Research Institute of Mountain Stockbreeding and  
Agriculture, 281 Vasil Levski Street, 5600, Troyan, Bulgaria

Corresponding author email: [iliev\\_ved@abv.bg](mailto:iliev_ved@abv.bg)

***Abstract***

*The aim of the experiment is to determine the staged annual mowing of a population of Pteridium acuilinum (harmful species), in a natural grass stand of Chrysopogon gryllus type. The results of the conducted research show a progressive reduction of the harmful species from the first to the last experimental years, ranging from 72.0-78.0 pcs. of plants/m<sup>2</sup> (2014) up to 14.2-15.9 pcs. of plants/m<sup>2</sup> (2019). A positive trend was established regarding the recovery of grass cover and an increase in the number of useful fodder species such as: Festuca arundinaceae Scherb, Agrostis alba L., Dactylis glomerata L., Trifolium hybridum L. and Chrysopogon gryllus L.*

**Key words:** *mechanical control, grass stand, Pteridium acuilinum.*

## MONITORING GRAPES' INFECTION WITH *Botrytis cinerea* BASED ON LACCASE ACTIVITY

Marian ION<sup>1</sup>, Florentina MATEI<sup>2,3</sup>, Steliana-Paula BARBU<sup>1</sup>,  
Georgeta TUDOR<sup>1</sup>, Elena BRINDUSE<sup>1</sup>

<sup>1</sup>Research and Development Institute for Viticulture and Enology,  
1 Valea Mantei Street, Valea Calugareasca, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>3</sup>Transilvania University of Brasov, 29 Eroilor Blvd, Brasov, Romania

Corresponding author email: elabrinduse@gmail.com

### **Abstract**

*Botrytis cinerea* causes grey mould and is one of the most damaging disease occurring in vineyards worldwide, resulting in loss of grape production and wine quality. Laccase enzymes produced following fungal infection are involved in the oxidation of phenolic substances during the development of grey mould and has been used as an indicator of the degree of infection. Between the laccase activity of resulting juice of *Botrytis cinerea* infected bunches and the severity of infection observed in the vineyard a moderate to good correlation has been highlighted over the measurements carried out over veraison (BBCH81 – 88), and a strong correlation has been highlighted for the measurements carried out over the full ripening growth stage (BBCH 89). As a consequence of the degradation of polyphenolic compounds and the intensification of laccase activity in the infected musts, the change of chromatic characteristics, in the sense of increasing the values of the „Hue” parameter and the yellow color of musts was highlighted, in direct correlation with the oxidative processes.

**Key words:** *Botrytis cinerea*, laccase, *Vitis vinifera*, polyphenolic compounds.

**BIOLOGICAL PECULIARITIES  
AND QUALITY OF PHYTOMASS FROM  
SOME *Salix* L. AND *Populus* L. SPECIES**

**Liubov ISHCHUK<sup>1</sup>, Victor ȚÎȚEI<sup>2</sup>, Halyna ISHCHUK<sup>3</sup>,  
Volodymyr HRABOVYI<sup>4</sup>, Ion ROSCA<sup>2</sup>, Alexei ABABII<sup>2</sup>,  
Veceslav DOROFTEI<sup>2</sup>, Nina GARSTEAI<sup>2</sup>, ONICA Natalia<sup>2</sup>**

<sup>1</sup>Bila Tserkva National Agrarian University, Soborna Area, 8/1,  
Bila Tserkva, Ukraine

<sup>2</sup>“Alexandru Ciubotaru” National Botanical Garden (Institute),  
18 Padurii Street, Chisinau, Republic of Moldova

<sup>3</sup>Uman National University of Horticulture, 1 Institutska Street,  
Uman, Ukraine

<sup>4</sup>National Dendrological Park "Sofiyivka" of the National Academy of  
Sciences of Ukraine, 12A Kyivska Street, Uman, Ukraine

Corresponding author email: ishchuk29@gmail.com

***Abstract***

*The rapid development of global bioenergy makes it necessary to find and develop fundamentally new approaches to forest management. Promising plants are species and varieties of the genera *Salix* L. and *Populus* L., which are characterized by fast rates of biomass growth. Research has established that the annual growth of species and varieties of the genus *Salix* L. is 80-145 cm, and that of the genus *Populus* L. is 120-165 cm. The *Salix viminalis* phytomass is characterized by 3.53% ash, 44.9 % cellulose, 24.7% hemicellulose, 9.1% acid detergent lignin, 50.22% C, 6.00% H, 0.89% N, 0.07% S, 0.05%Cl, 19.77 MJ/kg HHV and 18.46MJ/kg LHV. The *Populus alba* phytomass contained 2.82% ash, 50.6 % cellulose, 19.1% hemicellulose, 7.3% acid detergent lignin, 47.83% C, 5.98% H, 0.80% N, 0.16% S, 0.04%Cl, 19.22 MJ/kg HHV and 17.91MJ/kg LHV. The estimated theoretical ethanol yield from cell wall carbohydrates averaged 510.4 L/t in *Salix viminalis* substrate and 505.4 L/t in *Populus alba* substrate, as compared with 476.3 L/t in pruning residues substrate. The creation of short-rotation plantations of *Salix* L. and *Populus* L. will make it possible to reduce resource pressure on other categories of forests, increase the forest cover of territories and the productivity of plantations, shorten the time of growing wood with the possibility of its further use for energy purposes.*

**Key words:** *biological peculiarities, chemical properties, energy properties, phytomass, Populus, Salix, theoretical ethanol potential.*

**CONTRIBUTION TO THE IMPROVEMENT  
OF THE NUTRITIONAL AND FUNCTIONAL  
PROPERTIES OF BREAD BY INCORPORATING  
CINNAMON POWDER (*Cinnamomum verum*)**

**KOFFI MAIZAN JEAN-PAUL BOUATENIN**

University Nangui Abrogoua, Abobo road express, Abidjan,  
Ivory Coast (Cote D'Ivoire)

Corresponding author email: bouateninkoffi@gmail.com

***Abstract***

*This work was carried out with the objective of improving the nutritional and functional properties of white bread by using cinnamon in bread-making in order to contribute to the prevention of certain diseases related to eating habits. Therefore, bread making trials by incorporating 0.5% and 1% of cinnamon powder were carried out. A control bread (100% wheat) was produced in order to compare it with the breads formulated with cinnamon. Thus, the results showed that the protein, fat and crude fiber content of the cinnamon powder was  $3.04 \pm 0.03\%$ ;  $9.01 \pm 0.19\%$  and  $46.68 \pm 0.02\%$ , respectively. On the other hand, the biochemical composition of the bread containing 1% cinnamon powder and the bread containing 0.5% cinnamon was  $11.96 \pm 0.02\%$  and  $11.22 \pm 0.02\%$  for protein,  $1.70 \pm 0.01\%$  and  $1.41 \pm 0.07\%$  for fiber, respectively, compared to  $10.76 \pm 0.014\%$  protein and  $1.36 \pm 0.17\%$  fiber for the bread without cinnamon. From the nutritional point of view, the results of this work showed the positive impact of the incorporation of cinnamon powder in wheat flour based bread with beneficial properties on the health of consumers*

**Key words:** *Biochemical, phytochemical, functional properties, bread, incorporation, cinnamon.*

## MATHEMATICAL EVALUATION OF TECHNOLOGICAL APPROACHES FOR CORIANDER PRODUCTION

Velika KUNEVA<sup>1</sup>, Vanya DELIBALTOVA<sup>1</sup>,  
Svetlana MANHART<sup>1</sup>, Manol DALLEV<sup>1</sup>, Ivan MITKOV<sup>1</sup>,  
Dimitar RAZPOPOV<sup>1</sup>, Galya HRISTOVA<sup>2</sup>

<sup>1</sup>Agriculture University of Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria

<sup>2</sup>Trakia University, Stud. Grad., Stara Zagora, Bulgaria

Corresponding author email: manol\_dallev@abv.bg

### ***Abstract***

*Recently, the cultivation of essential oil and aromatic crops is becoming more and more popular. A typical representative of such a culture is coriander. The article presents real data from the coriander production process, using two different technological approaches. By using a mathematical, dispersion analysis and T-test, the technology is evaluated. The obtained results are adequate and easy to interpret, they reflect the entire process, but they are valid only under the specific conditions. However, it can be clearly emphasized that sowing term affects yield when cultivate coriander.*

**Key words:** *coriander, technology for production, sowing term, dispersion analysis.*



## RESEARCH ON THE IMPACT OF THE MULCHING SYSTEM ON STRAWBERRY YIELD

Maria-Cristina LUMÎNARE<sup>1,2</sup>, Beatrice IACOMI<sup>1</sup>,  
Lizica SZILAGYI<sup>1</sup>, Stelica CRISTEA<sup>1</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Research and Development Institute for Plant Protection Bucharest,  
8 Ion Ionescu de la Brad Blvd, Bucharest, Romania

Corresponding author email: cristina\_tane@yahoo.com

### **Abstract**

*The research followed the impact of the mulching system on strawberry yield in the Giurgiu County area in 2022. Mulching provides a physical barrier between the soil and the plant, with positive effects on decreasing the degree of weediness, water losses, and attack by harmful organisms. The biological material taken in the study was of the varieties Magic and Alba. Two types of mulch were used, black polyethylene mulch and wheat straw-based organic mulch. In comparison to the control, where the yield was 25 t/ha, the Alba variety produced the highest yields, 40 t/ha in the black polyethylene mulching system variant and 30 t/ha in the wheat straw mulching system variant. In the Magic variety, the yield was higher in the wheat straw mulching system variant 35 t/ha compared to the black polyethylene mulching system variant 25 t/ha and the control 20 t/ha. The research showed that in Alba, the black polyethylene mulching system provided the highest yields, while in Magic, the wheat straw mulching system was more suitable. The results of the experiment demonstrate that the use of mulching systems is effective in increasing yield, with the best system differing by variety.*

**Key words:** *strawberry, variety, mulching system, yield.*

## CHARACTERIZATION OF AN AGROFORESTRY SYSTEM FROM WEST OF ROMANIA THROUGH SUSTAINABILITY INDICATORS OF SOIL

**Romina MAZĂRE, Mădălina IORDACHE**

University of Life Sciences “King Mihai I” from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: mada\_iordache@yahoo.com

### **Abstract**

*The agroforestry systems in Romania are rare and low studied, although the advantages provided by these systems to agriculture are multiple. The aim of this research was to use several soil indicators widely used as indicators of soil sustainability to characterize an agroforestry system from western Romania, Timiș County (45.45418°N, 20.90334°E). The studied agroforestry system was a silvoarable ecosystem and consisted of two components: a woody perennial plant represented by Euro-American hybrid poplar trees (*Populus deltoides* x *Populus nigra*) and an agricultural crop - rapeseed (*Brassica napus* L.) - hybrid LG Architect. The soil parameters analyzed for both components were pH, humus, total nitrogen, plant-available phosphorus, and plant-available potassium. There have been found higher values of the soil parameters pH, humus, plant-available phosphorus and plant-available potassium in the soil cultivated with rapeseed than those of the soil planted with hybrid poplar, and statistically significant ( $p < 0.01$ ) correlations between several soil factors of the two components of the silvoarable system: between pH and plant-available potassium in the *Populus* spp. plantation and between humus and plant-available phosphorus in the rapeseed crop. The findings of this study show benefits expressed as nutrient increase of soil for the rapeseed crop in the silvoarable system poplar-based and emphasize the favourable association of these two types of plants: trees and crops.*

**Key words:** poplar, *Populus*, rapeseed, canola, silvoarable, nutrients.

## GRASSLANDS AS FODDER FOR ANIMALS AND RENEWABLE SOURCE OF ENERGY BIOMASS

Aliona MIRON<sup>1</sup>, Victor ȚÎȚEI<sup>1</sup>, Alexei ABABII<sup>1</sup>, Alexandru TLEUȚĂ<sup>1</sup>,  
Ana GUȚU<sup>1</sup>, Ludmila TALMACI<sup>1</sup>, Valentina COȘMAN<sup>1</sup>,  
Alexandru GALUPA<sup>1,2</sup>, COZARI Serghei<sup>1</sup>, Adrian-Ilie NAZARE<sup>3</sup>,  
Liliana MARDARI<sup>1</sup>, Ștefan LAZU<sup>1</sup>, Natalia CÎRLIG<sup>1</sup>

<sup>1</sup>“Alexandru Ciubotaru” National Botanical Garden (Institute),  
Chisinau, 18 Padurii Street, Republic of Moldova

<sup>2</sup>Forest Research and Management Institute, Chisinau,  
69 Calea Iesilor Street, Republic of Moldova

<sup>3</sup>University of Life Sciences “Ion Ionescu de la Brad” of Iasi,  
3 Mihail Sadoveanu Alley, Iasi, Romania

Corresponding author email: [aliona\\_miron@yahoo.com](mailto:aliona_miron@yahoo.com)

### **Abstract**

*Grasslands have a wide range of economic and ecological functions. We studied the productivity and quality of the biomass obtained from an area of grassland with *Elymus repens*, *Poa pratensis* and *Festuca valesiaca*, which is found within the boundaries of Orhei National Park, Republic of Moldova. The biomass was harvested at the beginning of the flowering stage and was dried under natural conditions. It was established that the productivity of grassland with *Elymus repens* were 4.72-9.31 t/ha dry matter, the grassland with *Poa pratensis* 1.38-3.63 t/ha dry matter and the grassland with *Festuca valesiaca* 1.59-3.77 t/ha dry matter. The biochemical composition of hay dry matter was: 6.62-13.90% crude protein, 1.31-3.43% crude fat, 26.65-40.78% crude cellulose, 43.27-53.02% nitrogen free extract, 2.41-6.82% sugars, 1.40-2.83% starch, 6.79-11.29% ash, 0.27-0.73% Ca, 0.15-0.30% P, 4.40-41.12 mg/kg carotene with energy concentration 17.78-18.44 MJ/kg GE, 7.93- 9.73 MJ/kg ME and 4.28-5.50 MJ/kg NEL. The gas forming potential of the fermentable organic matter of the hay collected from the studied grassland varied from 400 to 598 l/kg VS, and specific methane yield varied from 210 to 314 l/kg VS.*

**Key words:** *biochemical composition, fermentable organic matter, grasslands, hay, productivity, specific methane yields.*

## AN OVERVIEW OF 50 YEARS OF STUDIES ON THE WET ZONES CORMOFLORA IN THE ROMANIAN BANAT

Alina NEACȘU<sup>1,2</sup>, Ilinca IMBREA<sup>1</sup>, Diana OBIȘTIOIU<sup>1</sup>,  
Alina LAȚO<sup>1,2</sup>, Gabriel ARSENE<sup>1,2</sup>

<sup>1</sup>University of Life Sciences "King Mihai I" from Timisoara,  
119 Calea Aradului Street, Timisoara, Romania

<sup>2</sup>Bioresources, Environment and Geospatial Data Research Center,  
Faculty of Agriculture, 119 Calea Aradului Street, Timisoara, Romania

Corresponding author email: gabrielarsene@usab-tm.ro

### **Abstract**

*The paper contains our own data and observations issued from the scientific papers, published between 1970 and 2020. Although, at a first approach, the flora of wet zones in the Romanian Banat region does not seem spectacular, our analysis shows the presence of several hundreds of species. In the past 50 years, many authors have studied these wet zones habitats bringing important contributions (floristic inventories, the study of rare or invasive species, general observations on the flora). Compared to the first part of the reference period, many species, considered common in the past, have become less frequent, some of them with uncertain spontaneous presence or extinct from the Romanian Banat: *Hippuris vulgaris*, *Ludwigia palustris*, *Stratiotes aloides*, *Hottonia palustris*, *Lysimachia punctata*, *Potamogeton lucens*, *Zannichellia palustris*, *Marsilea quadrifolia*. Significant changes are also noticed in cormoflora structure in terms of life forms and geo-elements. Reducing and degrading habitats and direct human pressures, the presence of invasive species (*Amorpha fruticosa*, *Echinocystis lobata*, *Reynoutria japonica*, *Helianthus tuberosus*, *Asclepias syriaca*, *Lindernia dubia*) are serious threats to wet zones cormoflora, including that of the protected areas.*

**Key words:** Romanian Banat, wet zones, cormoflora, historical changes, invasive species.

## THE ALLUVIAL FOREST VEGETATION DISTURBED BY THE INVASIVE ALIEN PLANTS, IN THE DANUBE VALLEY, BETWEEN CETATE AND CALAFAT

**Mariana NICULESCU**

University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Romania

Corresponding author email: [mniculescu@yahoo.com](mailto:mniculescu@yahoo.com)

### **Abstract**

*Invasive species have a negative impact on forest, grassland, and agricultural ecosystems around the world, sometimes associating and forming segetal or ruderal plant communities. Exotic species compete with native species and threaten ecosystem stability. The paper presents the results of the investigations carried out in the alluvial forest vegetation in the Danube Valley from Oltenia, between Cetate and Calafat. In this region, the intensive abiotic activity, but not only that, has brought about the invasion of allochtone (invasive alien) species plants in the natural and semi-natural degraded ecosystems, especially in alluvial forest habitats. The species has been found in the following types of natural habitats: 91E0\* - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae); 92A0 - *Salix alba* and *Populus alba* galleries; 91F0 - Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia* along the great rivers (*Ulmenion minoris*); 91I0\* - Euro-Siberian steppic woods with *Quercus* spp.*

**Key words:** *invasive species, habitats, Oltenia, biodiversity, alluvial vegetation.*

**CHOROLOGY, ECOLOGY AND PHYTOSOCIOLOGY  
OF THE *Ruscus aculeatus* L. IN FOREST HABITATS  
FROM THE SOUTH OF OLTENIA, ROMANIA**

**Mariana NICULESCU**

University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Romania

Corresponding author email: [mniculescu@yahoo.com](mailto:mniculescu@yahoo.com)

***Abstract***

*Ruscus aculeatus* L. (Ruscaceae), is a shrub with strong, erect stems bearing numerous phylloclades widespread in western, southern and southeastern Europe, in Anatolia and northern Africa. This species is cited from few places in Oltenia. Following field research in the forest habitats of southern Oltenia, important populations of this species were identified. Such populations were identified in the lower Jiului basin, in the forest base of the Segarcea, Perișor and Craiova Forestry Districts. The most important populations with a large number of individuals, increased vitality and good conservation status are found in the Dâlga and Țuglui arboretums. The species is found especially in the forests of the *Quercus cerris* and *Q. frainetto*, in the natural habitat - 91M0 Pannonian-Balkan oak - Oak forests (CLAS. PAL.: 41.76). Thirty populations of *Ruscus aculeatus* were identified and monitored in the Dâlga and Țuglui arboretums.

**Key words:** *Ruscus aculeatus*, populations, corology, ecology, plant communities, forest habitats.

**THE PHYSICAL-GEOGRAPHIC AND SOCIAL-  
ECONOMIC CONDITIONS, ELEMENTS THAT DEFINE  
THE QUALITY OF ECO-PEDOLOGICAL RESOURCES  
IN THE TIMISOARA METROPOLITAN AREA**

**Lucian Dumitru NIȚĂ<sup>1</sup>, Gheorghe ROGOBETE<sup>2</sup>, Florin CRISTA<sup>1</sup>,  
Simona NIȚĂ<sup>1</sup>, Casiana MIHUȚ<sup>1</sup>, Karel Iaroslav LAȚO<sup>1</sup>,  
Anișoara DUMA COPCEA<sup>1</sup>, Alina LAȚO<sup>1</sup>**

<sup>1</sup>University of Life Sciences "King Mihai I" from Timisoara,  
119 Cale Aradului Street, Timisoara, Romania

<sup>2</sup>University "Polytechnic" of Timisoara, Piata Victoriei Street,  
Timisoara, Timis, Romania

Corresponding author email: simona\_nita@usab-tm.ro

***Abstract***

*The ecopedological resources together with the physical-geographical factors and the regime of climatic factors constitute a subsystem called biotope or resort which is in close connection with the associations of plants and animals, together making up terrestrial ecosystems, they having the ability to transform the energy they store in biomass, between these and socio-economic interventions, relations of a varied and complex reciprocity can be established. The Timișoara metropolitan area, from this paper, is a project that includes the municipality of Timișoara, the city of Receaș and 25 other neighboring territorial administrative units in order to create an integrated administrative unit between the municipality of Timișoara and the neighboring localities, which would include 468,162 of inhabitants, on an area of 223952 ha, establishing relations of economic, social and cultural cooperation, territorial development, technical-building equipment and environmental protection, each locality maintaining its autonomy. In Romania, metropolitan areas were regulated by law 351 of July 6, 2001 an area constituted by association, based on voluntary partnership, between large urban centers and urban and rural localities located at distances of up to 30 km.*

**Key words:** *quality, ecological, metropolitan, resources, sustainable.*

***Agrostis capillaris* L. - A REVIEW  
OF THE DISTRIBUTION, CHARACTERISTICS,  
ECOLOGICAL AND AGRONOMIC  
ASPECTS, AND USAGE**

**Marilena ONETE<sup>1</sup>, Luiza-Silvia CHIRIAC<sup>1</sup>,  
Roxana-Georgiana NICOARĂ<sup>1</sup>, Florian Paul BODESCU<sup>2</sup>,  
Minodora MANU<sup>1</sup>**

<sup>1</sup>Institute of Biology Bucharest, 296 Splaiul Independentei Street,  
Bucharest, Romania

<sup>2</sup>SC Multidimension SRL, 7 Ciprian Porumbescu Street,  
Saveni, Ialomita, Romania

Corresponding author email: marilena.onete@gmail.com

***Abstract***

*Agrostis capillaris* L. (syn. *A. tenuis* Sibth.) is a perennial herbaceous, hemicryptophyte, native to Romania, distributed frequently from oak to subalpine levels. The circumpolar world distribution shows that the native range is quite extensive and can become adapted to a wide range of other habitats. Still, the literature review showed that in many countries, this species is introduced in grasslands as fodder for animals, as a sports turf and lawn species, and might be invasive in other countries replacing the native species from pastures and other grassland types. *A. capillaris* might be used as a hyper-accumulator, improving grassland quality; it provides economic value, social benefit, and environmental services.

**Key words:** *Agrostis capillaris*, *A. tenuis*, distribution, characteristics, ecological and agronomic aspects, usage.



## **BENEFITS OF ORGANIC FERTILIZERS RESULTED FROM DIFFERENT ORGANIC WASTE CO-COMPOSTING: A REVIEW**

**Florența (JAFRI) PARASCHIV, Elena Mirela DUȘA, Vasilica STAN**

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: florenta.jafri@doctorat.usamv.ro

### ***Abstract***

*Considering the increasing demography and the diversity of human activities, the quantity of waste is also increasing around the world, and the quantity of organic waste too. Therefore, the nature cannot deal with all waste by itself. Thus, people are looking for the most efficient ways to improve waste management. One of those ways, which is to reintegrate most of the residual materials as resources or as new products and to reduce their environmental impact is the circular economy (CE). Composting is nature's way of dealing with organic waste to turn it into simple components which will be able to integrate the natural cycles. So, composting is a part of CE that can transform organic waste into new products such as compost. This paper will explore the methods of composting, from traditional composting to the involvement of artificial intelligence (AI) in this process and will analyse the benefits of the organic fertilizers resulted from composting and co-composting of different materials. From this perspective, the most well-known composting systems will be addressed (home composting, on-farm composting, and industrial composting).*

***Key words:*** co-composting, organic waste, circular economy, benefits, new products.

## PEA CROP DISEASES - AN OVERVIEW

**Maria-Magdalena PODEA<sup>1,2</sup>, Stelica CRISTEA<sup>2</sup>**

<sup>1</sup>Agricultural Research and Development Station Pitești,  
Pitești- Slatina road km 5, 117030, Pitesti, Romania

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: maria.podea@yahoo.com

### ***Abstract***

*The pea (*Pisum sativum* L.) represents one of the most important leguminous crops worldwide, being in the top 10 vegetable crops, belonging to the Fabaceae family. Peas are grown both for human consumption, fresh or canned, and for animal feed in the dry state. The pea crop is affected by an important number of pathogens, which in favorable conditions can significantly decrease both the yield and the quality of the grains, even leading to total losses. Fungi, bacteria and viruses can cause a number of foliar diseases in peas. The most important pathogens that cause significant economic damage are: *Didymella pinodes*, *Neocosmospora pisi*, *Pea enation mosaic virus*<sup>1</sup>, *Peronospora pisi*, *Uromyces pisi*, *Pseudomonas pisi*. *Pea enation mosaic virus*<sup>1</sup> can cause severe loss of pea harvest by up to 50% and *Neocosmospora pisi* leads to a decrease in yield by 15-60%. The *Ascochyta* blight disease complex can decrease the yield with values ranging from 10-60%. This bibliographic review provides an overview of recent studies on the main pathogens of pea crops.*

***Key words:*** control, pathogens, *Pisum sativum*.

**EFFECTS OF BIOPESTICIDE CARBECOL,  
FUNECOL AND BIOFERTILIZER ECOLIT  
ON PHOTOSYNTHETIC PIGMENTS AND HYDROGEN  
PEROXIDE CONTENTS IN TOMATO  
(*Solanum lycopersicum* L.) PLANTS**

**Vladimir ROTARU, Vladimir TODIRAŞ**

Institute of Genetics, Physiology and Plant Protection,  
State University of Moldova, Chisinau, Republic of Moldova

Corresponding author email: rotaruvlad@yahoo.com

***Abstract***

*The photosynthetic pigments and hydrogen peroxide content is a physiological marker to evaluate plant physiology and determine the response to application of different kinds of plant protection products. The aim of this study was to determine the response of leaf chlorophylls and hydrogen peroxide contents in tomato plants to application of biofungicide Carbecol alone or in combination with biofungicide Funecol and biofertilizer Ecolit. A greenhouse experiment was conducted out with tomato (*Solanum lycopersicum* L., cv Manusa) plants. Experimental results showed that plant treatments with Carbecol increased the contents of photosynthetic pigments in tomato plants, in particular chlorophyll a. The highest concentration of photosynthetic pigments was registered in treatment with integrated application of Carbecol, Funecol and Ecolit. The treatments with Carbecol alone increased the concentration of hydrogen peroxide in leaves. The highest level of this metabolite in leaves was observed in treatment with application of biofertilizer Ecolit. The integrate use of biofungicides and biofertilizer Ecolit increased tomato yield by 14%.*

**Key words:** Carbecol, Funecol, Ecolit, photosynthetic pigments, hydrogen peroxide, tomato.

**STUDY OF THE INTERNAL STRUCTURE  
OF *Amaranthus retroflexus* LEAF**

**Aida Patricia SĂRĂCIN<sup>1</sup>, Larisa Marina Elisabeth CHIRIGIU<sup>2</sup>,  
Ion SĂRĂCIN<sup>3</sup>, Johny NEAMȚU<sup>1</sup>, Ioan Alexandru SĂRĂCIN<sup>3</sup>**

<sup>1</sup>University of Medicine and Pharmacy, Faculty of Pharmacy,  
200349, Craiova, Romania

<sup>2</sup>"Constantin Brancusi" University, Faculty of Medical and Behavioral  
Sciences, 210135, Targu Jiu, Romania

<sup>3</sup>University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Dolj County, Romania

Corresponding author email: saracin.alex@gmail.com

***Abstract***

*The Amaranthus retroflexus species studied has a stem up to 100 cm high, branched, light green to reddish in color, with few leaves at the base, and the upper part with leaves covered with hairy hairs. For the microscopic observation of the internal structure of the Amaranthus retroflexus leaf, the seedlings were first fixed in AFE solution (70% ethyl alcohol, glacial acetic acid, 40% formalin) for 48 hours, after which they were washed with distilled water and preserved in alcohol 70%. The internal structure of an Amaranthus retroflexus leaf was observed in cross-section. It consists of two epidermises, one upper and one lower, as well as mesophyll. Stomata open in the morning under the influence of light (photoactive reaction), when the stomatal cells have a higher degree of turgor than the accessory cells. It was also observed that the opening degree of the stomata reaches a maximum in sunny conditions, when the penetration of CO<sub>2</sub>, necessary for photosynthesis, is more intense, which determines the transpiration of the leaves at a high intensity.*

**Key words:** *Amaranthus retroflexus, internal structure, stomatal, leaf.*

**CYTOGENETIC STUDIES  
IN *Amaranthus retroflexus* - CHROMOSOME  
NUMBERS AND PHYLOGENETIC ASPECTS**

**Aida Patricia SĂRĂCIN<sup>1</sup>, Larisa Marina Elisabeth CHIRIGIU<sup>2</sup>,  
Ion SĂRĂCIN<sup>3</sup>, Johny NEAMȚU<sup>1</sup>, Ioan Alexandru SĂRĂCIN<sup>3</sup>**

<sup>1</sup>University of Medicine and Pharmacy, Faculty of Pharmacy,  
200349, Craiova, Romania

<sup>2</sup>"Constantin Brancusi" University, Faculty of Medical and Behavioral  
Sciences, 210135, Targu Jiu, Romania

<sup>3</sup>University of Craiova, Faculty of Agronomy, 19 Libertatii Street,  
Craiova, Dolj County, Romania

Corresponding author email: saracin.alex@gmail.com

***Abstract***

*The study of the cell and cell division is of great importance, because it makes it possible to identify the genetic material, the mechanism by which genes are transmitted from the mother cell to the daughter cells, from ascendants to descendants, how genetic recombination is carried out and how they are produced mutations at gene level, as well as restructuring at chromosome level. The study of the preparations is carried out in bright light under a microscope. For the study of the chromosomes of the *Amaranthus retroflexus* species ( $2n=34$ ), the fast Feulgen-Rossenbeck staining method was used, which uses a bleached basic fuchsin solution (Schiff's reagent) as a dye.*

**Key words:** cell, genetic, chromosomes, *Amaranthus retroflexus*.

**NEW RESEARCH ON THE INCREASE  
OF RESISTANCE IN COMMON BEAN  
(*Phaseolus vulgaris* L.) CULTIVARS - A REVIEW**

**Valentina STOIAN<sup>1,2</sup>, Amalia Carmen MITELUT<sup>1</sup>**

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Vegetable Research and Development Station Buzau,  
23 Mestecanului Street, Buzau, Romania

Corresponding author email: stoianvalentina2507@gmail.com

***Abstract***

*The common bean (*Phaseolus vulgaris* L.) is an annual herbaceous plant of the leguminous family, which has been cultivated both in Romania and globally for about 500 years. Diversity in terms of biological elements and distinct characteristics of this species are the main research objectives for national and international vegetable institutes. Research on this species, in the fluctuating and challenging climate conditions of recent years, as well as in the conditions of the emergence of new diseases and pests, outlined that, although it has good resistance to these phenomena, it is necessary to develop new strategies leading to increased resistance to diseases and pests. Backcross, pedigree, and bulk-pedigree breeding methods have been used. Considerable progress has been made in genetics and germplasm enhancement for resistance to bean pod weevil (*Apion godmani* Wagner), tropical bruchid (*Zabrotes subfasciatus* Boheman), leafhoppers (*Empoasca kraemeri* Ross and Moore), and root-knot nematode (*Meloidogyne* species). Evaluations of the *Phaseolus vulgaris* lines have shown a higher content of N, Fe and Ca in seeds, which will ultimately help improve nutritional quality and resistance to diseases and pests.*

**Key words:** *Phaseolus vulgaris* L. var. *communis*, biodiversity, adaptability, resistance, development.

**THE INFLUENCE OF PLANT HORMONAL  
COMBINATION OVER DIFFERENT PARAMETERS  
OF GROWING AND DEVELOPMENT  
FOR POTATO PLANTLETS**

**Andreea TICAN, Mihaela CIOLOCA, Monica POPA**

Institute of Research and Development for Potato and Sugar Beet Brasov,  
2 Fundaturii Street, Brasov, Romania

Corresponding author email: tican\_andreea@yahoo.com

***Abstract***

*The main objective of this experience was monitoring the effect of plant growth regulators and their combinations on potato plantlets development, respectively on the following parameters: plantlets height, leaves number, root length, weight of fresh plantlet and of root. Thus, during in vitro multiplication process, two auxins were tested: naphthalene acetic acid (NAA) and indolyl acetic acid (IAA) (in two concentrations 0.05% and 0.1%, for both auxins), together with a gibberellin: gibberellic acid (GA3) (0.02%) and in vitro behavior was observed for three potato varieties: Marvis, Castrum, Ervant under the influence of these growth hormones. The nutrient medium supplemented with IAA 0.05% determined plantlets obtaining with high height and with the highest value of fresh root weight. The culture medium containing 0.1% NAA was effective in forming the number of leaves, showing a positive influence. NAA 0.1% + 0.02% GA3 and IAA 0.05% + 0.02% GA3 combinations had a beneficial effect on root length and fresh plantlets weight.*

***Key words:*** hormonal combination, in vitro, multiplication, potato, plantlets.

**THE BIOMASS QUALITY OF COMMON NETTLE,  
*Urtica dioica* L., AND ITS POTENTIAL  
APPLICATION IN MOLDOVA**

**Victor ȚÎȚEI**

“Alexandru Ciubotaru” National Botanical Garden (Institute),  
18 Padurii Street, MD 2002, Chisinau, Republic of Moldova

Corresponding authors email: vic.titei@gmail.com

**Abstract**

*Common nettle, Urtica dioica L., is an herbaceous perennial forb belonging to the Urticaceae family, distributed in temperate and tropical region in many parts of the world, and it has been reported to have multiple uses. We investigated the quality of the biomass of the local ecotype of Urtica dioica grown in the experimental plot of the “Alexandru Ciubotaru” National Botanical Garden (Institute), Chisinau, Republic of Moldova. The results revealed that the dry matter of the common nettle whole plant harvested in flowering period contained 20.7% CP, 10.6% ash, 26.8% CF, 32.9% ADF, 57.4% NDF, 6.6% ADL, 26.3% Cel, 24.5% HC, with forage value 633 g/kg DDM, RFV= 103, 12.47 MJ/kg DE, 10.23 MJ/kg ME and 6.25 MJ/kg NEI. The ensiled mass contained 22.1% CP, 14.5% ash, 28.3% CF, 33.8% ADF, 53.0% NDF, 6.6% ADL, 27.3% Cel, 19.2% HC, with forage value 626 g/kg DDM, RFV= 110, 12.34 MJ/kg DE, 10.13 MJ/kg ME and 6.14 MJ/kg NEI. It has been determined that studied common nettle substrates have C/N=13.4-15.0 and the biochemical methane potential reaches 319-321 l/kg ODM. The local ecotype of Urtica dioica can be used as an alternative forage source for farm animals or as co-substrate in biogas generators for renewable energy production.*

**Key words:** biomass, biomethane, green mass, silage, *Urtica dioica*.



## REASONS TO DEVELOP A MASTER PROGRAM OF “SUSTAINABLE FOOD PRODUCTION SYSTEMS” IN WESTERN BALKANS

**Maria TOADER<sup>1</sup>, Renata KONGOLI<sup>2</sup>, Gheorghe Valentin ROMAN<sup>1</sup>,  
Vassiliki CHATZIPETROU<sup>3</sup>, Michal LOSTAK<sup>4</sup>, Giannis TSOULFAS<sup>5</sup>  
Emir MUJIC<sup>6</sup>, Sabahudin BAJRAMOVICH<sup>7</sup>,  
Shala NEXHDET<sup>8</sup>, Uran RRACI<sup>9</sup>, Kejbjiana HAKA<sup>10</sup>**

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd, District 1, Bucharest, Romania

<sup>2</sup>Agricultural University of Tirana, Rruga Paisi Vodica 1025, Tirana, Albania

<sup>3</sup>ReadLab-Research Innovation and Development Lab, Athina, 11632, Greece

<sup>4</sup>Czech University of Life Sciences Prague, Kamýcká 129,  
165 00 Praha-Suchdol, Czechia

<sup>5</sup>Agricultural University of Athens, 75 Iera Odos, Athens 11855, Greece

<sup>6</sup>University of Bihać, Pape Ivana Pavla II 2, 77000 Bihać, Bosnia and Herzegovina

<sup>7</sup>University of Sarajevo, Obala Kulina bana 7/II, 71000 Sarajevo,  
Bosnia and Herzegovina

<sup>8</sup>University of “Haxhi Zeka” in Peja, Rr. UÇK. Pejë, Pejë 30000, Kosovo

<sup>9</sup>Universum College, Str. Hasan Prishtina 1,1, Konjuh, Lipjan, 14000, Kosovo

<sup>10</sup>European University of Tirana, Kompleksi Xhura, Rruga Xhanfize Keko,  
Tirana 1000, Albania

Corresponding author email: mirelatoadervali@yahoo.com

### **Abstract**

*STEPS project aims at building the capacities of higher education institutions in Western Balkans countries (Albania, Bosnia and Hertegovina, Kosovo) in collaboration with EU countries (Czech Republic, Greece, Romania), in order to help them offer curricula aligned with the needs of the labour market and society. The main objective of the project was the implementation of a modern MSc programme on “Sustainable food production systems”, compliant with the Bologna convention. Food culture and sociology, agriculture and rural development, food engineering, quality and safety, environmental footprints, economics, management and governance were combined in a flexible and modular educational programme, designed and developed in the light of the European initiative for the transition to circular economy. The new MSc programme in Western Balkans offer an holistic approach of food production systems and put in the core the sustainability dimension.*

**Key words:** circular economy, master program, sustainable food production, Western Balkans.



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