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"Agriculture for Life, Life for Agriculture"

BOOK OF ABSTRACTS

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SUMMARY

SOIL SCIENCES

CROP SCIENCES

MISCELLANEOUS

SOIL SCIENCES

SOIL MICROBIAL MEDIATION OF ALLELOCHEMICALS AND ITS IMPLICATIONS FOR PEDOGENESIS AND AGRICULTURAL LANDSCAPES

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Abstract

Allelopathy is an ecological process in which plants release bioactive allelochemicals into soil via root exudation, leaching, volatilization, and residue decomposition, where their fate and effects are mediated by soil properties and the soil microbiome. This review synthesizes current knowledge on microbial regulation of allelochemicals and its implications for pedogenesis and agricultural landscapes. Allelochemicals act as selective forces shaping microbial community structure and function, while microbial metabolism controls their degradation, transformation, and bioactivity. Soil properties and horizon differentiation further regulate allelochemical behavior. Sandy upper horizons enhance movement and volatilization, reducing persistence, whereas clay-rich lower horizons and associated iron and aluminum oxides promote adsorption and prolong activity. These vertical redistributions link allelopathy with soil formation, nutrient cycling, and fertility. In agricultural systems, such interactions affect crop performance, soil health, and ecosystem stability, contributing to soil sickness, autotoxicity, and weed suppression. Management strategies that manipulate soil microbial communities can mitigate negative effects while enhancing beneficial allelopathic functions, supporting sustainable agricultural landscape management.

Key words*: allelochemicals, soil microbiome, pedogenesis, agricultural landscapes, soil health.*

GIS-BASED SOIL EROSION SUSCEPTIBILITY MAPPING USING DRAINAGE DENSITY AND RUSLE FACTORS: CASE STUDY IN FLOREȘTI ATU (CLUJ COUNTY, ROMANIA)

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Abstract

Florești ATU represents a peri-urban territory where land-use transitions and surface disturbance can amplify erosion susceptibility locally, even when regional morphometry suggests moderate hazard. This study implements a standardized 2025 GIS workflow integrating drainage density (Dd) and RUSLE-related factors (R, K, LS, C, P) to generate a five-class erosion susceptibility product suitable for planning and screening. Dd captures terrain dissection and potential flow concentration pathways, while LS and NDVI-informed C factor reflect the dominant controls on runoff detachment and transport. The real ATU area derived from administrative boundary data is ≈ 60.9 km². The paper proposes a compact validation framework (ROC/AUC and confusion matrix) using orthophoto-derived erosion features and targeted field checks; preliminary example reporting indicates AUC ≈ 0.78.

Key words*: drainage density, GIS, NDVI, peri-urban erosion, RUSLE.*

SOIL FERTILITY DYNAMICS ON A SOWN GRASSLAND UNDER THE COMBINED INFLUENCE OF MINERAL FERTILIZATION AND WATER EROSION

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Abstract

This study investigates the temporal dynamics of key agrochemical properties of soil in a sown grassland under the influence of mineral fertilization and water erosion on a slope of 10-15%, at the Preajba Experimental Center, Gorj County. Research was conducted on a stagnic luvisol using three experimental treatments: unfertilized control (N0P0K0), fertilization with N60P60K60, and fertilization with N100P90K60, each replicated three times in a randomized block design. Soil samples were collected from the upper and lower positions of the plots at three distinct time points: pre-fertilization (April), post-fertilization (May), and at the end of the growing season (October). The results demonstrated highly significant increases in hay yield in the fertilized treatments, while soil agrochemical properties exhibited moderate changes, characteristic of soils with high buffering capacity and pronounced chemical inertia. Mineral fertilization induced slight acidification and increases in available phosphorus and potassium, whereas organic matter and total nitrogen evolved gradually. These findings provide a scientific basis for the development of sustainable management strategies for sown grasslands on sloped terrains.

Key words*: dynamics, mineral fertilization, sown grassland, water erosion, agrochemical indicators, soil fertility.*

MONITORING SOIL PHYSICO-CHEMICAL PROPERTIES UNDER DIFFERENT LAND USE CONDITIONS

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Abstract

Soil is a major environmental factor that plays a crucial role in the productivity and sustainability of the environment. The effect on soil quality was measured by monitoring the key physico-chemical parameters for the period 2017 to 2019. Case studies have been performed on various types of soil samples, like garden soils, uncultivated soils, and greenhouse soils. Parameters chosen for analysis include pH values, moisture content, porosity values, electrical conductivity with soluble salt values, alkalinity values, acidity values, along with values for Ca^{2+} and Mg^{2+}. The results highlighted the significant influence of land use, climatic conditions, and anthropogenic activities on soil quality. Changes in soil pH revealed a general trend toward alkalization, while parameters like soil moisture, porosity, and soluble salt values were largely affected by rainfall and agrotechnical practices. Alkalinity, hydrolytic acidity, and Ca^{2+} and Mg^{2+} values reflected the impact of agrotechnical practices on the environment. Overall, the findings emphasize the importance of continuous monitoring of soil physico-chemical parameters as an essential tool for assessing soil quality, preventing degradation processes, and supporting sustainable soil management.

Key words*: soil quality, physico-chemical parameters, agrotechnical practices, land use.*

EFFICIENT EXPLOITATION OF NATURAL AND MATERIAL RESOURCES THROUGH OPTIMAL TERRITORIAL PLANNING OF ARABLE LAND

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Abstract

Through this work, the organization and development of the territory for an area of 419.58 ha arable use category was carried out. The main objective is the efficient exploitation of natural and material resources through the optimal development of arable land, thus the concentration of agricultural areas in units of optimal size was achieved to allow the application of modern agricultural methods and technologies. Through this work, it was possible to size a number of 9 soles of similar dimensions, with areas between 45.55-49.11 ha. The natural conditions (soil type, climate, vegetation) specific to the area were analyzed on the basis of which the crop structure was formed for 2 field crop rotation for a period of 4 years for the C1 rotation (4 soles), respectively 5 years for the C2 rotation (5 soles).

Key words*: arable land, territory organization, optimization.*

STUDIES ON THE ACCUMULATION OF HEAVY METALS IN *Trifolium pratense* L. PLANTS ON AN ARTIFICIALLY POLLUTED SOIL IN THE GREENHOUSE

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Abstract

This study aims to investigate the accumulation of heavy metals (Cd, Pb, Zn and Cu) from soil in red clover (Trifolium pratense L.) plants in experiments with single-element induced pollution, carried out in the greenhouse. The soil used comes from an unpolluted permanent meadow in the Copsa Mica area and was analyzed from a physico-chemical point of view. The total contents of heavy metals fall within the normal limits according to Order 756/1997 on the assessment of environmental pollution. To perform the experiments with induced pollution, the soil material was treated with variable amounts of metal (Cd, Cu, Pb and Zn) from their soluble salts, and for each element 6 experimental variants were established depending on the metal content in the soil. The results show that for the total cadmium and lead contents in the soil and the metal content in the plant, extremely significant linear correlation indices were obtained and for zinc and copper very significant. The mobile metal contents in the soil and the metal content in Trifolium pratense plants have a very significant linear correlation index.

Key words*: heavy metals, pollution, soil, Trifolium pratense* L.

TILLAGE SYSTEMS - IMPACT ON THE ECOSYSTEM - REVIEW

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Abstract

This paper reviews the impacts of tillage systems on soil functions, greenhouse gas emissions, and crop performance, based on a synthesis of recent scientific literature. Conventional tillage, characterized by intensive soil disturbance, ensures rapid nutrient mineralization and good seedbed preparation, but is associated with soil structural degradation, losses of soil organic carbon, and increased erosion risk. Conservation tillage systems (minimum tillage, no-tillage, strip-till, mulch-till) improve aggregate stability, reduce erosion, and stimulate biological activity, promoting the accumulation of soil organic carbon in the surface layer. However, their effects on bulk density, whole-profile carbon sequestration, and N_2O emissions depend strongly on pedoclimatic conditions and nitrogen management. No-tillage maximizes soil conservation benefits and reduces energy consumption, but may limit yields in cold and humid climates and increase reliance on herbicides. The findings highlight the need for an integrated, site-specific approach to optimize the sustainability of agroecosystems.

Key words*: tillage system, ecosystem, production yield, soil properties.*

IMPACT OF INNOVATIVE SOIL CULTIVATION DISCS ON AGRONOMICALLY VALUABLE SOIL

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Abstract

The final stage of the mechanical action of soil tillage machinery is the attainment of a target aggregate composition, defined by the size distribution of the resulting soil fractions. This study investigates the performance of innovative disk type working bodies and their effectiveness in achieving a specific degree of soil fragmentation. Agronomically valuable structure is characterized by aggregates ranging from 1 to 25 mm, which ensure optimal aeration, water regime, and root development. The experimental setup includes three operating speeds of the machine-tractor unit and two different soil terrains. The tests were conducted using a tillage mill equipped with non-standard disk working bodies with a horizontal axis of rotation, designed for enhanced kinematic and energy efficiency. For each experimental configuration, the degree of fragmentation was determined by collecting five evenly spaced soil samples along the length of the test plot. The results indicate that, under specific combinations of soil type, moisture content, and operating speed, the innovative disk working bodies achieve optimal aggregate composition, confirming their applicability for high efficiency soil tillage processes.

Key words*: soil tillage machines, agronomically valuable soil, percentage of soil fragmentation.*

FUNCTIONAL ALTERATION AND DOMINANCE-CODOMINANCE PATTERNS IN DECOMPOSITION FUNCTIONAL MICROBIOMES FROM LONG-TERM FERTILIZED AND AMENDED EXPERIMENTS

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Abstract

The application of fertilizers and amendments in agroecosystems is a necessary management strategy to sustain crop productivity, but in the long term it causes changes in soil microbiomes. The aim of the research was to analyze in detail the changes on decomposition functional microbiome induced by both types of inputs in a long-term experiment. The functional microbial associations were analyzed using the DEMSA tool, for each of the experimental variants being extracted the segments of the ecological niche: intensification, expansion, narrowing and contraction. The functional alteration varied greatly ranging between 0.4% and 26.7%, with most of the communities showing a dominance of carbohydrates guilds (intensification and narrowing niche) and carboxylic acids (expansion and contraction niche). Within the communities, the dominant groups were associated mostly with amendments for the activities that exceeded the control. In contrast, the reduction of activities within the microbiomes was correlated with the applied fertilizers. Each of the analyzed microbiome segments presented a specific pattern of dominance-codominance of functional guilds and groups that were associated with the synergic impact of long-term applied amendments and fertilizers.

Key words*: functional ecological niches, long-term experiment, microbial assemblage changes, straw decomposition, substrate microbial reaction.*

IMPROVEMENT OF SOIL PHYSICAL PROPERTIES THROUGH THE INTEGRATION OF GREEN MANURE CROPS UNDER THE PEDO-CLIMATIC CONDITIONS OF BRĂILA

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Abstract

During the agricultural years 2022-2023 and 2023-2024, a study was carried out at SCDA Brăila, under the specific pedo-climatic conditions of the area, to evaluate the effect of green manures on selected soil physical properties, namely soil penetration resistance and bulk density. The experiment included autumn pea, mustard, rye, rapeseed, and a mustard + rapeseed mixture as green manure crops, compared with a control without green manure. Measurements were performed along the soil profile, assessing depth-dependent changes in penetration resistance and bulk density as indicators of soil structure and compaction. The results obtained over the two years show that green manure use led to an overall improvement in the analyzed soil physical parameters. Soil penetration resistance decreased in the upper soil layers, while bulk density improved compared with the control, indicating more favorable conditions for root growth and for water and air movement. Although the magnitude of the effect varied among species, all green manure treatments contributed to reducing soil compaction and improving soil physical quality, supporting the role of green manures in conservative soil management.

Key words*: green manures, soil penetration resistance, bulk density.*

EVOLUTION OF TYPOGENETIC CHERNOZOMIC PROCESSES UNDER HUMIC FERTILIZATION CONDITIONS

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Abstract

Humic preparations administered to the soil are powerful catalysts of biochemical processes that occur in chernozems. Our more recent research has shown that in arable chernozems this action is materialized in the unidirectional regeneration of chernozem typogenetic processes: the formation-accumulation of humus and the aggregation and structuring of the soil mass. The evolution of the humification-accumulation process of humus is materialized in the increase of humus content by 0.28-0.46% compared to the control, and that of the humic system is manifested in the formation, predominantly, of humic substances (Cah:Caf > 2) and the share of carbon of mobile humic substances in the composition of total carbon. At the same time, the relatively identical content of carbon of the non-hydrolyzed residue in the control and experimental variants allows us to consider that the specified changes in the composition of the humic system are products of the regeneration of the humification process. The specified changes lead to the intensification of the processes of aggregation-structuring of the soil mass with the formation, predominantly, of precious chernozem aggregates 5-1 mm.

Key words*: solil, fertilization, humic acid.*

HUMIC FERTILIZATION: SOIL REGENERATIVE CONSIDERATIONS

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Abstract

Based on a synthetic analysis of our own and other research, the opportunity to use humic fertilization in order to stop the degradative trend characteristic of arable chernozems and regenerate the chernozem process is argued. Through the perspective of the biophysical concept of the chernozem process of pedogenesis in the present research, the regeneration of the humification process, which constitutes the essence of the chernozem process of solification, is examined based on the direct and indirect action of humic fertilizers on the functionality of the "plant-microbiome" system in the rhizosphere. It has been established that the use of humic fertilizers, as biologically and physiologically active substances, contributes to the biostimulation of the "plant-microbiome" system and the catalysis of the humification processes that occur in the rhizosphere under their interconnected action. The evaluation of the pedoregenerative efficiency based on the cellulolytic activity, the microbial biomass content, the fractional composition of humus and the agrochemical fertility indices highlighted the intensification of the cellulolytic activity in the humuso-accumulative horizon by 10-14%, the increase by 3-12% of the microbial biomass in the 0-40 cm layer, manifested in the intensification of the humification process. It was established that the regeneration of the humification process involves two distinct stages: a) primary humification (the active biological period April-June) with the formation of "young" humic substances of easily mineralizable humic nature and b) secondary humification with the formation and stabilization of stable humic substances of humic nature. The regeneration of the humification process led to the optimization of the soil nutrient regime.

Key words*: fertilization, chernozem pedogenesis, humificatic fertilization, rhizosphere, plant-microbiome system, soil regenerative processes.*

ANALYSIS OF THE EVOLUTION OF SOIL FERTILITY UNDER THE INFLUENCE OF DIFFERENT TYPES OF WORKS, IN THE PEDOCLIMATIC CONDITIONS OF THE CENTRAL, SOUTHERN AND SOUTH-EASTERN REGIONS OF ROMANIA

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Abstract

This paper presents the results of research conducted by INMA Bucharest, within a complex project funded by the National Recovery and Resilience Plan, in support of the EU Mission – "A Soil Deal for Europe". The sustainable soil cultivation technology adapted to the pedoclimatic conditions in the Central, Southern and South-Eastern regions of Romania was developed for the purpose of remediation and restoration of degraded lands. The technology involved performing the following types of soil work: basic work with a plough with bodies equipped with ploughshares to break up the hardpan, in the Central region; scarification and incorporation of biofertilizers into the arable substrate in the South-East region and soil cultivation in narrow strips for sowing of weedy plants with a strip-till type equipment, in the South region. Soil samples were taken before and after applying different soil tillage options and their impact on the soil was evaluated by analyzing the following parameters: macroelements (Ca, Mg, Na, K); chemical forms of nutrients (water-soluble, exchangeable, total); other parameters (Cl^-, SO_4^{2-}, NO_2^-, NO_3^-, NH_4^+, pH).

Key words*: macroelements, mineral nitrogen, region, soil fertility.*

EXPERIMENTAL RESEARCH FOR THE PROMOTION OF TECHNICAL EQUIPMENT FOR CLEARING MOUNDS AND FERTILIZING SOILS OCCUPIED BY GRASSLANDS

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Abstract

An experimental field study was conducted in Jilişte (Vrancea County, Romania) to evaluate an innovative soil tillage equipment combining a scarifier with a controlled biofertilizer inoculation system. The experimental plots were marked, and measurements were performed using the equipment attached to a New Holland T7060 tractor at two working speed regimes. Qualitative indicators included working depth and width, soil bulk density, effective porosity, soil loosening degree, and biofertilizer injection depth. Energetic indicators comprised effective working speed, wheel slip, traction force, traction power, theoretical field capacity, hourly fuel consumption, and fuel consumption per hectare. Results showed a reduction in bulk density (1.207 → 0.811 g/cm³) and an increase in effective porosity (54.5% → 69.4%), indicating strong soil loosening. The biofertilizer was injected uniformly to a depth of up to 20 cm, with an average depth of 14.8 cm. Mean traction force ranged from 2300 to 2374 daN, with traction power between 33.8 and 43.7 HP, while wheel slip remained below 10%. Average fuel consumption was 19.8 l/h and 22.2 l/ha. The study confirms the operational efficiency of the equipment, and the results support the practical implementation of sustainable soil tillage and biofertilizer inoculation technologies.

Key words*: soil tillage, biofertilizer, field experiment, traction performance, soil loosening, sustainable technology.*

ASSESSMENT OF SOIL RESOURCES AND AGRICULTURAL LAND SUSTABILITY IN THE HAȚEG - GENERAL BERTHELOT AREA, HUNEDOARA COUNTY, ROMANIA

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Abstract

The study was conducted on an area of approximately 65.0 hectares located within the cadastral territory of Hațeg town (floodplain of the Galbena River) and the cadastral territory of General Berthelot commune (floodplain and terrace). The studied area is situated in the central-western part of Hunedoara County, geographically located in the Hațeg Depression, within the Galbena River watershed, a tributary of the Mureș River. One main soil profile and four control pedological augerings were carried out in both geomorphological units (floodplain and terrace). These were morphologically described and physico-chemically characterized according to the Guide for Field Description of Soil Profiles and Specific Environmental Conditions. The aim of the study was to evaluate soil resources and determine their agricultural suitability in the Hațeg - General Berthelot area, Hunedoara County. The research focused on the characterization of the physical and chemical properties of soils, the identification of the main soil types, and the analysis of the agricultural potential of the land, in order to recommend the most appropriate agricultural uses.

Key words*: Fluvisols, Eutric cambisols, land suitability, agricultural land use.*

FORMATION AND EVOLUTION OF SOILS IN THE LOW PLAINS OF WESTERN ROMANIA

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Abstract

The paper examines the evolution and pedological importance of soils in the low plains of western Romania, focusing on the Mureș-Galațca Plain and the Bega-Timiș-Bârzava Canal. The main objective is to investigate the natural factors influencing the formation, evolution, and characteristics of these soils, such as morphological and hydrographic variability, lithological aspects, and tectonic activities, including subsidence. A detailed analysis of geological processes, such as sediment deposition, will enhance understanding of their impact on soil fertility. The paper will also highlight the effects of human activity on land resources and the challenges faced, such as salinization and soil compaction. These issues are often worsened by groundwater conditions that can adversely affect agricultural productivity. Proposed strategies for managing soil resources include emphasizing conservation measures and adopting sustainable agricultural practices to improve soil health. By addressing these aspects, the paper underscores the vital connection between pedological characteristics and local agricultural development, emphasizing the need for effective land resource management to ensure long-term agricultural sustainability in these regions. A strategic reevaluation of agricultural policies is essential in light of current ecological challenges.

Key words*: pedology, low plain, soil evolution, resource management, sustainable agriculture.*

EVALUATION OF HEAVY METALS UPTAKE BY *Lotus corniculatus* L. IN RESPONSE TO CULTIVATION ON ARTIFICIALLY CONTAMINATED SOIL UNDER GREENHOUSE CONDITIONS

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Abstract

This work was conducted in 2025 and aimed to evaluate the heavy metals uptake by bird's foot trefoil (Lotus corniculatus L.) grown in pots on soil collected from the Copșa Mică area and artificially contaminated with different doses of cadmium (Cd), lead (Pb), zinc (Zn), and copper (Cu) derived from their soluble salts. The soil used in the experiment was collected from the first layer (0-20 cm), and analyzed both physically and chemically. The analyses showed that the initial concentrations of heavy metals did not exceed the alert and intervention thresholds for sensitive land uses, according to Ministerial Order No. 756/1997. The soil had a slightly alkaline pH, a low organic matter content, a moderate supply of total nitrogen (Nt), and a medium clay texture. Analysis of regression equations showed a positive linear relationship between soil metals content and their accumulation in the aerial parts of Lotus corniculatus L. plant. The correlation coefficients values of Cd, Pb, and Zn were very statistically significant, while for the Cu were insignificant. Future research will be carried out to validate the bioaccumulation potential of this species.

Key words*: bird's foot trefoil, heavy metals, Lotus corniculatus L., pollution, soil.*

THE IMPACT OF PESTICIDES ON SOIL QUALITY IN AGRICULTURAL SYSTEMS: RISKS AND PATHWAYS TOWARD SUSTAINABLE SOLUTIONS

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Abstract

This paper synthesizes current scientific data on the effects of conventional and emerging pesticides on soil physico-chemical properties, edaphic biodiversity, and ecosystem services. The increasingly intensive use of pesticides in modern agriculture poses major challenges to soil quality and ecosystem functioning. Available evidence indicates that most European agricultural soils contain a wide range of pesticide residues, often occurring as mixtures capable of producing synergistic effects even at low concentrations. Both persistent organic pollutants and modern pesticides can significantly alter soil microbiota, enzymatic activity, the diversity of edaphic fauna, and key biogeochemical processes. These alterations affect organic matter decomposition, soil structural stability, and the soil's capacity for self-regeneration. The socio-economic implications of pesticide dependence, along with potential mitigation strategies such as agroecological practices, bioremediation, and green technologies, are also discussed. Overall, the findings highlight the urgent need to reduce chemical pressure on soils and to promote the transition toward more sustainable agricultural systems.

Key words*: pesticides, soil quality, soil health, ecosystem services, sustainable agriculture.*

PRELIMINARY RESEARCH CONCERNING THE POTENTIAL USE OF POULTRY MANURE AS AN AGRICULTURAL FERTILIZER

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Abstract

Poultry manure management is a major technological, agronomic, and environmental challenge in intensive poultry production. The amount and characteristics of manure are influenced by feed composition, water quality, housing system, bird age, and microclimatic conditions. In Romania, poultry are mainly reared either on litter-based floor systems or in cage systems, and these systems strongly affect manure moisture, handling, storage, and final use. This study examines the relationship between poultry housing systems and manure flow, with emphasis on the energetic recovery of poultry litter through combustion and the agricultural use of the resulting ash. The experimental part included the chemical characterization of soil, poultry litter, ash obtained by combustion at different temperature, and soil–ash mixtures prepared at different rates. The results indicate that poultry litter ash can be considered a valuable secondary fertilizer resource within a circular economy framework, provided that application rates are adjusted to crop requirements, soil properties, and salinity risk.

Key words*: Poultry manure, agricultural fertilizer, chemical characteristics, heavy metals contents.*

ADAPTATIVE RESPONSE OF FUNCTIONAL MICROBIOMES IS HEAVY METALS SOILS EXPOSED TO A PHYTOREMEDIATION PROCESS

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Abstract

The current context of land restoration and increasing the quality of urban ecosystems represent a challenge in the areas where historical pollution with heavy metals is present. The aim of this paper is to show the presence of adaptative mechanisms in the functional microbiome of 5 urban soils after a phytoremediation process. Total activities revealed that 3-7 times increase in the activity is visible in the first 72 hours of incubation and is almost double after 96 hours. This indicates an adapted microbiome to heavy metals conditions and its ability to develop as a community. An in-depth analysis reveals that carbohydrates and carboxylic acids were the most prominent guilds from the community, but with a distinct functional signature in each of the analyzed sites. Interestingly, polymers, amino acids and amines/amides guilds which represent almost 40% of the activity reported to the entire community, even though these guilds have a reduced functional profile. The results indicate that plant presence in polluted ecosystems represents a factor that enables the recovery of functional microbiome and maintenance of a high activity.

Key words*: functional proliferation, heavy metal tolerance, site-specific activity, functional patterns, community assemblage.*

ORGANO-MINERAL FERTILIZATION ON THE MORPHOLOGICAL AND BIOMETRIC TRAITS OF SUGAR BEET (*Beta vulgaris* L.) UNDER THE ECOPEDOLOGICAL CONDITIONS OF COVASNA COUNTY

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Abstract

The application of organo-mineral fertilization in sugar beet cultivation stimulates plant growth and development, reflected by significant changes in their appearance and structural parameters, as a result of optimized nutrient availability and uptake. This study aims to evaluate the effects of different fertilization schemes on the development and biometric performance of three sugar beet hybrids under the ecopedological conditions of Covasna County during the 2022-2023 and 2023-2024 growing seasons. The experimental treatments consisted of three sugar beet hybrids (Darvas, Deseda, and Tatry) combined with different fertilization schemes, including varying doses of manure, nitrogen (N), phosphorus (P), and potassium(K). All applied fertilization schemes increased crown length and diameter, root weight, tuber yield, and sugar content compared to the untreated control, regardless of hybrid or climatic conditions. During the2022-2023 growing season, the Tatry hybrid recorded the highest yield (60.05 t/ha) with a sugar content of 18.27°S, while in 2023-2024, the Darvas hybrid achieved the highest yield (85.79 t/ha) and a sugar content of 19.02°S across the different fertilization schemes.

Key words*: climatic conditions, fertilization, hybrid, plant traits, sugar beet.*

ASSESSMENT OF THE TRANSFORMATIVE POTENTIAL OF DIGITALIZATION OF AGRICULTURE FOR ENSURING FOOD SECURITY IN THE REPUBLIC OF MOLDOVA

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Abstract

Agri-food systems at the state, community of states and global levels are currently revolutionizing towards precision agriculture and the digitalization of the growth, production, processing and distribution sectors of the agri-food chain. Research on the agri-food system of the RM, shows the variable productivity, low economic efficiency and inefficient use of agricultural potential at the current national level and corresponds to the characteristics of Agriculture 2.0, with elements of transition to Agriculture 3.0, being relevant the design of modular systems correlated with GPS, GIS systems, remote sensing devices, variable rate technologies and some types of climate and soil sensors. In accordance with current development trends in digital technologies for agriculture, it is considered appropriate to design technological modules according to the agri-food production value chains specific to Agriculture 4.0, with the central objective - to maintain and increase agricultural productivity, even with limited resources connected to ensuring food security. The proposed actuator model will be implemented within three research points: Northern agricultural zone - "Panfil" GȚ; Central agricultural zone - SCEA, Criuleni, UTM; Southern agricultural zone - "Terra Vitis" SRL.

Key words*: Internet of Things, precision agriculture, food security, digital actuator, soil.*

MODERN NITROGEN FERTILIZATION STRATEGIES FOR IMPROVING EFFICIENCY AND GRAIN QUALITY IN WINTER WHEAT

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Abstract

Efficient nitrogen (N) management is essential for improving yield and grain quality in winter wheat (Triticum aestivum L.). This study evaluated the effects of different spring-applied nitrogen fertilization strategies on grain yield, nitrogen use efficiency, and quality parameters of winter wheat. Field experiments compared conventional mineral fertilization based on urea (U46) and ammonium nitrate (AN34) with advanced fertilization systems, including a controlled-release nitrogen fertilizer (NS27) and a liquid nitrogen fertilizer (NS19). Grain yield, partial factor productivity of nitrogen (PFP-N), nitrogen content in grain and straw, and quality traits such as thousand-kernel weight, test weight, protein content, and gluten content were assessed. Controlled-release nitrogen applied at the onset of spring regrowth achieved grain yields comparable to conventional fertilization while significantly increasing partial factor productivity of nitrogen (PFP-N) and reducing nitrogen accumulation in straw. Late application of controlled-release nitrogen enhanced grain protein and gluten content without compromising yield. Liquid nitrogen fertilization showed relatively high nitrogen efficiency but resulted in lower yields when not combined with nitrate-based nitrogen sources.

Key words*: controlled-release fertilizer, liquid nitrogen fertilizer, nitrogen fertilization, nitrogen use efficiency, low nitrogen input.*

CHARACTERIZATION OF SPECIFIC SOILS FROM THE ROSEȚI AREA, CĂLĂRAȘI COUNTY

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Abstract

This paper, Characterization of Specific Soils from the Roseți Area, Călărași County, presents an analysis of the main pedological indicators: texture, pH, humus content, available phosphorus and potassium, groundwater level, and classification into quality classes, for three soil units-proxicalcaric chernozems, calcaric alluviosols, and strongly gleyed alluviosols - from the territory of Roseți. The proxicalcaric chernozems exhibits a pH range of 7.8-8.6, a humus content of 2.80%, and available phosphorus and potassium levels of 43 ppm and 400 ppm, respectively. The calcaric alluviosols presents a pH of 7.3-7.8, a humus content of 2.69%, 38 ppm available phosphorus, and 360 ppm available potassium. The strongly gleyed alluviosols is characterized by a humus content of 3.21%, 73 ppm available phosphorus, and 232 ppm available potassium. The findings emphasize the distinct properties of each soil type, providing a basis for assessing the agricultural potential of the Roseți area.

Key words*: soil fertility, soil assessment, limiting factors.*

MELANIC SOILS IN THE HIGH PLAIN TIMIȘ AND LIPOVA-LUGOJ-FĂGET HILLS

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Abstract

In the WRB are defined melanic horizon, melanic index starting ≤30cm from the soil surface, but only in the Andosols. In accordance with SRTS 2012, melanic is a Secondary morphologically characteristics, which is defined as an index present in a subhorizon Btml dark of color in comparison with adjacent horizons. We present the results of the soil survey effectuated in the eastern part of Timiș county with eight soil profiles in which we have identified a melanic Bt horizon. The mineralogical analyses have revelead stratification of the soil profiles during soil forming processes, oxidation - reduction and pherrolysis processes and finally melanic layer. The melanic index is present at 40-70 cm depth, has a low content in humus (0.68%), a high bulk density (1.40-1.50 g·cm^{-3}), and an average value of 15358 Fe (ppm) and 224.4 Mn (ppm). The type of soils are Luvisols, frequently luvic-stagnic or albic-stagnic, but all of them -melanic, with low hydraulic conductivity and a pH of 5.0-6.0. We consider that is necessary to introduce the melanic index as subtype of the Luvisols types and replacement the term "melanic" with "ferric-manganic".

Key words*: Luvisols, Bt -argic, melanic, subhorizon.*

SOIL PARTICLE-SIZE ANALYSIS: A COMPARISON OF THREE METHODS

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Abstract

Particle size distribution is one of the most important soil parameters, frequently used in soil and geological laboratories. It determines many other physical, chemical and biological soil characteristics. The objective of this study was to measure the distribution of different soil particle sizes (<2 µm, 2-63 µm, and 63-2000 µm) using the classic pipette method (standard in pedological research), the hydrometer method, and laser diffraction (methods more commonly used in geological research). The research was conducted on 20 soil samples from the continental region of Croatia. To analyse variability, descriptive statistics (arithmetic mean, median, standard deviation, minimum, and maximum) and a t-test were used. Statistical analyses were performed using the SAS statistical programme. The analysis identified statistically significant differences between data obtained by different methods, and in more than 50% of the analysed samples, differences in the textural interpretation of these data. The results indicate the need for further research involving a larger number of samples and greater variability in the texture of the analysed samples.

Key words*: particle size distribution, pipette method, hydrometer method, laser diffraction.*

EFFECTS OF PROGRESSIVE POTASSIUM FERTILIZATION RATES UNDER NP FERTILIZATION ON SOIL CHEMICAL PROPERTIES AND WHEAT GRAIN NUTRIENT COMPOSITION GROWN ON HAPLIC LUVISOL

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Abstract

This study investigates the effects of progressive potassium (K) fertilization rates, in conjunction with varying nitrogen (N) and phosphorus (P) levels, on soil chemical properties and the nutrient composition of wheat grains grown on a Haplic Luvisol. A bifactorial long term field experiment (split-plot) was set up with four NP treatments (N0P0, N80P0, N80P80, N160P80) applied in main plots and four potassium levels (0, 50, 100, 150 kg K/ha) in subplots, with three replications. Soil parameters analyzed included pH, humus content, available phosphorus and potassium, exchangeable aluminium, and hydrolytic acidity. Wheat grains were analyzed for macronutrients (N, P, K, Ca, Mg) and micronutrients (Cu, Fe, Mn, Zn). Results showed that increasing K rates significantly increased soil available potassium, but did not affect potassium accumulation in wheat grains. However, grain Cu, Zn, and Mn contents increased with potassium fertilization, suggesting improved nutrient uptake. These findings highlight the important role of potassium fertilization in soil nutrient dynamics and in shaping the nutritional quality of wheat grain grown on an acidic Haplic Luvisol.

Key words*: potassium fertilization, NP fertilization, wheat grain.*

APPROACHES TO HARMONIZATION OF SOIL SALINITY ASSESSMENT METHODS FOR SUSTAINABLE FERTILITY MANAGEMENT

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Abstract

Soil salinity influences soil quality and health, its provision of ecosystem services, soil health, sustainable management and food security. According to the EU Soil Monitoring Act, soil salinity is recognised as a factor contributing to soil degradation. The electrical conductivity is an indicator of this process. Harmonization of Ukrainian national standards for the diagnostics and assessment of soil salinity degree with international standards is an important task. Approaches to harmonization the assessment of soil salinity based on the composition of the soil:water extract (1:5) and electrical conductivity were shown in the article. The results of a laboratory experiment on modelling chloride-sulfate salinity in Chernozem podzolized (Phaeozems), and subsequent determination of salinity by various methods, are presented. Comparison of the results obtained from the content of water-soluble and toxic salts and electrical conductivity was performed, enabling the development of a statistically significant conversion model. The results of diagnostics the degree of soil salinity provide the opportunity to develop and apply measures for sustainable soil management.

Key words*: electrical conductivity, harmonization, soil salinity, sum of toxic salts, total soluble salts.*

CROP SCIENCES

NATURAL ALTERNATIVES TO CONVENTIONAL FUNGICIDES IN WHEAT CULTIVATION: RECENT ADVANCES AND PERSPECTIVES FOR SUSTAINABLE AGRICULTURE

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Abstract

The increasing resistance of fungal pathogens, along with the need to reduce the use of chemical fungicides, have led to intensified efforts to identify sustainable wheat protection solutions. This review synthesizes recent advances in the development and application of natural alternatives to conventional fungicides, including beneficial microorganisms, plant extracts, plant immunity elicitors, and mineral-based treatments. Biocontrol agents belonging to the genera Trichoderma, Bacillus, Pseudomonas, and Streptomyces have demonstrated significant efficacy in reducing major wheat diseases through mechanisms such as antagonism, competition, and systemic resistance induction. Plant-derived extracts, including garlic (Allium sativum), seaweed, and phenolic compounds, exhibit direct antifungal activity and modulate plant physiological responses. Natural elicitors such as chitosan, laminarin, and rhamnolipids activate defense-related genes and mitigate disease severity. Furthermore, silicon, sulfur, and bicarbonate applications enhance structural resistance and inhibit pathogen development. Integrating these natural strategies into crop protection programs can decrease reliance on chemical fungicides while improving the sustainability and resilience of wheat production systems. This review highlights the potential of natural alternatives to become essential components of modern, environmentally friendly wheat disease management.

Key words: *wheat, biocontrol, plant extracts, elicitors, integrated management.*

BIOSTIMULATOR INFLUENCE ON THE NUMBER AND WEIGHT OF TUBERS PER HILL AT DIFFERENT CLIMATIC AND TECHNOLOGICAL CONDITIONS

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Abstract

The use of biostimulators in potato crop is a modern agricultural practice aimed at enhancing plant physiological processes, nutrient efficiency, and yield stability under variable environmental conditions. This study evaluated the effects of biostimulator application on the yielding elements of the Romanian potato variety Darilena, considering cultivation location and planting density. Field trials were conducted over three consecutive years (2023–2025) at the National Research and Development Institute for Potato and Sugar Beet Brașov and at a private farm (Lorad Agro SRL, Codlea) in Romania. Two planting densities (45,000 and 53,000 plants/ha) and five treatment variants were tested: control, three biostimulators (Genaktis 1, Irys, Terram Number One), and one foliar fertilizer (Wuxal Macromix). Results indicated that all biostimulants treatments significantly increased the number and weight of tubers per hill, independent of location and annual climatic variations.

Key words*: potato, biostimulator, climatic conditions, plant density, number of tubers, weight of tubers, tuber yield.*

EVALUATION OF LATE BLIGHT AND EARLY BLIGHT IN POTATO CROPS UNDER CURRENT CLIMATIC CONDITIONS IN THE BÂRSA DEPRESSION USING CONVENTIONAL FUNGICIDES AND BIOLOGICAL TREATMENTS BASED ON *Beauveria bassiana*, *Trichoderma* spp. AND NEEM OIL

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Abstract

Late blight (Phytophthora infestans) and early blight (Alternaria solani) are major biotic constraints affecting potato production worldwide. In Romania, both pathogens are frequently reported, with disease development strongly influenced by climatic conditions. Consequently, the development of effective and sustainable disease management strategies, including biological alternatives, is of increasing importance. Field experiments were conducted at NIRDPSB Brașov, Romania, using a randomized complete block design with four replicates. The Romanian potato variety Darilena was evaluated under eight treatment schemes, including conventional fungicide programs and biological treatments based on Beauveria bassiana, Neem oil, and Trichoderma spp. Late blight onset was recorded on 30 June 2025, followed by regular disease severity assessments. Early blight occurred later but showed limited progression due to unfavorable environmental conditions, particularly reduced precipitation and insufficient leaf wetness. Treatments significantly influenced yield, with variants V2 and V7 showing statistically significant increases compared to the untreated control. The highest tuber yield was obtained in V7 (27.44 t/ha). These results highlight the combined effects of environmental conditions and treatment strategies on disease dynamics and potato productivity.

Key words*: biological control, early blight, fungicide, late blight, potato.*

RESEARCH ON THE BIOECOLOGY OF THE SPECIES *Diabrotica virgifera virgifera* Le Conte IN THE PEDOCLIMATIC CONDITIONS OF CENTRAL MOLDOVA, IN THE PERIOD 2022-2024

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Abstract

In 2022, the larval development process began on June 1, when the eggs hatched under the influence of soil temperature, located in the range of 10-12°C, in conditions of low humidity. The first pupae were identified on June 21, and the appearance of adults was reported on July 1, suggesting a pupal stage duration of approximately 10 days under optimal temperature conditions (above 20°C). In 2023, egg hatching was observed on June 1, when the soil temperature at 5 cm depth ranged between 15-16°C. The pupation process began on June 20, and adults emerged on June 30, with the pupal stage lasting approximately 10 days, supported by high temperatures (above 23°C). In 2024, the first larvae were recorded in the first decade of June, marking the beginning of larval activity, favored by high soil temperature (16-18°C at 5 cm depth). On June 10, the larvae were in the L1 and L2 stages, and by June 20 they had reached the pupal stage, and the emergence of adults was already recorded on June 27.

***Key words**: Diabrotica, maize, bioecology, emergence, climatic conditions.*

RESEARCH ON THE ANALYSIS OF SOME FACTORS THAT INFLUENCE THE QUANTITY OF POLLEN PRODUCED BY THE INBREED CORN LINES (*Zea Mays* L.)

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Abstract

This study analyzes factors influencing pollen production in inbred maize (Zea mays L.) lines, focusing on genetic material and plant density. Trials in Brăila, Romania (2024), tested six lines across three densities (95k, 135k, and 160k plants/ha). Results indicated that density had no statistically significant effect on flowering time (p = 0.927) or tassel branching. However, significant genotype-specific differences were found. The Zeta V43 line exhibited the highest number of tassel branches (up to 13.0), while Epsilon V81 achieved the maximum main axis length (42 cm) and the highest pollen dry weight (76.80 g) at 115,000 plants/ha. Tukey HSD tests confirmed a significant genotype × density interaction, showing that while Zeta V43 branching improves at lower densities, Epsilon V81 excels in pollen output at medium densities. These findings suggest that genetic selection is the primary driver for tassel development, identifying Epsilon V81 and Zeta V43 as superior candidates for breeding programs aimed at optimizing pollen-producing capacity in hybrid seed production.

Key words*: Zea mays L., pollen weight, tassel morphology, plant density, inbred lines.*

EVALUATION OF SOME *Dactylis glomerata* GENOTYPES FORAGE QUALITY UNDER BRAȘOV AREA CLIMATIC CONDITIONS

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Abstract

The aim of this research was to evaluate the forage quality of six genotypes of Dactylis glomerata using randomized complete block design with three replications. Three trials were conducted to evaluate the forage quality of each genotype by measuring the main quality parameters under different climatic conditions. The data analysed in this paper belong to the results of three years (2022-2024) obtained from field samples. The results of the bifactorial analysis of variance regarding the crude protein (CP) content indicated significant differences ($p \leq 0.05$) within the genotypes and very significant ($p \leq 0.001$) for the years average. Large significant differences ($p \leq 0.001$) were observed between the 6 genotypes for the crude fiber (CF) and lignocellulose (ADF) content. The similarity of the genotypes was different each year for nutritional quality, this aspect being highlighted by the Cluster analysis.

Key words*: Cluster analysis, Dactylis glomerata, Duncan test, quality forage.*

EVALUATION OF SOIL HERBICIDES FOR WEED CONTROL IN LAVENDER (*Lavandula angustifolia* Mill.)

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Abstract

The study was conducted during the period 2022-2024 at the experimental field of the Institute for Roses and Aromatic Plants - Kazanlak in a young lavender plantation (Lavandula angustifolia Mill.), cultivar `Teres`. The influence of soil herbicides applied before beginning of lavender vegetation was monitored: Pledge 50 WP (500 g kg^{-1} flumioxazin) - 0.20 kg ha^{-1}, Sirtaki CS (clomazone 360 g L^{-1}) - 0.6 L ha^{-1}, Bismark CS (clomazone 55 g L^{-1} + pendimethalin 275 g L^{-1}) - 2.5 L ha^{-1} and Challenge 600 SC (600 g L^{-1} aclonifen) - 2.5 L ha^{-1} on weeding during the first three years after the establishment of the plantation. The results show that Pledge 50 WP successfully controls annual species forming the weed association in the row strip of the plantation (Chenopodium album L., Portulaca oleracea L., Polygonum aviculare L., Setaria glauca L.). Sirtaki CS, Bismark CS and Challenge 600 SC exhibit weaker action, reducing their density to 15-20% compared to the control. The tested herbicides show high selectivity towards lavender. The treated variants are distinguished by higher yields than the control.

Key words*: Lavandula angustifolia Mill., weeds, herbicides, efficacy, selectivity.*

INFLUENCE OF DROUGHT ON SEED OIL CONTENT OF SOME SUNFLOWER HYBRIDS IN YEARS 2024 AND 2025, IN SOUTHEASTERN OF ROMANIA

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Abstract

Drought is most restrictive abiotic factor who affect negatively seed yield and seed oil content of sunflower genotypes. Years 2024 and 20254 are characterized as a drought years and in this paper we present results about seed oil content of ten sunflower hybrids belonging to NARDI Fundulea, cultivated in Express Sun system, in south eastern of Romania, in Fundulea location. In year 2024 was registered an average seed oil content between 35.2% at sunflower hybrid H8E and 45.8% at sunflower hybrid FD15E27. In year 2025 was registered an average seed oil content between 31.58% at sunflower hybrid H8E and 41.71% at sunflower hybrid FD15E27. In year 2025, was registered a lowest seed oil content at all ten sunflower hybrids analysed in both years. In year 2024 was registered an average seed yield between 623kg/ha at sunflower hybrid H8E and 1155 kg/ha at sunflower hybrid H1E. In year 2025 was registered an average seed yield between 1792 kg/ha at sunflower hybrid H2E and 2334 kg/ha at sunflower hybrid H1E. In year 2024, was registered a lowest seed yield than year 2025.

Key words*: sunflower, seed oil content, drought.*

RESEARCH ON THE REACTION OF SOME BEAN GENOTYPES TOWARDS PATHOGENIC AGENTS DETECTED, UNDER IRRIGATED CULTIVATION CONDITIONS, IN THE BALTA-ALBĂ AREA, BUZĂU COUNTY

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Abstract

The aim of this work is to highlight the reaction of bean genotypes to specific pathogens under conditions of natural infection and irrigated cultivation. The observations were carried out under the conditions of 2025, within S.C. BioVitAgro, Balta-Albă, Buzău County. The biological material used was represented by the bean varieties: Elba, Sonesta, Supernano Giallo and Canellino. The diseases detected were: bean common mosaic (Bean common mosaic virus), bacterial blight of bean (Xanthomonas phaseoli pv. phaseoli), fusarium wilt of bean (Fusarium oxysporum f. sp. phaseoli) and angular leaf spot of bean (Pseudocercospora griseola). Observations were made regarding the incidence and intensity of the attack in the control and fungicide-treated variants. The degree of attack and the effectiveness of the applied treatments were calculated. The highest attack values were determined in the control variant, in which the frequency of attack by Pseudocercospora griseola was 59.5%, and the lowest in the attack by Fusarium oxysporum f. sp. phaseoli (8.25%). The application of treatments had an effectiveness ranging between 63.6% and 96.25% in combating the monitored diseases.

Key words*: pathogens, diseases, attack, effectiveness.*

BIOACTIVE SUBSTANCES OF ACTINOBACTERIA ORIGIN FOR AGRICULTURE USE

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Abstract

For plant protection against pathogens, microbial biopreparations are successfully used. Representatives of actinobacteria are involved in obtaining biopreparations, as they interact beneficially with plants, stimulating their growth and increasing resistance to diseases. In this study, strains of actinobacteria with high antimicrobial and phytostimulatory potential were identified. Sixteen strains of actinobacteria were studied, the highest results of antagonism were demonstrated by 3 strains (Streptomyces sp. 21, Actinomadura sp. 37, and Actinoplanes sp. 43) towards phytopathogens Alternaria alternata, Botrytis cinerea, Fusarium solani, and Fusarium oxysporum with inhibition zones of 15-22 mm. The solutions of exometabolites obtained during the cultivation of Streptomyces sp. 21, Actinomadura sp. 37, and Micromonospora sp. 56, taken in different concentrations, were tested on wheat seeds (Moldova cultivar). The results obtained after seed treatment demonstrated the stimulation of the indices: germination, average length of seedlings, dry mass of stems and roots by 20-60 % more. Thus, we can conclude that these strains are promising for agriculture. This research was funded by Government of Republic of Moldova, Ministry of Education and Research, Research Subprogram 020101 "InBioS - Innovative biotechnological solutions for agriculture, medicine and environment".

Key words*: Actinobacteria, wheat, test cultures, antifungal activity, phytostimulation.*

STUDY OF YELD QUANTITY AND ECONOMICAL IMPACT OF MAIZE OBTAINED IN A PRIVATE FARM LOCATED IN MACEA MICROZONE, ARAD COUNTY

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Abstract

This paper investigates the yield efficiency of maize cultivated in a private farm located in Macea, Romania. The study spans two agricultural years, 2024 and 2025, and involves eight commercial maize hybrids developed by three major seed companies. Field experiments were conducted to monitor and compare the performance of these hybrids in terms of grain yield. The average grain yield achieved in 2024 was 3,963 kg/ha, while in 2024 it declined to 2,920 kg/ha, likely reflecting interannual climatic variability and other environmental factors. Despite the lower yield in 2025, the market selling price increased from 0.70 RON/kg in 2024 to 0.80 RON/kg in 2025, partially compensating for the production drop. The study offers a practical assessment of maize productivity in a private farming context and highlights the influence of hybrid selection, seasonal conditions, and market trends on crop efficiency. The results are relevant and aiming to optimize maize production under field conditions in Western Romania and similar agroecological regions. Further investigations integrating input use and cost-efficiency analysis could provide a more comprehensive picture of farm-level maize performance.

Key words*: maize, corn hybrids, agriculture technology, impact, economic impact.*

MILLET CULTIVATION - A SUSTAINABLE ALTERNATIVE TO MAIZE CULTIVATION IN MOISTURE DEFICIT AREAS OF NORTH-WESTERN BIHOR COUNTY DOMINATED BY ARENOSOLS, IN THE CONTEXT OF CLIMATE CHANGE

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Abstract

The present study examines the potential of millet (**Panicum miliaceum**) *cultivation as a sustainable alternative to maize cropping systems in Arenosols-dominated areas of northwestern Romania under climate change conditions. To this end, comparative field trials with millet and maize were established in the locality of Valea lui Mihai during the 2024 and 2025 growing seasons. The research addressed the pedological characteristics of Arenosols, the impact of water stress on maize in comparison with millet, the agro-biological advantages of millet, recommended cultivation technologies, comparative performance, and the socio-economic potential of this crop. Millet exhibits high drought tolerance, low agro-technical input requirements, a short vegetation cycle, and high water-use efficiency, thus demonstrating strong potential to stabilize agricultural production in areas exposed to aridization processes. Based on the obtained results, among resilient alternative crops, millet* (**Panicum miliaceum**) *represents a viable agronomic option capable of enhancing the resilience of local agricultural systems through reduced water requirements and high adaptability to Arenosols-occupied areas, where persistent moisture deficits are consistently recorded.*

Key words*: climate change, moisture deficit, millet crop, differentiated fertilization, statistical analysis.*

EFFECTS OF SEED TREATMENT WITH MICRONUTRIENTS ON EARLY DEVELOPMENT OF OILSEED RAPE (*Brassica napus* L.)

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Abstract

The rapid development of the root system helps to mitigate the impact of prolonged drought and low temperatures in autumn crops. The aim of this study was to investigate the effect of micronutrient seed treatments on the early development of oilseed rape seedlings. A total of five experimental variants based on zinc and manganese were established. The experiments were conducted both under laboratory conditions, using Petri dishes, and in vegetation pots under field conditions. The applied treatments did not significantly affect the germination rate; however, they induced clear differences in early seedling development, particularly in terms of coleoptile length, root system development, and biomass accumulation. Seed treatments with zinc and manganese, applied in a biostimulant-based formulation, resulted in an efficient and consistent stimulation of root growth and dry matter accumulation, while zinc alone promoted shoot growth and fresh biomass. Manganese applied alone had a limiting effect on growth, which was partially alleviated when combined with zinc.

Key words*: biomass accumulation, manganese, root development, seedling growth, zinc.*

ANALYSIS OF PRODUCTIVITY AND CLIMATE-STRESS ADAPTABILITY OF *Lotus corniculatus* L. CULTIVARS IN A COMPARATIVE CULTIVATION SYSTEM

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Abstract

This study examined the agronomic performance of three bird's-foot trefoil (Lotus corniculatus L.) cultivars - Lovrin 25, Dacia, and Doru - within the ISTIS comparative trial network in Romania. The experimental framework assessed dry matter productivity and the stability and adaptability of each cultivar across heterogeneous pedoclimatic environments, thereby enabling rigorous comparisons between newly developed germplasm and established reference cultivars to determine their agronomic and economic value. Across all test sites, the Lovrin 25 cultivar exhibited a remarkably superior dry matter yield compared with the control cultivars Dacia 1 and Doru. This enhanced productivity appears to be associated with improved post-mowing regrowth dynamics and a more homogeneous stand structure, facilitating more efficient resource acquisition and utilisation. The yield advantage observed for Lovrin 25 underscores the potential for targeted genetic improvement to increase biomass accumulation without compromising essential agronomic attributes such as nutritional value, drought tolerance, and persistence. Collectively, the findings indicate that Lovrin 25 integrates high productivity with noticeable resilience to climatic variability, supporting its suitability for sustainable forage production systems.

Key words*: Lotus corniculatus L., dry matter yield, correlation, regression.*

MORPHOLOGICAL AND NUTRITIVE VARIABILITY ACROSS WHITE CLOVER (*Trifolium repens* L.) GENOTYPES UNDER FIELD CONDITIONS

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Abstract

This study provides a comparative assessment of morphological variation and nutritive quality across a diverse set of Trifolium repens genotypes cultivated under standardized field conditions. Marked genotypic differences were observed in structural traits, including plant height, canopy diameter, and reproductive output. Leaflet morphology exhibited substantial variability in surface area, with genotypes such as TRA 316, TRA 74, TRA 836, and TRA 1323 exhibiting the largest mean values, indicative of enhanced photosynthetic capacity and potential for biomass accumulation. Nutritive analyses further highlighted significant biochemical differentiation among genotypes. Fiber fractions (ADF, NDF) showed broad variability, reflecting differences in cell wall composition and potential digestibility. Protein content ranged widely, with several high-performing genotypes (e.g., TRA 1410, TRA 1619, TRA 1227) consistently exceeding 15%, suggesting strong nutritional value. Variation in starch and soluble sugar concentrations also revealed genotype-specific carbohydrate allocation strategies relevant to forage palatability and ruminal fermentation. Collectively, the results underscore the considerable functional diversity present within the evaluated white clover germplasm, emphasizing its importance for breeding programs focused on enhancing forage quality, adaptability, and agronomic resilience.

Key words*: Trifolium repens, genotype variability, morphological traits, nutritive quality.*

EFFECTS OF MINERAL NUTRITION FACTORS AND PEDOCLIMATIC CONDITIONS ON YIELD PERFORMANCE AND QUALITY OF *Vicia faba* L.

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Abstract

This study assessed the effects of mineral nitrogen fertilization and pedoclimatic conditions on yield performance and quality of Vicia faba L. Field experiments were conducted in two distinct pedoclimatic areas of Romania, Grădinari and Timișoara. Four nitrogen fertilization levels (N_0, N_{30}, N_{60}, and N_{90}) were tested on a constant phosphorus and potassium background ($P_{60}K_{60}$). Grain yield, protein content, and protein yield were evaluated as indicators of productivity and quality. In addition, nodulation, number of pods per plant, and number of seeds per pod were analyzed to describe crop response to nitrogen fertilization. The results indicated that nitrogen application significantly influenced yield and quality parameters, with moderate nitrogen rates improving grain and protein yield. Higher nitrogen doses reduced nodulation intensity, suggesting a negative effect on biological nitrogen fixation. Pedoclimatic conditions strongly affected crop performance, highlighting location-specific responses to fertilization. The findings demonstrate that optimizing nitrogen fertilization according to local pedoclimatic conditions is essential for improving productivity and protein yield in Vicia faba cultivation and for promoting sustainable legume-based cropping systems.

Key words*: pedoclimatic conditions, nitrogen fertilization, protein yield, Vicia faba.*

CHEMICAL COMPOSITION, DIGESTIBILITY AND NUTRITIVE VALUE OF SOWN GRASSLANDS OF CEREALS AND LEGUME MEADOW GRASSES

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Abstract

The development of some species of perennial grasses forage crops in double mixtures with red clover was investigated in order to establish the quality and nutritive value of forage under mountain conditions. The dry matter of the mixture of D. glomerata L. with Tr. pratense L. was found to have the highest content of NDF, ADF and cellulose. The exceeded compared to the mean value of the traits was 6.0%, 8.0% and 12.5%, respectively. The mixture of Ph. pratense L. with Tr. pratense L. was shown to have the lowest content of fiber structural components (excluding ADL). The biomass had the highest in vitro dry matter digestibility. The values of the parameter were 2.3 to 7.0% higher than those of the other mixtures in the experiment. The plant mass of the two-component mixtures with L. perenne L. and F. rubra L. contained significantly higher amount of ADL in dry matter and had the highest values of GE.

Key words*: perennial grass mixtures, detergent fibers, energy value.*

PHOTOSYNTHETIC PIGMENTS AND ANTIOXIDANT ACTIVITY IN INDUSTRIAL HEMP AS INFLUENCED BY SOWING DATE AND PLANT DENSITY

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Abstract

The present study evaluated the effects of sowing date and plant density on phytochemical compound in industrial hemp (Cannabis sativa L.) leaves. Field experiments were conducted in 2025 at the Agricultural Research and Development Station Lovrin (Romania) using 'Silvana' variety, under non-irrigated conditions. Three sowing dates (St1 - 10 April; St2 - 22 April; St3 - 5 May) and four row spacing (Rs1 - 0.125 m; Rs2 - 0.70 m; Rs3 - 1.00 m; Rs4 - 1.50 m; Rs = row spacing); 12 experimental variants (T1 to T12) were obtained, arranged randomly in three replications. On 24 September, leaf samples from female plants were collected at maturity and analysed for chlorophyll a and b, total carotenoids, dry matter, antioxidant activity (DPPH assay), and total phenolic content. Polynomial models successfully described the variation of phytochemical traits in relation to sowing date, row spacing, and pigment composition. The obtained results highlight the importance of optimizing sowing time and plant density to enhance photosynthetic efficiency and antioxidant potential in industrial hemp leaves; the findings contribute to refining cultivation practices aimed at improving the functional value of hemp biomass.

Key words*: antioxidant activity, carotenoids, chlorophyll a, b, phenolic compounds, comparative analysis, industrial hemp leaves, trend model.*

EVALUATION OF FUNGICIDE TREATMENTS FOR THE CONTROL OF NET BLOTCH (*Pyrenophora teres*) IN SPRING BARLEY UNDER EPPO SOUTH-EAST ZONE CONDITIONS

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Abstract

Field trials were conducted in 2024 to evaluate the biological efficacy of fungicide treatments based on benzovindiflupyr (SDHI) and prothioconazole (DMI), applied at different dose rates, for the control of foliar diseases of spring barley (Hordeum vulgare L.), with emphasis on net blotch caused by Pyrenophora teres, under EPPO South-East Zone conditions. The experiment was carried out in western Romania (Parta, Timis County) in accordance with EPPO guidelines and Good Experimental Practice, using a randomized complete block design with four replications. Fungicide treatments were compared with a commercial reference product and an untreated control. Disease assessments focused on incidence and severity, evaluated on the most relevant leaf layers before and after application. Additional observations included green leaf area preservation and crop selectivity based on phytotoxicity symptoms. Fungicide efficacy was calculated using Abbott's formula, and data were analyzed by one-way ANOVA ($p = 0.05$). Results showed a clear dose-dependent reduction in disease severity, with efficacy comparable to the reference standard and no phytotoxic effects.

Key words*: fungicide efficacy, net blotch, Pyrenophora teres, SDHI–DMI, spring barley.*

PRELIMINARY STUDIES ON THE IMPACT OF EXPERIMENTAL CONDITIONS ON WHEAT MICROGREENS DEVELOPMENT

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Abstract

The growing interest in microgreens is due to their high nutrient and bioactive compound levels during the early stages of plant growth, making them a concentrated, efficient source of vitamins, minerals, and antioxidants for a healthy diet. Our study investigated the influence of experimental conditions on the early development of wheat Triticum aestivum L. microgreens. Germination performance, morphometric traits, biochemical indicators, and antimicrobial properties were systematically evaluated. Preliminary results indicate that in vitro conditions significantly accelerate germination and stimulate early metabolic activation, suggesting enhanced physiological reactivity under controlled conditions. In contrast, natural-like conditions sustained a more robust structural development, indicating that both systems contribute complementary advantages to microgreens' vigour. Integrating germination physiology with secondary metabolite dynamics highlights key metabolic adjustments relevant for both plant resistance and nutritional quality. These results provide a fundamental framework for future research focused on optimizing growth protocols and improving functional characteristics of wheat microgreens. The study supports the potential of personalized cultivation strategies to enhance the nutritional value and bioactive profile of microgreens intended for balanced human diets.

Key words*: germination conditions, in vitro, wheat microgreens, proteins, seeds, Triticum aestivum.*

STATE OF KNOWLEDGE REGARDING THE INFLUENCE OF SOIL CULTIVATION ON CORN CROPS

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Abstract

Corn is one of the most important agricultural crops worldwide, due to its multiple uses: food, feed, and industrial. Originally from Central America, corn spread rapidly in Europe after the 16th century, becoming a staple crop in Romania as well. Evolution of acreage and production Globally, corn acreage has grown steadily, and production has increased significantly in recent decades as a result of genetic progress, fertilization, and mechanization. In Romania, corn occupies over 2 million ha, but production has long been unstable, heavily influenced by drought. After 2000 production increased due to high-performance hybrids and improved cultivation technologies, although climate variability remains a limiting factor. The evolution of cultivation systems and soil tillage. The conventional system is based on plowing and intensive soil tillage, ensuring a favorable seedbed, but has disadvantages such as high energy consumption and the risk of soil structure degradation. Minimum tillage involves reducing the number and depth of tillage operations, partially maintaining plant residues, and conserving soil water, contributing to reduced erosion and production costs. The no-tillage system involves direct sowing into stubble, with significant benefits.

Key words*: soil tillage, maize crop, minim tillage, conventional tillage.*

THE IMPACT OF HERBICIDE TREATMENTS IN THE CONTROL OF WEED SPECIES PRESENT IN THE WHEAT CROP

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Abstract

Wheat (Triticum aestivum) is one of the most important cereals worldwide, essential for human and animal nutrition, being a dominant agricultural crop in Romania, with a major economic role. Weed control remains a key component in optimizing wheat crop productivity and the application of herbicide treatments is a fundamental agronomic practice. Weeds are a major factor in reducing wheat production, and the application of herbicides is an effective measure for their control. The present study evaluates the impact of treatments on the control of weed species in wheat crops, under the pedoclimatic conditions of the Fundulea area. The purpose of the research was to identify new technological sequences regarding the control of weeds in wheat crops by using herbicide treatments, having as main objective the broadening of the spectrum of control, synergism, persistence and without negative impact on the environment. The main objective of this work is the study of the degree of selectivity and effectiveness of the application of herbicide treatments in combating weed species existing in wheat crops. The use and application of herbicide treatments must be correlated with the degree of infestation, the spectrum and dominance of weed species and the pedoclimatic conditions of the research area.

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

FACTORS INFLUENCING STERILITY BREAKAGE IN CMS MAIZE LINES (*Zea mays* L.)

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Abstract

The use of CMS lines in the production of commercial corn hybrids represents a significant advancement, as it eliminates the detasseling operation that damages plants and reduces yield, although it also involves additional costs. However, these lines present a major disadvantage if sterility breakage occurs. The aim of this research is to identify and analyse the potential factors causing sterility breakdown in CMS female parental lines under the pedoclimatic conditions of southeastern Romania. For this study, eight CMS lines from a commercial hybrid production program were selected for testing. These eight lines belong to two types of cytoplasmic male sterility: six lines with Type C (Charrua cytoplasm, CMS-C) and two lines with Type S (Sorona cytoplasm). The factors analysed were the type of cytoplasmic male sterility, climatic conditions, and planting density, which, according to specialized literature, are the main factors that may lead to sterility breakage.

Key words*: corn, sterility breakage, factors, environmental conditions, genetics.*

MULTIVARIATE ANALYSIS OF GRAIN QUALITY TRAITS IN OAT (*Avena sativa* L.) CULTIVARS UNDER DIFFERENT NITROGEN FERTILIZATION LEVELS

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Abstract

Understanding relationships among grain quality traits is essential for improving oat performance under varying agronomic conditions. This study used principal component analysis (PCA) to assess the multivariate structure of key physical and chemical grain quality traits in eleven oat cultivars grown under different nitrogen fertilization levels during 2023-2025. A total of 55 cultivar × fertilization combinations were evaluated for hectoliter weight, protein content, fat content, and nitrogen-related traits. The first two principal components explained 93.4% of the total variance. The first component (72.9%) was mainly associated with protein and nitrogen content, indicating the strong influence of nitrogen nutrition on grain composition. The second component (20.5%) was related to hectoliter weight and fat content, reflecting variation in physical grain quality among cultivars. PCA scores clearly differentiated cultivar–fertilization combinations, highlighting distinct cultivar responses to nitrogen supply. These findings confirm that PCA is an effective approach for identifying major determinants of oat grain quality and supports cultivar selection and nitrogen management strategies in oat production systems.

Key words*: hectoliter weight, multivariate analysis, nitrogen fertilization, oat cultivars.*

THE INFLUENCE OF GENETIC AND ENVIRONMENTAL FACTORS ON PRODUCTIVE TRAITS AND MALT QUALITY IN SPRING BARLEY

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Abstract

Spring barley is the main raw material for malt production, serving the brewing, distilling, and baking industries. Malt quality is strongly influenced by grain protein content and kernel uniformity, with optimal protein levels of 10-12% required to ensure efficient wort clarification and high malt extract. Balancing grain yield and quality therefore remains a major breeding objective. This study investigated the influence of genetic and environmental factors on productive traits and malt quality in eight spring barley genotypes evaluated over six years (2017-2022) at the Agricultural Research and Development Station Turda. Measurements included spike length, grain number and weight, thousand-kernel weight (TKW), yield, protein content, starch, and key malt quality parameters. Significant variability among genotypes and years demonstrated the strong impact of environmental conditions on productivity. Genotypes Romanița and Dumbrăvița showed superior grain weight and TKW. Protein content directly affected malt quality attributes such as extract and diastatic power. The results support the selection of stable, high-performing genotypes suitable for variable growing conditions and brewing requirements.

***Key words**: climatic conditions, malt quality, quality traits, spring barley, yield traits.*

AGRONOMIC EVALUATION OF SUNFLOWER HYBRIDS (*Helianthus annuus* L.) BY THE QUANTITY AND QUALITY INDICES

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Abstract

Sunflower is one of the most important oilseed crops on a global scale. The aim of the present study was to determine the productivity of four sunflower hybrids and to establish the influence of the factor hybrid in accordance with the specific climatic conditions of the year on the seed yield, as well as on some qualitative and quantitative indicators. The experiment was conducted during the period 2021-2023 in the region of Targovishte on soil type chernozem and an experimental area of 25 m^2 in four replications, after predecessor wheat. The following hybrids sunflower were tested: "P64LE136", "LG 50.549 SX", "Subaro" and "P64HE118". The results showed that the tallest plants were formed from P64LE136 hybrid and the lowest one - from LG 50.549 SX. The highest values of head diameter (20.4 cm), number of seeds per head (1513), seed weight of head (240.0 g), seed yield (3593 kg/ha) and 1000 seed weight (204.0 g) was reported for Subaro hybrid. Hybrid LG 50.549 SX was distinguished by the highest values of oil content (48.4%) and oil yield (1548 kg/ha) as well as test weight (43.2 kg).

Key words*: sunflower, hybrids, seed yield, quality, oil.*

GENETIC DIVERSITY OF HIGH AND LOW MOLECULAR WEIGHT GLUTENIN SUBUNITS IN BULGARIAN ACCESSIONS FROM *Aegilops triuncialis* SPECIES

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Abstract

Thirty-eight samples of the species Aegilops triuncialis L. *were analyzed for HMW and LMW glutenin subunits. A total of 18 alleles were documented at the Glu-U1 locus, with allele frequencies ranging from 2.63% to 15.79%. A total of ten alleles were identified at the Glu-C1 locus, with the alleles Glu-C1h, Glu-C1i, and Glu-C1j classified as rare. The genotypes under scrutiny exhibited substantial allelic variation with respect to both B-LMW-GS and C-LMW-GS. A total of 41 alleles were identified within the B zone, 20 within the Glu-U3 locus, and 21 within the Glu-C3 locus. A total of 35 alleles were identified in the C zone, 21 in the Glu-U3 locus and 14 in the Glu-C3 locus. The presence of a diverse array of glutenin subunits, encompassing both high and low molecular weight variants, within this species, signifies a valuable genetic resource that has the potential to enhance the quality of wheat.*

Key words*: Aegilops triuncialis L., alleles, glutenins, polymorphism, SDS-PAGE.*

RESEARCH ON THE BEHAVIOR OF ISOGENIC LINES FOR THE WAXY GENE RESPONSIBLE FOR WHEAT WAXINESS, IN THE PEDOCLIMATIC CONDITIONS OF CENTRAL OLTENIA

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Abstract

The presence of epicuticular wax (waxiness) is a key physiological trait for wheat adaptation to environmental stress. This study evaluated the influence of the waxy (wx) gene on yield and physical quality traits, specifically Thousand Kernel Weight (TKW) and hectolitre weight (HW), under the pedoclimatic conditions of Central Oltenia at SCDA Caracal (2023–2025). The biological material consisted of two isogenic lines derived from the Nogal × Otilia hybrid combination: F 13248 G4-16 wx (waxy) and F 13248 G4-16 non-wx (non-waxy). Our results indicate that the absence of waxiness negatively impacts productivity; the non-waxy line yielded 312 kg/ha less than its waxy counterpart, a difference found to be distinctly significant. Furthermore, the presence of the wx gene positively influenced TKW and HW, suggesting that waxiness plays a protective role during the grain-filling period in this region. These findings highlight the importance of incorporating waxiness into breeding programs for semi-arid environments.

Key words*: wheat, isogenic lines, waxy gene, waxiness, production.*

EFFICACY AND SELECTIVITY OF HERBICIDES TESTED ALONE AND IN COMBINATION WITH BIOSTIMULANTS IN MAIZE

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Abstract

In 2024 and 2025, a field experiment was conducted with corn, hybrid Adnano (FAO 480). The experiment was conducted in the village of Brest, Gulyantsi municipality, Bulgaria. No-Till technology is applied on the experimental area. The experiment was based on a wheat predecessor. Direct sowing of corn was carried out. The experiment was set up according to a randomized block design. In the phenophase 4-6 leaf (BBCH 14-16) of the crop, treatment was carried out with the herbicides Capreno SC (345 g/l tembotrione + 68 g/l thiencarbazone-methyl + 134 g/l isoxadifen-ethyl) and Mistral Plus OD (220 g/l dicamba + 50 g/l nicosulfuron). Each of the products was applied alone and in a tank mixture with the biostimulants Lebosol Aminosol (115 g/l N - 9.4%; 15 g/l K_2O - 1.1%; 0.25 % S; 1.28% Na; 66.3% organic substance) and Lebosol Zinc 700 SC (700 g/l Zn - 40%). The weeds in the experimental field were represented by: Conyza canadensis L., Chenopodium album L., Polygonum convolvulus L., Abutilon theophrasti Medic., Convolvulus arvensis L. and Sorghum halepense (L.) Pers.

Key words: *maize, weeds, herbicides, biostimulants.*

EVALUATION OF IMAZAMOX-CONTAINING HERBICIDES FOR WEED CONTROL IN COMMON BEANS (*Phaseolus vulgaris* L.)

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Abstract

In 2024 and 2025, a field experiment was conducted with common beans, variety `Elexir`. The study was conducted on the agricultural land in the village of Madrets, Stara Zagora region, Bulgaria. The variants of the experiment were: 1. Untreated control - without the use of herbicides and without hoeing; 2. Economic control - removal of weeds by hoeing, without the application of herbicides; 3. Pulsar 40 (0.70 l ha^{-1}); 4. Pulsar 40 (1.00 l ha^{-1}); 5. Pulsar 40 (1.30 l ha^{-1}); 6. Pulsar Plus (1.12 l ha^{-1}); 7. Pulsar Plus (1.60 l ha^{-1}); 8. Pulsar Plus (2.08 l ha^{-1}). The herbicides were applied during the second lateral branching phenophase of the crop (BBCH 22). The highest herbicidal control against Setaria viridis L., Xanthium strumarium L., Chenopodium album L. and Abutilon theophrasti Medik. was found after the application of Pulsar Plus (2.08 l/ha) and Pulsar 40 (1.30 l/ha). Convolvulus arvensis L. is the most difficult to control of the herbicides studied. The highest bean yield was obtained with Economic control, Pulsar Plus (2.08 l ha^{-1}) and Pulsar 40 (1.30 l ha^{-1}).

Key words*: common bean, weeds, herbicides, efficacy, yield.*

THE IMPACT OF THE APPLICATION OF *Chlorella vulgaris* TREATMENT ON GROWTH PARAMETERS AND HARVEST YIELD OF *Mentha piperita* L. VARIETIES 'VICTORIA' AND *Mentha longifolia* L. VARIETIES 'ARGINT'

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Abstract

The paper presents the scientific results obtained in the field experiments carried out in 2025 on soils cultivated with Mentha piperita L., cultivar 'Victoria', and M. longifolia L., cultivar 'Argint'. In the experiments, the Chlorella vulgaris suspension was applied in a concentration of 100%, as well as diluted with drinking water in the ratios 1:3, 1:4, 1:5, to the open field cultivation of the mentioned medicinal plants. The results obtained indicate that, in the case of M. piperita cultivation, the most favorable variant proved to be the 100% algal suspension, which led to an increase in plant height by up to 3.95%, an increase in crop yield by up to 3 t/ha and an increase in essential oil content by 0.5%. For M. longifolia, the most effective treatment was the one diluted in the ratio 1:5, which generated an increase in plant height by 4.09%, an increase in yield by 3.1 t/ha and an increase in oil content by 0.5%.

Key words*: algae, biostimulator, medicinal plants.*

ECOLOGICAL EVALUATION OF SUNFLOWER GENOTYPES UNDER THE MICROCLIMATIC CONDITIONS OF SANDY SOILS IN SOUTHERN OLTENIA

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Abstract

The research was conducted during 2024-2025 to evaluate advanced-generation sunflower genotypes under the specific microclimatic conditions of irrigated sandy soils. The study aimed to assess the biological, physiological, morphological, and productive performance of 22 sunflower genotypes cultivated under these conditions. The vegetation period ranged from 99.5 to 117 days, with accumulated air thermal resources of 2271.2-2682.4°C. Under high leaf-level temperatures (37-45°C), stomatal conductance showed a significant positive correlation with photosynthetic rate (r = 0.518) and a highly significant correlation with leaf transpiration (r = 0.908**). Plant productivity varied widely among genotypes, ranging from 2055.9 to 4198.3 kg/ha, reflecting differences in growth and developmental responses to environmental conditions. The genotypes FD-15CL44, HS-2441CLP, FD-23CLP45, FD-22CL83, and FD-22CLP32 recorded yields exceeding 3500 kg/ha. During the flowering stage, these genotypes exhibited leaf area index values of 4.01-5.30 and photosynthetic rates of 21.07-29.88 µmol $CO_2/m^2/s$. These results indicate that the identified genotypes exhibit superior adaptability and productivity in sandy soil and high-temperature conditions, making them promising candidates for cultivation in similar agroecological environments.*

Key words*: field crops, thermal resources, plant physiology, leaf area index, productivity.*

INFLUENCE OF SEEDING RATE, SOWING DATE, AND METEOROLOGICAL CONDITIONS ON THE YIELD OF DURUM WHEAT

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Abstract

The study was conducted during the period 2022-2024 on the experimental field of the Field Crops Institute (FCI), Chirpan. The experiment was set up using a randomized block design with four replications, and a plot size of 15 m². The aim was to determine optimal seeding rates and appropriate sowing dates for achieving high and stable grain yields. Three sowing dates were tested: the third ten-day period of October, the first half of November, and the end of November, combined with three seeding rates (400, 500 and 600 germinating seeds/m²) of the Bulgarian durum wheat variety Predel. The results of the analysis of variance showed that the year had the strongest and most significant effect on yield (62.5%). The influence of the other factors was considerably lower, ranging from 1 to 6.3%. According to the stability indices σ^2_i *and* Wi^2*, the highest yield stability was observed at a seeding rate of 600 germinating seeds/m² with sowing in the third ten-day period of October. This also meets the stability parameter of the Kang (KR). Low yield stability was recorded at the same seeding rate (600 germinating seeds/m²) when sowing was carried out in the first half of November.*

Key words*: seeding rate, sowing date, meteorological conditions, yield, durum wheat.*

SORGHUM CROP AS AN ALTERNATIVE IN THE CONTEXT OF CLIMATE CHANGES IN THE SOUTH- EAST ROMANIA

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Abstract

In the South Dobrogea Plateau from South-East Romania, the climate change in recent years has resulted in an increase in average air temperature, changes in rainfall patterns and extreme meteorological phenomena. These conditions have affected maize crops, as maize plants are sensitive to water stress conditions, especially when associated with high temperatures. As a result, farmers have responded by reducing the area cultivated with maize and increasing the area cultivated with winter crops. They have also shifted to growing spring crops that are more resistant to water stress and better tolerate heat stress, such as sorghum. Thus, the cultivated area with sorghum in Constanta County, Dobrogea region, has increased from 155 ha in 2022 to 500 ha in 2025. But the farmers expect also some technological solutions to allow them to better manage sorghum crop. In this context, research was performed under rainfed conditions in two years, respectively 2024 and 2025, in the fields of S.C. SPORT AGRA S.RL. located in Amzacea Village, Constanța County, in the South Dobrogea Plateau (South-East Romania).

Key words*: sorghum, climate change, drought, crop technology, yield.*

IMPACT OF CLIMATE CHANGE ON THE GROWTH AND YIELD OF CORN IN AGROCLIMATIC CONDITIONS AT ARDS SIMNIC, DOLJ COUNTY

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Abstract

Corn is a global staple food, essential for ensuring food security. In the current climate scenario, the ability of corn hybrids to adapt to local agroclimatic conditions is a major concern for breeders and farmers, on which crop productivity depends. In this regard, at SCDA (ARDS) Șimnic - Dolj County, experiments were carried out with recently released Romanian corn hybrids, during three dry growing seasons (2023-2025), where their grain yield and growth were monitored. The results showed that the number of days to physiological maturity was influenced by increasing temperatures and droughts during the three growing seasons, ranging from 101-105 days in 2023 and 94-96 days în 2024 to 81-88 days in 2025. It was also found that 73% of the variation in yield was determined by seasonal hydroclimatic variability, ranging from 2158 kg/ha to 3628 kg/ha for the Felix hybrid, from 2044 kg/ha to 3502 kg/ha for the Magnus hybrid and from 2481 kg/ha to 3878 kg/ha for the Amurg hybrid. On average over the three season, the Amurg hybrid (3088 kg/ha) significantly exceeded the grain yield of the control hybrid PO216 (2637 kg/ha).

Key words*: corn, drought, heat, test weight, yield.*

EVALUATION OF SOME FEATURES PRODUCTION FOR VETCH- OATS FORAGE MIXTURES - CASE STUDY

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Abstract

Cultivation of some species of grasses and forage legumes in mixtures and various combinations has been proven to offer a series of benefits in terms of production for agricultural farms. Although there are increases in costs generated by sowing, weed control and harvesting, mixtures of legumes and forage grasses bring long-term benefits, improving soil structure by leaving a representative amount of organic matter in the soil. Thus, the purpose of the present study was to evaluate production indices such as: dry matter (DM) and crude protein (CP) production, thus identifying the most efficient proportion (vetch-oats). When setting up the experimental field, one variety of vetch (V) and two varieties of oats (O1, O2) were used. The sown vetch-oat mixtures (V+O) were: V-33%+O-66%, V-50%+O-50%, V-66%+O33%. The same mixing scheme was used for both oat varieties. In conclusion, we can say that the highest production of dry matter (DM) was at V-50%+O-50% and of crude protein (CP) V-66%+O33%, for both varieties.

Key words*: efficient proportion, dry matter, crud protein, productivity.*

EVALUATION OF THE EFFICACY OF YEAST FUNGICIDES FOR THE CONTROL OF FUNGAL DISEASES OF BARLEY

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Abstract

Fungal diseases have become a major threat to important cereal crop production that causes massive yield losses and affects global food security. Barley (Hordeum vulgare L.) is the fourth most important cereal crop in the world after wheat, rice and maize. This paper reviews the efficacy of biofungicides from Hansenula anomala yeast for the control of fungal diseases of barley. The protein, mannoprotein and exopolysaccharide preparations with high antifungal potential were obtained from Hansenula anomala CNM YS-07 yeast strain. The test tube water agar method was used for the estimation of antifungal effect of yeasts biofungicides on seeds of barley. Biofungicides from Hansenula anomala has been demonstrated to be effective for the fungal growth inhibition of Aspergillus fumigatus, Fusarium solani, Fusarium oxysporum. In conclusion, it can be mentioned that the application of Hansenula yeast fungicides as fungal biocontrol agents offers an efficient and environmentally friendly alternative to conventional fungicides.

Key words*: antifungal activity, barley, fungicide, Hansenula anomala, yeast.*

STUDY ON THE IMPACT OF INNOVATIVE BIOFERTILIZERS ON PROSO MILLET (*Panicum miliaceum*) PRODUCTIVITY

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Abstract

During the period 2023-2025, at the Agricultural Institute - Shumen, millet genotype G2 was treated with innovative bioinoculants. Based on the obtained results, it was established that under carbonate chernozem soil conditions, the application of inoculants at different doses and using different methods, led to an increase in the grain yield of millet in all cases of application. The increase in yield also led to an increase in the coefficient of variation. Under the more favorable agrometeorological conditions of 2023, seven of the tested variants showed significantly higher yields. In conditions of water deficit in 2024 and 2025, significantly higher yields were observed only in the variants treated with Fosfatovit 0.5 l/ha, Azotovit 1 l/ha and Fosfatovit 1 l/ha. The aim of the study is to investigate underl field conditions the influence of innovative bioinoculants on grain yield in millet.

Key words*: fertilization, inoculants, millet, yield.*

THE EFECT OF TEMPERATURE IN THE MILLET SEED GERMINATION AND THE INFLUENCE OF ROW SPACING ON THE PERFORMANCE OF SEVERAL *Panicum miliaceum* L. GENOTYPES UNDER THE PEDOCLIMATIC CONDITIONS OF A.R.D.S. SECUIENI

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Abstract

Millet is a secondary crop in Romania but at the global scale it occupies substantial cultivated areas in arid regions (Asia and Africa), where its grains constitute a staple food for populations. In the context of recent climatic changes, the diversification of cultivated species has become a well-established objective. Consequently, in 2022, Panicum miliaceum L. was incorporated into the research portfolio of the A.R.D.S. Secuieni. The investigation focuses on two main objectives: the effect of temperature on millet seed germination and the interaction between genotype and row spacing on millet grain yield. Laboratory experiments demonstrated a directly proportional relationship between temperature and germination percentage, with 50.25% germination recorded at 10°C and 97.75% at 20°C. Field trial results revealed that millet demonstrates pronounced adaptability to the pedoclimatic conditions of the Secuieni area in 2022. Under these conditions, the evaluated genotypes produced average yields ranging from 1984 kg/ha (cultivar Marius - 12.5 cm row spacing) to 1664 kg/ha (BG 1 - 50 cm row spacing), highlighting an inverse relationship between grain yield and row spacing.

Key words*: germination percentage, millet, row spacing, yields.*

ENHANCING WHEAT RESILIENCE TO HYDRIC STRESS THROUGH DYNAMIZED MINERAL BIOSTIMULANTS: GREENHOUSE TRIAL INSIGHTS

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Abstract

Wheat stands out as one of the most vital crops for global food sovereignty. However, instability due to environmental changes on productive areas, particularly draught, pressure wheat farming systems across the globe. Furthermore, most of the wheat is farmed under heavily petroleum-based agricultural practices that threaten its long-term sustainability. These environmental and economic pressures compromise the stability of global wheat supply chains and undermine the resilience of farming communities. The agroecological transition and its practices offer a promising pathway toward more sustainable wheat production. In the last 30 years, the use of dynamized high dilutions (DHDs) in agriculture has gained recognition as an agroecological method, particularly in Brazil, Ecuador, Mexico, India, Pakistan, Italy, Germany, and Switzerland. The method focuses on using organic low-residual impact biostimulants and a salutogenic approach to treat the agro-ecosystem. However, this field of research is still at its dawn and needs robust studies to comprehensively assess the possibilities and limitations of using DHDs in agriculture. Therefore, the objective of this study is to investigate the biostimulatory impact of mineral DHDs to support wheat plants subjected to hydric stress in greenhouse agronomical trials in 2025 and 2026.

Key words*: drought mitigation, health-based solution, homeopathic preparations, plant vitality, Triticum aestivum.*

EVALUATION OF CHEMICAL, BIOLOGICAL AND NATURAL SEED TREATMENTS IN SUNFLOWER (*Helianthus annuus* L.) FOR IMPROVED GERMINATION AND CROP PROTECTION

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Abstract

The study evaluated the efficacy of chemical, biological, and natural treatments applied to sunflower seeds, aiming to reduce reliance on toxic pesticides and identify sustainable crop protection strategies. The experiments were conducted during 2024-2025 at two research stations with different agroclimatic conditions: A.R.D.S. Turda and A.R.D.S. Brăila. Fourteen treatment variants were tested, including commercial products, biostimulants, and experimental plant extracts. Seed treatments influenced sunflower performance differently at the two sites, indicating a strong interaction between treatment effects and local pedoclimatic conditions. At Turda, some high-dose treatments showed unfavorable effects on plant density and phytosanitary status, while yield differences were less clearly expressed, probably due to high climatic variability. At Brăila, seed treatments had a more evident positive effect on crop establishment, pest reduction, and yield, with the best results recorded for treatments such as Signal 300 ES, Bioseed, Biosem, Redigo Pro, and some Requiem Prime and Repel Aves variants. The results show that the agronomic efficiency of sunflower seed treatments depends strongly on local environmental conditions. Their effects were more consistent under the Brăila conditions, while at Turda the response was more variable. These findings support the need to adapt seed treatment strategies to specific pedoclimatic conditions in order to improve crop performance and reduce risks during early development.

Key words: *biological treatments, climatic conditions, seed treatment, sustainable agriculture, yield.*

EVALUATION OF PRODUCTIVE AND QUALITY PARAMETERS IN SPRING BARLEY

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Abstract

Spring barley (Hordeum vulgare L.) ranks fourth globally among cereal crops in terms of cultivated area and production, being used predominantly for feed (~75%), followed by beverage production (~20%) and human consumption (~5%). Starch, which represents ~70% of the grain mass, is highly sensitive to heat stress, as its synthesis depends on the conversion of carbohydrates within the developing kernel. The endosperm, composed of starch granules embedded in a protein matrix, is essential for embryo viability and development. Protein content, which varies between 8-30%, is influenced by environmental conditions, cultivar, and technological factors. For malting barley, an optimal protein content of 10–12% is crucial to ensure uniform germination and high extract yield. This study, conducted at the Agricultural Research and Development Station Turda and involving seven spring barley cultivars, evaluated productivity parameters as well as starch and protein content. Qualitative analyses remain fundamental for cultivar selection and for guiding breeding programs toward more precisely targeted end-use directions.

Key words*: spring barley, starch, yield parameters, protein, breeding.*

TRANSGRESSIVE VARIABILITY OF THE NUMBER OF SPIKELETS IN THE MAIN SPIKE IN F_2–F_4 POPULATIONS UNDER HYBRIDISATION OF WINTER WHEAT VARIETIES OF DIFFERENT ECOTYPES

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Abstract

In 2022-2024, the transgressive variability of the number of spikelets in the main spike was studied in F_2–F_4 populations obtained from the hybridization of Western European, Forest-Steppe, and Steppe ecotypes of winter bread wheat. With an average number of spikelets in F_2 of 18.4-21.4, positive transgressive variability was identified in five out of the 10 studied populations (Td = 4.8-9.5%; Tf = 3.6-6.8%). In 2023, with an average number of spikelets ranging from 16.9 to 20.4, positive transgressions were determined in five out of 13 F_3 populations (Td = 4.5-10.0%; Tf = 2.8-9.6%). The selected populations 'Varvik / Tsarivna' and 'Sluzhnytsia Odeska / Lybid' were characterized by positive transgressive segregation in F_2 (Td = 4.8%; Tf = 3.6% and Td = 9.5%; Tf = 5.6%, respectively) and in F_3 (Td = 9.5%; Tf = 9.6% and Td = 4.8%; Tf = 3.6%, respectively), while in F_4 they formed the maximum number of spikelets in the main spike at the level of the best parental form.

Key words*: populations, varieties, number of spikelets in the main spike, transgressive forms, correlation.*

RESEARCH REGARDING EFFICACY OF FENPICOXAMID TREATMENT IN THE CONTROL OF SOME PATHOGENS IN WINTER WHEAT

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Abstract

This study evaluated the efficacy of fenpicoxamid, a novel picolinamide fungicide, for controlling major wheat foliar diseases under Romanian field conditions. Field trials were conducted during 2024/2025 growing season in Buzău and Neamț counties using Anapurna wheat variety. A standardized fungicide programme including SDHI, strobilurin, triazole, picolinamide, and their mixtures was applied across both locations. Disease pressure from Zymoseptoria tritici, Puccinia recondita, and Blumeria graminis was recorded during the season. The combination of fenpicoxamid + prothioconazole (50 g/L + 100 g/L) provided over 90% control of septoria tritici blotch (STB) at both sites. The efficacy against brown rust attack was 86.2% in Buzău location and 84.3% in Neamț location. Efficacy against powdery mildew was higher than 82% in both locations. The results demonstrated a high and constant efficacy under different pedoclimatic conditions. These conclusions confirm fenpicoxamid as an effective tool in integrated management of wheat diseases. Its performance supports its use in diverse production systems.

Key words*: efficacy, fenpicoxamid, wheat, foliar diseases, field performance.*

CHARACTERIZATION OF BLACK POINT DISEASE IN WINTER WHEAT: EPIDEMIOLOGY, SEVERITY SCORING AND FUNGAL COMMUNITY STRUCTURE

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Abstract

Black point is a common fungal disease of wheat caused by several genera, including Alternaria sp., Cochliobolus sp., Cladosporium sp., and Fusarium sp., leading to embryo discoloration and reduced grain quality. This study evaluated winter wheat varieties to characterize disease epidemiology, assess the incidence and severity of kernel darkening, and identify the associated fungal community. Favorable weather conditions during grain filling resulted in variable disease levels among genotypes. Significant differences were observed in both the proportion of affected kernels and the severity of discoloration. Fungal isolations confirmed Alternaria sp. as the dominant pathogen, accompanied by Cochliobolus sp., Cladosporium sp., Fusarium sp., Epicoccum sp., Curvularia sp., and Chaetomium sp.. The results provide insights into varietal responses to black point under Romanian conditions and support breeding and management strategies to mitigate disease impact and maintain grain quality.

Key words*: winter wheat, black point, kernel discoloration, fungal disease.*

POPULATION DYNAMIC OF EUROPEAN CORN BORER (*Ostrinia nubilalis* Hbn.) AT NARDI FUNDULEA IN THE SOUTH-EAST ROMANIA

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Abstract

European corn borer (ECB) (Ostrinia nubilallis Hbn.) is one of the most dangerous pests of the maize crop in Romania. This paper presents the results of pest population monitoring in southeast Romania at the National Agricultural Research and Development Institute, Fundulea, Călărași County, in a maize field, between 2021 and 2025, and the reaction of nine maize hybrids from different maturity groups to this pest attack in 2024. For ECB monitoring, it has used pheromone traps of the VRAL+ type from Csalomon®. The highest population of this pest was recorded in 2020, with 92 captures, while the lowest was in 2023. In all years of this study, there were two flight peaks: one in the second or third 10 days of June and the second in August. The ECB larva attack on maize hybrids in 2024 was low, gallery length/plant ranged from 1.30 to 4.50 cm, while the number of larvae/plant ranged from 0.20 to 0.78. A possible explanation for this was the high temperatures recorded during the first stage of the ECB larva.

Key words*: maize, pest, borer, monitoring, attack.*

THE INFLUENCE OF BIOTIC AND ABIOTIC FACTORS ON THE PRODUCTION AND ITS QUALITY IN FOUR NEW WINTER WHEAT GENOTYPES

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Abstract

The aim of the study was to monitor the behavior of four new winter wheat genotypes (A4-10, A95-13, A44-13, A57-14) compared to the Ursita wheat variety, under the following conditions: nitrogen fertilization (120 kg/ha nitrogen a.s. and 160 kg/ha nitrogen a.s.) and seed treatment, in the case of the treated variants, with the insect-fungicide Austral Plus, 5 l/T. The factors studied were: grain yield (kg/ha), protein content (%) and gluten content (%). The results obtained showed that the genotypes A4-10 and A57-14 achieved an average production of 6600 kg/ha, respectively 6420 kg/ha in the variant fertilized with the dose of 120 kg/ha nitrogen a.s. and in the variant with 160 kg/ha nitrogen a.s., a production of 6955 kg/ha and 6790 kg/ha compared to the Ursita control. Both variants also had seed treatment. Regarding quality indices, the protein content was noted in line A95-13 (14.03%) and (14.35%) in line A44-13, compared to the Ursita variety which recorded a content of 13.60%.

Key words*: wheat genotypes, nitrogen fertilization, grain production, quality indices.*

MICROBIAL COMMUNITY OF WHEAT STORED SEEDS

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Abstract

The microbial community of stored wheat seeds is mainly represented by fungi and bacteria. Its development is influenced by storage conditions, with temperature and humidity as the main factors that can trigger the development of stored seeds microbiota. The purpose of the study was to identify the microbiota associated with seeds of Trivale variety stored during the period 2022-2024, in the warehouse of Pitesti Agricultural Research and Development Station. In order to highlight the developed microbiota, wheat seeds were incubated on the PDA culture medium, in two variants: undisinfected and surface disinfected seeds. In general, the microbial community of Trivale variety stored seeds was represented by fungi of the genera Alternaria, Fusarium, Aspergillus, Trichothecium, Epicoccum as well as bacteria. The highest incidence of isolates (80%) was recorded for Alternaria spp., detected in the disinfected stored seeds from the 2023 harvest. For the seeds analyzed from the 2024 harvest, the incidence of Alternaria isolates was 70%, also in the disinfected variant. Isolates of Fusarium spp. have been recorded with an incidence of 8% in undisinfected stored seeds from the 2024 harvest.

Key words*: fungal community, incidence, microbiota, stored seeds, wheat.*

THE EFFECT OF BLACK POINT DISEASE ON THE QUALITY OF WHEAT GROWING IN THE SOUTHERN PART OF ROMANIA

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Abstract

Black point is a disease that affects wheat production quality worldwide, affecting the chemical composition. The aim of the study was to evaluate the effect of black point disease on the quality of wheat grown in southern Romania during 2022-2024. The incidence and severity of black point were determined by classical laboratory analyses. Quality analyses were carried out using standard NIR spectroscopy to determine dry matter, hardness, gluten, crude protein, and starch. The incidence of caryopses with black points varied by year and climatic conditions. The year 2023 stands out, with the incidence of the attack ranging from 3.3% (Line 1) to 10.4% (Ursita). The gluten content was low across all 2022 samples, classified as satisfactory only in the Ursita and Miranda varieties (26.6% and 27.7%, respectively). In 2023, gluten exceeded 30% in Trivale, Line 1 and Line 2 being classified as very good. Statistical analysis (Tukey test) shows significant differences among experimental years and varieties, and when the two factors are combined.

Key words*: wheat, black point, proteins, hardness, gluten.*

TILLAGE SYSTEM AND INTEGRATED INPUTS IMPROVE SMALL FARMERS' SOIL FERTILITY AND PRODUCTIVITY IN MAIZE CROPPING

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Abstract

A simple experiment was carried out on three neighboring micro farms where the owners agreed to implement some proposed technologies in which the influence of differentially applied agricultural works and the influence of some inputs on corn production would be tested. The micro farms are located in the south-west of Olt County, adjacent to Dolj County. Conventional and minimum tillage works were performed. For the conventional works, the farmers continued to use their knowledge of corn cultivation. For the proposed technologies, they received nitrogen 70 kg ha-1, phosphorus 90 kg ha-1 and NPK 8.15.15 + 3% CaO+ 9%S 200 kg ha .-1. It was found, even in the short term, that minimum tillage, with integrated soil fertility management technologies, was more effective in increasing corn production in situations of low rainfall than conventional soil amendment with the same technologies.

Key words*: microfarm, inputs, minimum work.*

QUALITY TRAITS OF CORN GRAIN AND BY-PRODUCTS IN RESPONSE TO MACRONUTRIENT FERTILISER AND PLANT GROWTH REGULATOR APPLICATION

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Abstract

This article presents the results of a study investigating the effects of mineral fertilisers and plant growth regulators on the quality parameters of corn grain and its by-products. The research was conducted from 2022 to 2024 at the private agricultural enterprise "Svitanok" in the Kyiv Region, Ukraine. The application of mineral and micronutrient fertilisers altered the chemical composition of the grain: starch and fat contents decreased by 0.19-1.28% and 0.08–0.46%, respectively, while protein content increased by 0.19–0.59% compared to the unfertilised control. Corn biomass excluding grain was characterised by a high carbon content (45.55%) and oxygen content (42.22%), with low levels of sulphur (0.07%) and nitrogen (0.49%). Husk and cob tissues had higher concentrations of carbon (45.90-46.34%), hydrogen (6.35-6.62%), nitrogen (0.55-0.72%), sulfur (0.08-0.10%), and oxygen (43.24-43.36%) than stems and leaves (44.75-45.23%, 5.70-5.96%, 0.25-0.39%, 0.05-0.06%, and 41.12-41.20%, respectively). The application of mineral fertilisers led to a slight increase in ash content (by 0.22-0.32%), hydrogen (0.12-0.27%), nitrogen (0.09-0.16%), and sulphur (0.01%), while reducing carbon (by 0.19-0.46%) and oxygen (by 0.04-0.06%) concentrations. These findings provide insights into the compositional changes in corn grain and residues under different fertilisation strategies, with implications for grain quality improvement and sustainable residue utilisation.

Key words*: corn, mineral fertilizers, plant growth regulators, grain, by-products.*

SMART PEST MANAGEMENT IN MAIZE: THE ROLE OF VISUAL DIAGNOSTICS IN CROP DECISION-MAKING

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Abstract

Smart pest management is a key component of resilient maize production systems, particularly under increasing pest pressure and climatic variability. Effective crop management relies on early detection and correct diagnosis of insect pests, yet not all species and developmental stages are equally detectable under field conditions. This study proposes a decision-oriented diagnostic framework for maize pest management, combining visual scouting, high-resolution imaging, digital tools and targeted verification methods, applied across crop phenological stages from emergence to maturity. All maize pests relevant to Western Romania (Ostrinia nubilalis, Helicoverpa armigera, Diabrotica virgifera virgifera, Oulema melanopus, Rhopalosiphum padi, Agriotes spp., Opatrum spp. and Tanymecus spp.) were evaluated in terms of detectability, diagnostic complexity and management relevance. Species and stages were classified into easy, moderate or difficult to detect categories, based on visibility, symptom expression and habitat. Original high-resolution images were used to illustrate decision-relevant diagnostic features and frequent confusion cases. The proposed approach supports integrated pest management by improving diagnostic accuracy, reducing unnecessary interventions and enhancing smart, field-based decision-making in maize crop management.

Key words*: smart pest management, maize, pest diagnostics, IPM, early detection.*

BIOCHEMICAL COMPOSITION OF FRESH BIOMASS AND ILAGE FROM *Chenopodium album* AND *Amaranthus hypochondriacus* GROWN IN THE REPUBLIC OF MOLDOVA

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Abstract

This study presents the evaluation of the biochemical composition of fresh biomass and silage from Chenopodium album and Amaranthus hypochondriacus in the Republic of Moldova, highlighting their potential as alternative forage and biomethane substrates. The dry matter of whole plants contained 16.0-17.5% crude protein (CP), 10.0-10.1% ash, 33.5-37.0% crude fibre (CF), 35.0-36.8% acid detergent fibre (ADF), 52.5-54.8% neutral detergent fibre (NDF), 5.3-5.9% acid detergent lignin (ADL), 29.7-30.9% cellulose (Cel), and 17.5-18.0% hemicellulose (HC). The silage contained 16.0-17.4% CP, 10.0-10.1% ash, 30.0-38.8% CF, 31.0-36.5% ADF, 47.8-53.5% NDF, 3.9-4.2% ADL, 27.1-32.3% Cel, and 16.8-17.0% HC. The dry matter digestibility (DMD) ranged from 619-678 g/kg, with RFV of 107-133, ME of 10.02-10.90 MJ/kg, and NEL from 6.04 to 6.91 MJ/kg. The substrates for anaerobic digestion showed an optimal carbon-to-nitrogen (C: N) ratio and a biochemical methane potential (BMP) varying from 321 to 348 L/kg volatile solids (VS). These species demonstrate significant potential as alternative forage sources and biomass for sustainable biomethane production.

Key words*: Amaranthus hypochondriacus, Chenopodium album, biochemical composition, biochemical methane potential, nutritive value.*

COMPARATIVE ANALYSIS OF VEGETATIVE BIOMASS COMPONENTS IN *Origanum vulgare* L. DEPENDING ON THE PROCESSING METHOD

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Abstract

This study presents a comparative analysis of vegetative biomass components leaves, inflorescences, and stems in two subspecies of Origanum vulgare (ssp. hirtum and ssp. vulgare), evaluated according to the processing method of the plant material (fresh versus dried). Statistical results indicate that the processing method exerts the strongest influence on the mass of vegetative components, explaining the majority of the total variability. The differences between the two subspecies were moderate, and the interaction between subspecies and processing method did not reach statistical significance, indicating a similar response of the subspecies regardless of the state of the fresh or dried material. The detailed analysis of the biomass of leaves, inflorescences and stem provides useful information for optimizing the harvesting, handling and processing stages, with direct implications for the standardization of the quality of raw materials intended for both the food and pharmaceutical industries. The results contribute to a better understanding of the specific characteristics of the two oregano subspecies, supporting their potential for wider cultivation, including under Romanian growing conditions.

Key words*: agronomic potential*, biomass distribution, *Origanum vulgare* ssp. *hirtum*, *Origanum vulgare* ssp. *vulgare*, *yield characteristics.*

EVALUATING THE CHLOROPHYLL CONTENT OF SOME POTATO VARIETIES LEAVES, AGRONOMIC FEATURES AND YIELD USING SPAD METER

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Abstract

Between 2023-2024 at NIRDPSB Brasov, Romania were performed research to determine the leaf greenness index SPAD and selected potato characteristics, i.e. plant height, yields and tubers starch content on twelve varieties. With SPAD 502 Plus meter (Chlorophyll Meter) were carried out 3 determinations on the leaves of the middle level of 3 plants from each variety taken into the study. Values recorded on 22.06.2023 were between 47.9 and 42.5 units, and those on 18.07.2023 between 47.6 and 42.1 units and the yield varied between 14 t/ha and 45.47 t/ha. Values recorded on 18.06.2024 were between 49.9 and 41.4 units, and those on 08.07.2024 between 47.0 and 39.9 units and the yield varied between 25.72 t/ha and 7.58 t/ha. The results showed that threshold SPAD values decrease as the growing season progresses for all varieties and the yield is strongly influenced by climatic conditions.

Key words*: leaf greenness index SPAD, potato, plant development, starch, yield.*

EFFECTS OF NITRIC AND AMMONIACAL NITROGEN FERTILIZATION ON THE ZELENY SEDIMENTATION INDEX IN COMMON WHEAT (*Triticum aestivum* L.)

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Abstract

The present study evaluated the effects of nitrogen form and fertilization level on the Zeleny sedimentation quality index of bread wheat (Triticum aestivum L.). A bifactorial experiment was conducted including 27 wheat cultivars and six fertilization regimes combining three nitrogen rates (120, 150, and 170 kg ha^{-1} N) applied either as nitric or ammoniacal nitrogen, arranged in three replications. Analysis of variance revealed that cultivar, fertilization regime, and their interaction had a highly significant effect ($p < 0.001$) on the Zeleny index. Mean sedimentation values ranged from 44.12 to 60.94 mL among cultivars, while fertilization treatments varied between 48.31 mL under ammoniacal nitrogen and 55.93 mL under nitric nitrogen. Nitric nitrogen consistently produced significantly higher Zeleny index values compared to ammoniacal nitrogen at all fertilization levels. The fertilization regime accounted from the proportion of total variance (2.97%), followed by the cultivar × fertilization interaction (32.21%) and cultivar effect (28.46%). These results highlight the dominant role of nitrogen form in determining wheat technological quality and emphasize genotype-specific responses to fertilization strategies.

Key words*: bread wheat, grain quality, nitrogen form, protein quality, wheat quality, Zeleny sedimentation index.*

DIFFERENTIAL EFFECTS OF NITRIC AND AMMONIACAL NITROGEN FERTILIZATION REGIMES ON DRY GLUTEN ACCUMULATION IN BREAD WHEAT (*Triticum aestivum* L.)

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Abstract

This study examined the influence of nitrogen form and fertilization rate on dry gluten accumulation in bread wheat (Triticum aestivum L.) under contrasting fertilization regimes. A bifactorial field experiment was conducted using 27 wheat cultivars subjected to six agrofonds, combining three nitrogen application rates (120, 150, and 170 kg ha^{-1} N) supplied as either nitric or ammoniacal nitrogen, arranged in three replications. Analysis of variance revealed that dry gluten content was significantly affected by the fertilization regime ($p < 0.001$), whereas cultivar and cultivar × fertilization interaction effects were not significant ($p > 0.05$). Mean dry gluten values ranged from 9.6% under ammoniacal nitrogen to 12.6% under nitric nitrogen, with the highest values recorded at the lowest nitric nitrogen rate. Variance component analysis indicated that the fertilization regime accounted for the largest share of explained variability, while cultivar-related effects were minor. These findings highlight the predominant role of nitrogen source and application strategy in regulating dry gluten accumulation in wheat grain and suggest that optimizing nitrogen form is more critical than cultivar choice for improving this quality trait under the studied conditions.

Key words*: agrofond, ammoniacal nitrogen, bread wheat, dry gluten content, fertilization level, grain quality, nitrogen fertilization, nitrate nitrogen.*

EFFECTS OF AMMONIUM-BASED FERTILIZERS ON WINTER WHEAT YIELD AND GRAIN QUALITY

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Abstract

This study evaluated the effects of ammonium nitrate and ammonium sulfate fertilization on winter wheat yield and grain quality under field experimental conditions. Grain yield and major quality parameters, including protein content, gluten content, thousand kernel weight, and test weight, were determined. Nitrogen was applied at five fertilization rates: b1 - N0, b2 - N50, b3 - N100, b4 - N150, and b5 - N170 kg N ha^{-1}, to assess crop response to increasing nitrogen supply. The results indicated that both nitrogen source and application rate significantly affected grain yield, with higher nitrogen rates promoting increased productivity. Nitrogen fertilization also exerted a pronounced effect on grain quality traits, leading to higher protein and gluten contents, while thousand kernel weight and test weight showed distinct responses depending on nitrogen form and dose. Overall, the study demonstrates that optimizing nitrogen source and application rate is essential for achieving a balanced improvement in winter wheat yield and grain quality under intensive cropping systems. These findings provide practical guidance for nitrogen management strategies aimed at sustainable wheat production systems.

Key words*: ammonium nitrate, ammonium sulfate, grain quality, nitrogen fertilization, protein content.*

INFLUENCE OF NITROGEN FERTILIZATION AND PLANT DENSITY ON GRAIN SORGHUM YIELD AND QUALITY IN THE SOUTH-WESTERN BANAT REGION

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Abstract

Grain sorghum represents a viable alternative to maize under the increasing occurrence of water and thermal stress in Romanian lowland areas. The research was conducted during the 2023-2024 period in the Bozovici Depression (south-western Banat), aiming to assess the effects of nitrogen fertilization and plant density on yield level and stability, as well as on the main grain quality indicators. The experiment was set up as a bifactorial design with three nitrogen rates (N50, N100, N150 applied on a constant P60K60 background) and four plant densities (150,000-300,000 harvestable plants ha^{-1}). The results showed significant yield increases with both higher nitrogen doses and increased plant density, with the highest grain yields recorded under the N150P60K60 fertilization level combined with a density of 300,000 plants ha^{-1}. Quality analyses indicated a positive influence of nitrogen fertilization on thousand-kernel weight and test weight. The findings highlight the importance of optimizing technological inputs to improve grain sorghum adaptability to local pedoclimatic conditions.

Key words*: grain sorghum, grain yield, nitrogen fertilization, plant density, south-western Banat.*

SURVEY ON INCREASING RATES OF THE HERBICIDE STRATOS ULTRA (100 G/L CYCLOXYDIM) ON YIELD AND GRAIN QUALITY OF DUO SYSTEM MAIZE HYBRIDS

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Abstract

The Duo System technology in maize is extensively used in agricultural practice. It is characterized by the cultivation of cycloxydim-tolerant hybrids, while the herbicide ensures efficient control of monocotyledonous weed species, which may compromise grain yields and quality. Overall, the selectivity of the herbicide primarily depends on the application rate but the hybrids differ in their tolerance levels. A research for evaluating the effects of increasing rates of Stratos Ultra was conducted in the experimental field of the Agricultural University Plovdiv, Bulgaria. Three Duo System hybrids were grown - Zanetixx DUO, Hexxagone DUO, and Elaraxx DUO. Each hybrid was treated five increasing herbicidal rates ranging from 1.00 to 5.00 L ha^{-1}. The obtained results were compared to Untreated (Earthed-up) control. After harvesting, yields and grain quality parameters such as moisture, 1000 grain weight, hectoliter seed mass, protein, oil and starch content were estimated. Due to the increased rates of 4.00 and 5.00 L ha^{-1} of Stratos Ultra and the reported herbicide phytotoxicity significant decrease in grain yields and its quality was recorded.

Key words: *maize, tolerance, cycloxydim, yields, quality.*

EFFECTS OF MINERAL FERTILIZATION AND PLANT SPACING ON *Melissa officinalis* L. YIELD AND PREDICTIVE RELATIONSHIPS UNDER WESTERN ROMANIAN PEDOCLIMATIC CONDITIONS

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Abstract

Melissa officinalis L., commonly known as lemon balm, is a melliferous species from the Lamiaceae family, known and used since antiquity for its medicinal properties. The study investigated the impact of mineral fertilization and planting distance on yield and associated technological relationships in lemon balm cultivation. The bifactorial experiment included three levels of nitrogen fertilization (N0, N30, N60) and two planting densities (50/30 and 60/30), arranged in a randomized block design with four replications. Fresh and dry biomass yields were determined, along with the contribution of each factor to total production. Statistical analysis focused on assessing the significance of differences using ANOVA, as well as on linear correlations among factors and regression coefficients, with the aim of identifying predictive relationships between technological inputs and plant response. Preliminary results highlight a significant influence of mineral fertilization on yield, enhanced by optimal planting densities, with relevant interactions between factors. Calculated correlations indicate direct relationships between fertilization level and biomass performance, while regression models outline predictive trends useful for developing sustainable cultivation technologies.

Key words*: lemon balm, mineral fertilization, plant spacing, biomass yield, regression analysis.*

COMPARATIVE STUDY BETWEEN WINTER WHEAT VARIETIES OF DIFFERENT ORIGINS REGARDING THE VALORIZATION OF WATER ACCUMULATED THROUGH PRECIPITATION DURING THE PERIOD 2023-2025 AT CARACAL

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Abstract

During the period 2023-2025, a wide range of winter wheat varieties of different origins were sown at SCDA Caracal. In addition to the local varieties, were sown varieties from France, Germany, Austria, Serbia, Hungary, marketed or tested in Romania by the companies: Syngenta, KWS, Donau Saat, Limagrain, Saaten Union, RAGT, Lidea, Axereal, Biocrop. In the agricultural year 2022-2023, there was a surplus of precipitation over the entire growing season for wheat (+67.3 mm), the surplus months being November, January, April and May, all against a background of low temperatures. The years 2023-2024 and 2024-2025 recorded a deficit of precipitation over the entire vegetation period but also surplus months - November and May, due to low temperatures, in both years and December only in 2024-2025, due to high temperatures. All these data were reported to the 35-year normal for the area. Distributions of the productions were made depending on the precipitations in certain phenophases and the coefficients of productions variability were calculated in order to identify the productively stable wheat varieties, regardless of climatic conditions.

Key words*: wheat, precipitation, production, stability, climatic conditions.*

EVALUATION OF AGRONOMIC PERFORMANCE IN BEAN (*Phaseolus vulgaris* L.) GENOTYPES FROM LOCAL, REGIONAL, AND INTERNATIONAL COLLECTIONS

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Abstract

Under the agro-ecological conditions of ARDS Secuieni during 2024-2025, 60 bush bean (Phaseolus vulgaris L.) genotypes originating from local (Neamț County), national (Romania), and international germplasm (Macedonia, Serbia, Republic of Moldova, Italy, Nepal, USA) were evaluated to identify drought- and heat-tolerant forms. Key agro-morphological traits included vegetation period (85-112 days), flowering dynamics, thousand-seed weight (180-420 g), and yield. The results showed significant variability ($p < 0.05$), with an average yield of 1,550 kg·ha^{-1} and a wide range from 0 to 4,203 kg·ha^{-1}. Local germplasm exhibited greater phenological stability, while non-local genotypes displayed higher agronomic variability. The top-performing genotypes were POPTR1, GGSe4, BGR30, GGMa9, POPMOLD3, and BGR25, which significantly exceeded the experimental mean, reaching yields of 2,500-4,203 kg·ha^{-1} and demonstrating strong adaptability to climatic stress. These findings highlight the decisive role of genetic factors in crop performance and support their inclusion in breeding programs and multi-location trials.

Key words*: bush bean, climate resilience, drought tolerance, genotype evaluation.*

EFFECT OF DIFFERENT TYPES OF MINERAL FERTILIZATION ON YIELDS AND SOME PHYSIOLOGICAL CHARACTERISTICS IN FIELD BEANS

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Abstract

The study was conducted within the Longstanding Stationary Fertilizer Experiment (LSFE) in IASS "Obraztsov chiflik", Rousse with the aim of establishing the influence of different options of mineral fertilization on yield and some physiological characteristics, including resistance to environmental stress in field beans. It was found that the highest yield for the period - 1,070 kg ha^{-1} - was obtained in the experimental plot with combined N_5K_7 fertilization, represents nearly 70% increase compared to the average yield of the control. The content of photosynthetic pigments in the leaves of field beans varies significantly in different fertilization options, with the highest levels of chlorophyll a+b being found in the variant with nitrogen fertilization (N_5) - 1.520 mg g^{-1}. The variants with combined N_5P_{12} fertilization stand out as the most resistant to atmospheric drought during the four-year research period, with the reported values - 98.28μS cm^{-1}, being 9,8% lower, compared to the control. The highest resistance to soil drought was established again in the variants with combined N_5P_{12} fertilization (500.00μS cm^{-1}) and the lowest - within the control (711.58μS cm^{-1}).

Key words: *chlorophyll, field beans, mineral fertilizers, physiological characteristics, yield.*

EFFECTS OF CULTIVAR, LOCATION, AND NITROGEN FERTILIZATION LEVEL ON MORPHOLOGICAL AND YIELD TRAITS OF SOYBEAN (*Glycine max* L.)

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Abstract

The present study evaluated the effects of cultivar, location, and nitrogen fertilization level on the morphological and yield traits of soybean (Glycine max L.). Field experiments were conducted at four locations - Caracal, Crișcior, Jimbolia, and Grabat - under different pedoclimatic conditions. Two soybean cultivars, Amyata and Orakel PZO, were evaluated using three nitrogen fertilization levels (N75, N125, and N150) in a factorial experimental design. The analyzed traits included plant height, number of nodes, height of first pod insertion, number of pods per plant, thousand-seed weight, and hectoliter mass. The results revealed significant differences between cultivars for most of the analyzed traits, reflecting distinct genetic characteristics. Location significantly influenced all morphological and yield traits, highlighting the impact of environmental conditions on soybean development. Nitrogen fertilization level had a significant effect on plant architecture and seed physical characteristics, with variable responses depending on cultivar and location. Significant interactions among cultivar, location, and nitrogen fertilization level emphasize the importance of optimizing nitrogen management according to local conditions in order to improve soybean productivity and seed quality.

Key words*: location, morphological traits, nitrogen fertilization, soybean, yield traits.*

IMPACT OF NITROGEN FERTILIZATION ON YIELD AND QUALITY TRAITS OF SOYBEAN UNDER DIFFERENT PEDOCLIMATIC CONDITIONS

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Abstract

This study evaluated the impact of nitrogen fertilization on yield and quality traits of soybean (Glycine max L.) under different pedoclimatic conditions. Field experiments were conducted at four locations - Caracal, Crișcior, Jimbolia, and Grabat - using two soybean cultivars (Amyata and Orakel PZO) and three nitrogen fertilization levels (N75, N125, and N150) arranged in a factorial design. Seed yield, oil content, protein content, and harvest moisture were assessed. Soybean yield was significantly influenced by environmental conditions, with mean yields ranging from 1968.6 kg ha^{-1} at Caracal to 3011.9 kg ha^{-1} at Jimbolia, while intermediate values were recorded at Crișcior (2726.1 kg ha^{-1}) and Grabat (2631.1 kg ha^{-1}). Across cultivars, Orakel PZO achieved a higher mean yield (2662.6 kg ha^{-1}) compared to Amyata (2506.3 kg ha^{-1}). Nitrogen fertilization significantly affected yield and seed quality traits, with variable responses depending on location and cultivar. Oil and protein contents showed contrasting trends in relation to nitrogen level, while harvest moisture was mainly influenced by site-specific conditions. These results highlight the importance of optimizing nitrogen management according to local pedoclimatic conditions to improve soybean productivity and seed quality.

Key words*: soybean, nitrogen fertilization, yield, oil content, protein content.*

RESEARCH ON THE BIOLOGICAL CONTROL OF CERTAIN PEST AGENTS IN POTATO CULTIVATION IN THE FAMILY FARM, SÂNZIENI, COVASNA COUNTY

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Abstract

The aim of the research was to monitor the attack of the stem and tuber nematode of potato (Ditylenchus destructor) and the pathogen Rhizoctonia solani in plots at the Sânzieni location, Covasna County, under the climate conditions of 2025. The biological material studied consisted of potato genotypes for chips, for frying and for table use. Treatments were applied with the ecologically certified products Artis® 2.5 kg/ha and Idemio® 0.5 kg/ha, and their efficacy was calculated. In the Opal variety, in the „Moacsa I" plot, Rhizoctonia was detected with an attack severity value of 30%, while the presence of the nematode was not detected. The incidence of the nematode D. destructor was 100% in the other plots of the research site. The application of the treatments had an efficacy of 95% in controlling the fungus R. solani. The efficacy of the treatments in combating the stem and tuber nematode was 98.33% for the Opal variety in the Moacsa II plot and 97.96% for the Prada genotype (Class A - uncertified) in the "Bane" plot.

Key words*: pest, genotype, control, effectiveness.*

IDENTIFICATION OF POTENTIAL PARENTS AND PROMISING CROSSES BASED ON COMBINING EFFECTS FOR IMPROVING PRODUCTIVITY AND FIBER QUALITY IN COTTON

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Abstract

The object of this study was 59 F_1 hybrid populations obtained from three schemes of line × tester crosses. The aim was to find the most promising F_1 crosses for improving productivity, lint percentage and fibre length of new cotton varieties. In 2022 and 2023 the crosses and their parents were included in three trials carried out by the block method design in three replicates. The highest values of total GCA effects of the two parents for each trait were taken as "ideal" and the Euclidean distances between them and the GCA effects of both parents were calculated for each F_1 cross. The crosses with the shortest Euclidean distances were considered as the most reliable for the selection. Some crosses were found to exhibit the highest possible GCAs for the three studied traits and appeared to be the most valuable for the breeding programs. There were identified good general combiners for the three traits under study. Some cross combinations showed high and positive SCA effects and heterosis manifestations. Heterobeltiosis was also registered for the three traits most strongly expressed in productivity per plant.

Key words*: cotton, line × tester crosses, combining ability, Euclidean distance.*

ASSESSMENT OF CADMIUM (Cd) CONTENT IN PEANUTS FROM MAIN PEANUT PRODUCING AREAS OF TÜRKIYE

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Abstract

Peanut seeds are consumed in different forms in Turkey, such as different snacks, candies and peanut butter. Therefore, in addition to determining the nutritional properties it contains, it is necessary to determine the elements that pose a danger to human health. Cadmium is one of these harmful elements and it is very important to determine the amount in the produced peanut seeds. 79% of the peanut cultivation area and 81% of production in Turkey takes place in the cities of Adana and Osmaniye. It was determined that the amount of Cd in the seeds of 17 peanut samples taken from some fields in Adana-Ceyhan and Osmaniye, where peanuts are produced intensively, varied between 0.1-1.35 mg kg^{-1}.

Key words*: peanut, cadmium, heavy metal, pollution.*

AGRO-BIOLOGICAL RESPONSE OF GRAIN SORGHUM TO FOLIAR MINERAL FERTILIZATION AND BIOSTIMULANT APPLICATION

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Abstract

Grain sorghum (Sorghum bicolor L.) is a cereal crop of significant importance in agriculture, valued for its adaptability to diverse pedoclimatic conditions and drought resistance, and is used both for forage and human consumption. The experiment was conducted at the Agricultural Research and Development Station Secuieni, Romania (26°5' E; 46°5' N), during 2022-2024, aiming to evaluate the effect of foliar application of three products, Basfoliar 36 Extra, Terra Sorb, and Aminosol®, on the Albanus hybrid. The results highlighted a positive agro-biological response of the hybrid to foliar treatments, reflected in improved plant growth and development, as well as higher grain yield compared to the untreated control. The study emphasizes the importance of efficient use of foliar fertilizers and biostimulants in optimizing plant nutrition, contributing to increased yield and improved quality of grain sorghum.

Key words*: biostimulants, drought, foliar fertilizers, sorghum, yield.*

INFLUENCE OF THE PARENTAL FACTOR ON THE PRODUCTIVITY ELEMENTS OF WHEAT SPIKE

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Abstract

The mass of grains per spike is one of the important characteristics underlying the productive potential of the wheat genotype (Triticum aestivum L.). The research was carried out on some parents, F_2 hybrids originating from reciprocal F_1 hybrids. It were performed: i) morphometric analyses of the main productivity elements of the spike; ii) correlational, cluster analyses; iii) calculation of the degree and frequency of transgressions. It were established: i) significant differences in the correlational dependencies of characters within the spike; ii) the influence of the parental factor on the transgressive potential of the segregating combination; iii) clusters of parents / populations with different levels of productivity elements. The successful orientation of the crossing to obtain F_1 hybrids of common wheat contributes to the efficient exploitation of the productive potential of the spike in F_2 hybrid combinations, the process being an additional source of variability in segregating populations that is reflected in the degree and frequency of valuable transgressions.

Key words: *common wheat, productivity, parental factor, correlations, transgressions*.

CORN RESILIENCE: INFLUENCE OF TEMPERATURE CHANGES AND BIOREGULATORS ON GERMINATION CHARACTERISTICS AND YIELD

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Abstract

Based on research data and practical observations, the effect of temperature changes on the characteristics of corn germination was analyzed and the role of JS bioregulator, isolated from Juniperus sabina L. *plants and used in increasing corn resistance to abiotic stress was assessed. The studies were conducted on corn hybrids Porumbeni 465 (P465) and Porumbeni 398 (P398) with dent (P465) and flint (P398) grain endosperm in laboratory and field conditions. The modification of root/ seedling length and vigor, as well as metabolic efficiency of corn germination under influence of low (10°C) and high (50°C) temperatures and impact of natural growth regulator JS were also established. Comparison of germination characteristics in laboratory studies with corn emergence in the field and its yield made it possible to establish their correlation relationships, some of which were quite strong (≥0.65). In conclusion, it should be noted that the differences between the studied hybrids in physical structure, chemical composition of grain and maturity time are reflected in their resilience to temperature stress and response to treatment with a bioregulator.*

Key words*: corn seed, non optimal temperatures, bioregulator, growth characteristics, correlation.*

GERMINATION RESPONSES TO SEED PELLETING IN ALFALFA AND IMPLICATIONS FOR FORAGE PRODUCTION

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Abstract

Alfalfa (Medicago sativa L.) is a key forage crop that requires an integrated understanding of technological, environmental, and genetic factors. Selecting appropriate varieties for pure stands or for mixtures, adapted to local ecopedoclimatic conditions, is essential for optimizing production systems. Although seed pelleting is widely recognized for its beneficial effects, further refinement of this technique through targeted testing on Romanian alfalfa varieties is needed, especially under increasing climatic variability. The limited number of studies addressing this technological component underscores the importance of new research that leverages existing national expertise and the adaptive potential of Romanian cultivars, which frequently perform well in arid environments. To investigate germination-related responses to pelleting, a laboratory experiment was conducted on the Romanian variety Dobrogea, comprising unpelleted seeds (control) and six pelleted treatments differing in composition and color. Parameters assessed included seed purity, germination rate, thousand-seed weight, seedling quality, number of dead seeds, etc., complemented by microscopic measurements using the Motic Panthera L Series. The study aims to enhance technological elements of alfalfa cultivation and support climate-resilient forage production in the central Romanian Plain.

Key words*: Alfalfa cultivation, seed pelleting, germination performance, Dobrogea variety, microscopical analysis.*

THE EFFECT OF PHYTOSANITARY TREATMENTS ON WHEAT CROP (*Triticum aestivum* L.) AGAINST *Zymoseptoria tritici* (Desmazières) Quaedvlieg & Crous AND *Blumeria graminis* F. sp. *tritici* (Decandolle) Speer

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Abstract

Wheat (Triticum aestivum L.) is one of the most important and widely cultivated cereals; however, grain yield can be significantly affected by pathogen attacks, especially Zymoseptoria tritici (Desmazières) Quaedvlieg & Crous and Blumeria graminis (de Candolle) Speer. These pathogens reduce photosynthesis, affect plant vigor, and cause significant yield losses. To reduce these losses, it is necessary to use specific plant protection products containing active substances with different modes of action. This research was carried out in Iași County and includes observations on crop phytotoxicity and vigor, the severity and incidence of pathogen attacks, as well as the effectiveness of treatments. The studied variety was FDL Miranda, on which 14 plant protection products were applied. Following the conducted research, it was observed that the wheat plants did not exhibit phytotoxicity to any of the applied products, and the crop vigor was very good. The pathogen Zymoseptoria tritici recorded the lowest attack severity of 6.00% when the product Priaxor EC (1.0 L/ha) was applied, while for Blumeria graminis, the variant treated with Revycare (1.5 L/ha) recorded the lowest attack severity of 4.83%.

Key words*: diseases management, plant protection product, treatment, winter wheat.*

IMPACT OF PD-04_DR-02_P4 GREEN COVER CROPS ON THE PRODUCTIVITY OF MAIZE HYBRIDS

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Abstract

This study assessed the agronomic and environmental effects of pea (Pisum sativum L.) green cover crops, implemented under the PD-04_DR-02_P4 agri-environmental scheme of the Romanian Strategic Plan (PNS 2023-2027), on drought-tolerant maize hybrids cultivated in the semi-arid Dobrogea region. Field trials (2024-2025) at Săcele, Constanța County, used two Pioneer AQUAmax® hybrids: P8834 (FAO 360) and P9903 (FAO 390), to evaluate the contribution of legume-based cover crops to soil improvement and yield stability. The 2025 season was extremely dry (124 mm rainfall), resulting in severe water stress. Plots previously cultivated with pea produced 25-30% higher yields (1.10-1.30 t ha^{-1}) than the control, due to improved soil friability, 10-12% higher NDVI, and enhanced biological nitrogen input (≈ 30-40 kg N ha^{-1}). The early hybrid P8834 achieved yields comparable to P9903, confirming its drought-escape advantage. These findings demonstrate that integrating pea cover crops with drought-tolerant maize hybrids strengthens soil structure, increases water retention, and stabilizes yield under extreme drought. The results validate the PD-04 eco-scheme as a cost-effective measure for climate-smart agriculture in southern Romania and similar semi-arid regions.

Key words*: biological nitrogen fixation, cover crops, Dobrogea, drought, maize hybrids, PD-04_DR-02_P4.*

RESEARCH ON THE BIOLOGY AND PRODUCTIVITY OF THE *Phacelia tanacetifolia* Benth. SPECIES IN THE CLIMATE CONDITIONS OF CENTRAL MOLDOVA

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Abstract

Phacelia is used in several climatic regions, and this illustrates its adaptability to different climates and soil types. This species is an annual herbaceous, non-leguminous, flowering plant of the Hydrophyllaceae family. It is also a versatile crop, widely used in the USA and Europe, both in crop rotation and as a source of nectar for bees. The main objective of the present research was to study the biology and productivity of the species Phacelia tanacetifolia Benth. with the aim of understanding its adaptability to the climatic conditions in Central Moldova in the period 2023-2024. Phacelia, depending on the sowing season, reaches maturity between 85-97 days from sowing, and the optimal time for harvesting is when the inflorescences have dried and the seeds have a brown color. Under the conditions at A.R.D.S. Secuieni the highest seed production was obtained with the variant sown in the first decade of April of 415 kg/ha and at a distance of 50 cm between plants/row (395 kg/ha).

Key words*: phacelia, epoch of sowing, seed.*

EFFICACY AND SELECTIVITY OF THE HERBICIDES EXPRESS 50 SG AND PANTERA 40 EC ON SUNFLOWER

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Abstract

In 2024 and 2025, a field trial was conducted with ExpressSun® sunflower, hybrid P64 LE185. The experiment was set up in a production field of the Agricultural University-Plovdiv, Bulgaria. The herbicides Express 50 SG (500 g/kg tribenuron-methyl) for the control of dicotyledonous weeds and Pantera 40 EC (40 g/l quizalofop-P-tefuryl) for the management of monocotyledonous weeds were tested. The herbicides used were applied vegetatively, in the phenophase of the fourth-sixth leaf of the crop (BBCH 14-16). Weeding of the experimental field was represented by: Sinapis arvensis L., Amaranthus blitoides L., Datura stramonium L., Convolvulus arvensis L., Setaria glauca L. and Sorghum helepense (L.) Pers. Weeding with the established weeds is the reason for obtaining a very low average yield from the untreated control (1.05 t ha-1). Herbicidal efficacy was reported on the 10-point EWRS scale. The highest biological grain yield was obtained after the use of Express 50 SG applied in combination with Pantera 40 EC. The 9-point EWRS scale was used to determine the selectivity of the herbicides.

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

STUDY ON THE BEHAVIOR OF SOME INDIGENOUS WHEAT VARIETIES IN THE PEDOCLIMATIC CONDITIONS OF THE BRĂILA PLAIN DURING THE PERIOD 2022-2025

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Abstract

This work aims to highlight the productive capacity of some indigenous wheat varieties in the pedoclimatic conditions of the Brăila Plain. The experience was carried out over a period of three years, namely the agricultural years 2022-2023, 2023-2024 and 2024-2025. The varieties used in the crop were some established in the agriculture of our country as well as some newly established varieties with the aim of improving the range of varieties used over the years by Romanian farmers. The wheat varieties used were the following: Glosa, Otilia, Pitar, Izvor, Ursita, Voinic, FDL Abund, FDL Columna, FDL Consecvent, FDL Evident, Şimnic 1412, Dacic and Biharia. Although the local agricultural area is characterized by a multiannual level of 442 mm precipitation and an average temperature of 10.9°C, the three years of the study were climatically varied. It is noteworthy that the yields obtained over the years varied between 7700 kg and 10600 kg/ha, being characterized as high yields.

Key words*: wheat varieties, production, Brăila Plain, pedoclimatic conditions.*

RESEARCH ON OPTIMIZING RAPESEED CULTIVATION TECHNOLOGY IN SOUTHERN ROMANIA

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Abstract

At the global level, the area cultivated with rapeseed has expanded in recent decades, driven by the demand for edible oil and biodiesel and by its role in crop rotations; the literature indicates a sustained increase in harvested area, reaching over 40 million ha at present, compared to ~31 million ha in 2009. In the EU, the area under rapeseed can fluctuate significantly from one year to another depending on prices, policies, and climatic risk. In Romania, the area has increased in years with favorable autumns, with a maximum of over 700,000 ha (in autumn 2024), but production remains highly volatile due to hydric/thermal stress and overwintering. Tillage systems decisively influence the crop: plowing provides a "clean" seedbed, but may amplify water loss; minimum-till/no-till conserves moisture and reduces erosion, potentially improving stability in dry years, but increases the risk of uneven emergence on residues, surface compaction, and slug/disease pressure. In practice, strip-till (band) is often an efficient compromise for rapeseed.

Key words*: rapeseed (Brassica napus L.), soil tillage systems, sowing scheme, sowing density, yield stability.*

CHARACTERISTIC OF MORPHOBIOLOGICAL AND ECONOMICALLY VALUABLE TRAITS OF WINTER TRITICALE VARIETIES IN THE TRANSITIONAL-CONTINENTAL REGION OF BULGARIA

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Abstract

A comparative study of modern Bulgarian and Polish winter triticale varieties over four growing seasons was conducted, after a predecessor of sunflower under unfertilized conditions on Pelic Vertisol. The length of the growing season and the days to heading were characterized based on the number of days with active temperature above 5°C, as well as the variability of productivity and the elements of productivity: plant height, number of grains in a spike and mass of 1000 grains. The results on average for the period showed that the Colorit variety had the shortest growing season (163 days) and the shortest period from sowing to heading 112 days). The duration of the growing season was longest for Casino variety (169 days). The period from sowing to heading was the longest for Avocado and Casino varieties (119 days). Environmental conditions had a dominant effect on yield, number of grains per spike and plant height, while the variety had a dominant effect on thousand-grain mass. The Casino and Avocado varieties demonstrated the best results in terms of thousand-grain mass and grain yield, while the Colorit variety showed the highest number of grains per spike.

Key words*: elements of productivity, grain yields, length of the growing season.*

INFLUENCE OF NITROGEN FERTILIZATION STRATEGIES ON YIELD AND TECHNOLOGICAL QUALITY PARAMETERS OF WHEAT

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Abstract

Nitrogen fertilization is a key factor influencing wheat productivity and technological quality. This study evaluated the impact of different nitrogen fertilization strategies, applied in three growth stages, on grain yield and quality parameters of wheat. Total nitrogen rates ranged from 530 to 780 kg/ha, and their effects on grain yield, protein content, wet gluten, Zeleny sedimentation index, and thousand kernel weight were assessed. Grain yield varied between 6,240 and 6,710 kg/ha, with higher nitrogen rates generally resulting in increased yields. Protein content ranged from 16.0 to 16.2%, while wet gluten content varied between 29 and 33%, indicating an improvement in technological quality with increased nitrogen supply. The Zeleny sedimentation index showed relatively stable values (59-60), suggesting a consistent baking quality across treatments. Thousand kernel weight ranged from 40.1 to 44.9 g. The results demonstrate that optimized, stage-specific nitrogen fertilization enhances both yield and grain quality, while excessive nitrogen inputs provide limited additional benefits. These findings support the need for balanced nitrogen management in sustainable wheat production.

Key words*: grain yield, protein content, wheat, wet gluten.*

RESEARCH ON THE COMPETITIVENESS OF SOME PERENNIAL GRASS AND LEGUME SPECIES IN SIMPLE MIXTURES, UNDER THE CONDITIONS OF ARDS SECUIENI

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Abstract

The experiment was located within the ARDS Secuieni during the period 2023-2025. The aim of the research was to analyze the competition relationships between the species Phleum pratense L. *and Trifolium pratense* L. *cultivated alone or in simple mixtures, under different fertilization conditions with complex mineral fertilizers. In the second year of vegetation, the RYT (Relative Yield Total) index was calculated, which recorded values >1 except for the unfertilized variant and sown with the mixture of Phleum pratense* L. *(25%) + Trifolium pratense* L. *(75%), showing that the species Phleum pratense* L. *and Trifolium pratense* L. *compete for the same vegetation factors. and the CR index (Competition Rate) for the species Phleum pratense* L. *was higher than for the species Trifolium pratense* L.*, resulting in the grass species being more competitive.*

Key words*: mixtures of species, fertilization, RYT (Relative Yield Total), CR (Competition Rate).*

RESEARCH ON DOWNY MILDEW ATTACK IN *Camelina sativa* UNDER FIELD CONDITIONS IN DRACEA, TELEORMAN COUNTY IN 2025

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Abstract

Camelina sativa has attracted increasing scientific interest due to the valuable composition of its oil and its high adaptability to different pedoclimatic conditions. The main objective of this research was to evaluate the level of downy mildew (Peronospora camelinae) attack in camelina crops under field conditions. The research was conducted in 2025, in Dracea, Teleorman County. The experiment included two camelina cultivars, Mădălina and Camelia. Phytosanitary assessment was carried out by determining the frequency, intensity of attack, and degree of attack for each analyzed cultivar. The results highlighted a downy mildew attack value of 21% in the Mădălina cultivar, while the Camelia cultivar recorded a higher attack level of 29%.

Key words*: Camelina sativa, downy mildew, Peronospora camelinae, genotype.*

IDENTIFICATION OF PATHOGENS CAUSING LEAF SPOTS ON DURUM WHEAT VARIETIES IN BULGARIA AND DESCRIPTION OF THEIR SYMPTOMS

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Abstract

In the experimental field of Field Crop Institute - Chirpan, 12 varieties of durum wheat selected by the institute are sown annually.The dynamics of the appearance and development of leaf spots during the growing season were monitored. The main method for determining the species composition of fungal pathogens is the comparative-morphological one. Symptoms are described on naturally infected durum wheat plants and compared with those on common wheat caused by the respective pathogens. The identification was made by direct observation of the structures of the pathogens formed on plant tissue and during cultivation in nutrient media - potato-dextrose agar, water agar, malt extract agar, oat agar, Synthetischer nährstoffarmer agar, Shear's solution and is based on a set of morphological and cultural characters. The characters with the highest taxonomic value were taken into account: morphology and sizes of asexual and sexual mating, colony morphology. The most widespread on durum wheat are the fungal species that form a mass sexual stage in the conditions of Bulgaria: Pyrenophora tritici-repentis, Parastagonospora avenae f. sp. triticea, Monographella nivalis, Cladosporium herbarum.

Key words*: Cladosporium herbarum, fungal pathogens, Monographella nivalis, Parastagonospora avenae f. sp. Triticea, Pyrenophora tritici-repentis.*

STUDY ON THE AGRONOMIC AND PRODUCTIVE TRAITS OF WINTER CEREALS GROWN SOLE AND AS MIXED CROPS

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Abstract

There is a limited information for the growing of winter cereals in mixed cropping system. Therefore, a field experiment in two growing seasons (2023/2024 and 2024/2025) was conducted. The trial was performed on the lands of the Agricultural University of Plovdiv, Bulgaria. Variants of the experiment were: 1. Winter wheat - variety `Sofru` (sole crop); 2. Winter wheat - variety `Solindo` (sole crop); 3. Winter wheat - variety `Sofru` + winter wheat - variety `Solindo` (mixed crop); 4. Winter barley - variety `Odyssey` (sole crop); 5. Winter barley - variety `Odyssey` + winter wheat - variety `Sofru` (mixed crop); 6. Winter barley - variety `Odyssey` + winter wheat - variety `Solindo` (mixed crop); 7. Rye, variety `Millennium` (sole crop). Differences were found in the height of the plants and the ear length, as well as the 1000 grain weight and the hectoliter mass of the seeds in mixed crops. The highest yield was recorded when the wheat variety `Solindo` was sown alone. Regarding barley, a higher yield was recorded when it was grown together with the wheat variety `Solindo`.

Key words*: winter cereals, sole crops, mixed cropping.*

COMPARATIVE STUDY ON ANALYTICAL VARIABILITY OF PHYSICAL PURITY IN SEED TESTING LABORATORIES

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Abstract

This study presents a comprehensive six-year analysis (2019-2024) of inter-laboratory analytical variability across Romania's 30-laboratory seed testing network through 11 biannual proficiency testing rounds. Following ISTA Standard Proficiency Test (PT-P-01) methodology, the research examined all three purity components across 11 crop species representing diverse ISTA crop groups. Mathematical analysis revealed that while overall physical purity demonstrated exceptional standardization (mean CV 0.36%), constituent components exhibited dramatically different variability patterns due to mathematical amplification effects in constrained compositional systems. Inert matter showed extreme variability (mean CV 70.7% - 197-fold higher than purity), other seeds demonstrated intermediate variability (CV 32.0% - 89-fold higher), while pure seed maintained exceptional consistency. This component-specific analysis reveals that traditional purity-focused proficiency testing masks substantial analytical complexity at component level. Z-score analysis confirmed outstanding network competency (95.45% excellent ratings), validating that observed variability reflects mathematical constraints and biological factors rather than analytical incompetence. The study demonstrates that mechanical separation methodology achieves chemical-procedure precision under quality-assured conditions, while providing new insights into compositional data analysis for seed testing networks.

Key words*: physical purity, inter-laboratory variability, seed testing laboratories, components, quality assurance.*

RESEARCH ON ANALYTICAL VARIABILITY OF GERMINATION DETERMINATION IN SEED TESTING LABORATORIES

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Abstract

The study presents results obtained from research on analytical variability of germination determination from the period 2019-2024, based on 11 testing rounds with 30 laboratories from the territorial seed testing network. Data analysis reveals significant variability between laboratories and uncovers that the analytical complexity of biological evaluation of germination is far from uniform across species. Compositional data analysis reveals that high variability in minor germination components reflects mathematical closure effects rather than analytical deficiencies, explaining why laboratories achieve excellent ratings despite statistical variability in minor components. Three distinct categories are identified: species with predictable behaviour and consistent results between laboratories (low complexity), species with acceptable performance but requiring monitoring (moderate complexity), and species presenting significant analytical difficulties with large variability and confirmed extreme values (high complexity). This stratification reveals that some species are intrinsically more difficult to evaluate from a biological perspective, explaining divergences in laboratory performance. Results demonstrate that standardized training is insufficient for all species and that a differentiated approach is necessary, with species-specific protocols and additional training for problematic species.

Key words*: germination, analytical complexity, inter-laboratory variability, differentiated training.*

INVESTIGATION OF PRODUCTIVE AND NUTRITIONAL VARIABILITY IN SUNFLOWER HYBRIDS IN PEDOCLIMATIC CONDITIONS SPECIFIC TO THE WESTERN ROMANIA

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Abstract

This paper aims to analyzes the performance of five sunflower hybrids in the agricultural years 2023 and 2024 by evaluating physical and quality indicators. The experimental setup was located falls within the moderate continental climate with sub-Mediterranean influences, specific to the West of Romania, specifically Banat's microclimate. Average productions recorded significant increases in 2024, with an increase of around 16%, attributable to favorable climatic conditions and technological advances. Hybrids LE99 and SURELI HTS showed the highest yields, while AROMATIC SU showed the most modest results. Harvest humidity ranged between 4.0-5.5%, registering decreases in 2024 for all hybrids, confirming better ripening conditions; DAVERO stood out for its lowest values. Quality analyses indicated differences between hybrids, with LE99 demonstrating superior mineral content (2.99%), crude protein (19.33%) and total fat (35.73%), associated with a higher quality oil and a slightly higher energy value. The carbohydrate content ranged from 38.43% to 41.61%, with AROMATIC SU showing higher values. The results confirm the high agronomic and nutritional potential of the analyzed hybrids focusing on optimization of production and recovery processes.

Key words*: sunflower hybrids, productions, quality analyses.*

EVALUATION OF THE FORAGE QUALITY OF SOME MIXTURES OF AROMATIC MEDICINAL PLANTS AND GRASSLAND GRASS SPECIES WITH A VIEW TO OPTIMIZING THE NUTRITIONAL VALUE

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Abstract

Cultivated grasslands are composed of a diverse mix of plant species with different forage qualities. This study aimed to evaluate the quality of forage resulted from grassland grass species and aromatic medicinal plants, in order to optimize their nutritional value and forage potential. The study was conducted at ICDP Brașov, Romania, within a field experiment of 5 variants of plant mixtures with 20 species of aromatic medicinal plants and grasses. The main quality parameters that were analyzed were: crude protein (CP), total ash (ASH), crude fiber (CF), acid detergent fiber (ADF), lignin (ADL), neutral detergent fiber (NDF), digestibility dry matter (DMD) and digestibility organic matter (DOM). The highest CP content was obtained in variants V3 (20.33%) and V5 (19.50%), compared to the control variant V1 (17.40%). The highest ADF content was recorded in the control variant V1 (34.57%), compared to the other 4 variants, which recorded lower values, with positive implications on the quality of the feed. The correlations between the analyzed parameters showed that crude protein was positively correlated with total ash, dry matter digestibility and organic matter.

Key words*: aromatic medicinal plants, fodder quality, grasses, grassland.*

THE CURRENT STATE OF RESEARCH REGARDING THE USE OF BIOSTIMULANTS IN AGRICULTURE

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Abstract

Plant biostimulants represent one of the most dynamic categories of inputs used in contemporary agriculture, in the context of increasing pressures generated by climate change, soil resource degradation, the need to reduce the use of conventional fertilizers, and the requirement to maintain stable and high-quality yields. Building on this conceptual framework, the present article critically examines the current state of research on the main groups of biostimulants used in agriculture, with particular emphasis on their classification according to mode of action: biostimulants affecting nutrient uptake and nutrient use efficiency, root system development, antioxidant and anti-stress responses, plant metabolism, and the rhizosphere. A global meta-analysis conducted under field conditions reported an average yield increase of 17.9%, while some experimental studies recorded considerably higher increases in specific crops and formulations. However, the compositional heterogeneity of these products, the variability of biological responses, and the lack of methodological standardization still highlight the need for further validation, particularly to facilitate the transfer of findings from controlled experiments to sustainable commercial farming systems.

Key words: *biostimulants, sustainable agriculture, abiotic stress, nutrient use efficiency, plant productivity.*

INFLUENCE OF FERTILIZATION ON POTATO (*Solanum tuberosum* L.) YIELD IN THE BURNAS PLAIN

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Abstract

Organo-mineral fertilization in potato cultivation enhances plant growth and development by improving nutrient availability and uptake, which is reflected in changes in morphological and structural parameters. This study aimed to evaluate the effects of different fertilization schemes on the final yield of two potato cultivars grown under different irrigation regimes in the Burnas Plain during the 2024-2025 growing season. The experimental treatments included two potato cultivars (Anabelle and Red Lady) combined with different fertilization schemes consisting of varying doses of manure, urea, and mineral fertilizers containing nitrogen (N), phosphorus (P), and potassium (K). All fertilization treatments increased tuber yield compared with the unfertilized control, regardless of cultivar or irrigation regime. During the experimental year, the Anabelle cultivar recorded the highest yield under non-irrigated conditions (14.20 t/ha) in the NPK (20:20:0) treatment, while under irrigated conditions the maximum yield (24.49 t/ha) was obtained with 20 t/ha poultry manure + 111 kg/ha NPK (20:20:0). The Red Lady cultivar recorded maximum yields of 12.05 t/ha under non-irrigated conditions and 20.50 t/ha under irrigated conditions in the NPK (20:20:0) treatment.

Key words*: fertilization, irrigation regime, potato, tuber yield.*

THE ROLE OF REMOTE SENSING AND IoT-BASED MONITORING SYSTEMS IN ENHANCING MAIZE YIELD RESILIENCE UNDER DROUGHT STRESS

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Abstract

This research investigates the synergistic application of remote sensing and IoT- based monitoring systems to enhance maize yield resilience under drought stress. As climate variability intensifies, precise water management becomes critical. We deployed a network of in-field IoT sensors to continuously monitor soil moisture, temperature, and plant health parameters. Concurrently, drone-based multi-spectral and thermal imagery provided spatial data on crop water status and canopy temperature. These complementary datasets were integrated into a predictive irrigation model. Field trials over two growing seasons demonstrated that the technology-enabled treatment achieved a 22% reduction in water usage while maintaining maize yields comparable to fully irrigated control plots under moderate drought conditions. The system`s real-time analytics enabled pre-emptive irrigation scheduling, effectively mitigating moisture deficits during critical growth stages. Our findings confirm that integrating proximal (IoT) and remote sensing data provides a robust, scalable framework for improving water productivity and yield stability, offering a practical pathway toward climate-resilient maize production systems.

Key words*: precision irrigation, crop water stress, smart agriculture, yield stability, data fusion.*

WINTER TWO-ROW BARLEY YIELD RESPONSE TO SOWING DENSITY IN SOUTHEASTERN ROMANIA

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Abstract

*This study evaluated the performance of grain yield and its components of 19 winter two-row barley genotypes under two sowing densities: a reduced density of 350 germinable seeds/m² (D1) and a conventional density of 500 germinable seeds/m² (D2). Field experiments were conducted over three consecutive growing seasons (2020-2022) at the National Agricultural Research and Development Institute Fundulea, Romania, on chernozem soil. Total rainfall varied among years (310.4 mm in 2020, 523.2 mm in 2021, and 316.8 mm in 2022), while mean air temperature was ~2°C above the long-term average. Grain yield was significantly higher at D1, averaging 6426 kg/ha, compared with 6012 kg/ha at D2, a 6.9% increase. Correlation analysis showed strong positive associations between thousand kernel weight and seed weight per spike (r = 0.844***) and a significant negative correlation between yield and spike number (r = −0.347*), reflecting compensatory effects among yield components. These results indicate that reduced sowing density enhances individual plant performance and is an effective strategy to increase barley grain yield under Southeastern Romania conditions.*

Key words*: winter two-row barley, sowing density, yield components, climate variability.*

MAIN PESTS ATTACK ON POTATO AND SUGAR BEET CROPS IN THE CONDITIONS OF THE CENTRAL AREA OF MOLDOVA (ROMANIA)

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Abstract

During 2024-2025, under the conditions of the Central area of Moldova, the purpose of the research carried out was to establish the harmful organisms to sugar beet and potato crops, but also the degree of attack produced. The results obtained over the two years show that in sugar beet, the number of recorded pests varied, with nine insect species and two pathogens identified in 2024, and 12 species and two pathogens in 2025. The soil pest complex has been attacking since the emergence of the plants, with the highest attack rate observed in 2024, when adults of the Bothynoderes punctiventris species were present, at 16.5%. In 2025, the attack rate was 7.2% due to the presence of Cheatocnema sp. species. In potatoes, the most widespread pests were Leptinotarsa decemlineata, with the degree of attack between 0.7% and 22.3% in 2024 and between 10.9% and 100% in 2025, and the pathogen Phytophthora infestans produced attacks from 7.9% to 27.6% in 2024 and between 12.5% and 28.5% in 2025.

Key words*: potato, beet, attack, entomofauna, pathogens, climatic conditions.*

YIELD, QUALITY AND PHYSIOLOGICAL TRAITS OF MONOECIOUS HEMP (*Cannabis sativa* L.) AS INFLUENCED BY SOWING TIME AND FERTILIZATION

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Abstract

Hemp is gaining increasing interest due to its high yield potential and multiple uses. This study was conducted under field conditions at ARDS Secuieni to assess the influence of sowing time and fertilization on yield performance, physiological traits, and biochemical quality of an early monoecious hemp variety, using a bifactorial split-plot experimental design. The E1 × F1 combination enhanced vegetative biomass accumulation, resulting in the highest inflorescence biomass (5300 kg·ha^{-1} fresh and 1600 kg·ha^{-1} dry) and stem yield (4380 kg·ha^{-1}), whereas seed production reached its maximum under the E1 × F2 combination (3293 kg·ha^{-1}). The second sowing time (E2) was associated with the highest photosynthetic rate (14.5 µmol CO_2·m^{-2}·s^{-1}) and the greatest amount of carbon stored in the soil (68.3 t·ha^{-1}), while F1 fertilization recorded the highest photosynthetic rate (15.5 µmol CO_2·m^{-2}·s^{-1}). Moreover, the interaction between the second sowing time and F1 fertilization maximized vitamin C content (67.3 mg·100 g^{-1}) and soluble solids (12.3 °Brix). Overall, the results highlight the importance of appropriate sowing time and fertilization in improving productivity and quality in monoecious hemp.

Key words*: inflorescence biomass, stem yield, seed yield, photosynthetic rate, biochemical traits.*

WHEAT GRAIN QUALITY DEPENDING ON CULTIVATION TECHNOLOGY AND PREVIOUS CROP

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Abstract

Maintaining wheat quality in the context of climate change is a crucial challenge for ensuring food security and the economic value of agricultural production. In a difficult economic environment, farmers often tend toward cereal-dominated crop rotations, which increases the risk of yield and quality decline, particularly due to the unfavorable effect of preceding crops. The study comparatively evaluates the effect of conventional tillage and no-tillage on the yield and quality of winter wheat grains cultivated in a four-crop rotation, with soybeans, maize and winter rapeseed as preceding crops. The parameters analyzed include yield, crude fiber content, ash content, starch content, total fat, crude fiber and crude protein (both expressed on a dry matter basis), and moisture. The results confirm the clear influence of the preceding crop type and soil tillage system on wheat yield and quality, emphasizing the importance of choosing appropriate technologies to optimize crop performance, promote agricultural sustainability, and increase the competitiveness of the cereal sector.

Key words*: crop rotations, tillage, winter wheat.*

INTEGRATED MANAGEMENT OF TAN SPOT DISEASE IN WHEAT

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Abstract

Tan spot, caused by the necrotrophic fungus Pyrenophora tritici-repentis (Ptr), is one of the most damaging foliar diseases of wheat worldwide. The pathogen causes characteristic tan necrotic lesions with chlorotic halos, resulting in significant yield and quality losses. Effective management of tan spot requires an integrated approach that combines accurate disease diagnosis, timely intervention, and the use of both cultural and chemical control strategies. The integration of advanced computational methods with agronomic expertise offers a pathway toward scalable, objective, and effective disease management systems. This paper presents a synthesis of current integrated management strategies for tan spot disease in wheat, emphasizing the role of innovative digital tools, such as the WisWheat dataset and fine-tuned VLMs, alongside traditional agronomic practices.

Key words*: Tan spot, integrated management, wheat, digital tools, disease.*

YIELD AND GRAIN QUALITY RESPONSES OF WINTER WHEAT TO BIOSTIMULANTS UNDER REDUCED FERTILISER INPUTS

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Abstract

A field experiment was conducted in the UK to evaluate the efficacy of the biostimulants Converta and AminoMax on winter wheat (cv. Extase). All treatments, including Control, received 25% lower fertiliser inputs than standard full rates. Six treatments were arranged in a randomised complete block design with six replications. Converta was applied at two rates (1 and 3 Lha^{-1}) at first node detectable stage (BBCH GS 31). AminoMax was applied at 1kg ha^{-1} either alone or in combination with Converta at late milk development stage (BBCH GS 77). Yield components such as heads m^{-2} and grains per head did not differ significantly between treated and Control plots. Converta applied at 3 Lha^{-1} resulted in moderate increases in thousand grain weight and a non-significant yield rise of 9.9% relative to Control (10.85 t/ha). AminoMax had minimal effect on yield but increased grain protein content by 9.1% compared with Control (10.22%). Overall, Converta showed potential to enhance yield at higher doses, while AminoMax improved grain protein content, with applications timing identified as critical for optimal product performance, requiring further investigation.

Key words*: heat, biostimulants, Converta, AminoMax, grain yield, grain protein content.*

MULTIVARIATE STATISTICAL ANALYSIS OF PRODUCTIVE TRAITS IN POA PRATENSIS UNDER WESTERN ROMANIAN CONDITIONS

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Abstract

This study evaluated the growth performance and productive potential of smooth meadow-grass genotypes under the pedoclimatic conditions of western Romania. The local populations were analyzed from which 20 genotypes were selected, evaluated based on morphological and productive characters, such as bush diameter, plant height, number of generative shoots, leaf area and green mass per clone. Pearson correlation analysis revealed very strong positive relationships between green mass, bush diameter and number of generative shoots, underlining the importance of these characters in determining biomass production. Principal component analysis (PCA) and cluster analysis revealed the existence of significant phenotypic variability between genotypes and allowed the identification of groups with different levels of productivity. Overall, the results demonstrate that environmental conditions strongly influence vegetative development and the expression of productive characters, highlighting at the same time the potential for selection of valuable genotypes for Poa pratensis breeding programs.

Key words*: smooth meadow-grass, biochemical composition, biomass quality, generative shoots.*

EFFECTIVENESS OF APPLIED NITROGEN RATES IN BARLEY

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Abstract

The effectiveness of nitrogen rates 0, 40, 80 and 120 kg N.ha^{-1} on the productivity and the indexes Partial factor productivity and Agronomic efficiency of malting barley was studied in the experimental field of Agricultural University of Plovdiv, Bulgaria in the period of 2023-2025. The total nitrogen as NH_4NO_3 was applied as top dressing. The experimental design was a randomized, complete block design with four replications and a size of experimental plots of 18 m^2 after a sunflower as a predecessor. A high effect of low N40 fertilization of barley variety Emon has been proven in terms of PFP-N and AE-N indicators. The productivity per unit of soil and fertilizer nitrogen (PFP-N) for grain, for grain + straw and for grain protein exceeds 3.17, 2.93 and 2.93 times, respectively, those at the N120 rate in 2024 and 2.7, 2.5 and 2.2 times, respectively, in 2025.

Key words*: nitrogen, fertilization, effectiveness, barley.*

OPTIMIZATION OF ROW SPACING AND PLANT DENSITY FOR MODERN MAIZE HYBRIDS

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Abstract

Maize hybrid productivity is determined by a range of factors, including climatic conditions, technological inputs, and genetic material. During the 2024-2025 growing seasons, a field experiment was conducted at the Agricultural Research and Development Station (ARDS) Turda to assess the impact of three plant densities (65,000, 80,000, and 95,000 plants/ha) and two row spacing (70 and 50 cm) on the yield performance of four maize hybrids (Turda 2020, Turda 380, Turda 332, and Turda 344). The results demonstrate that maize yield varied significantly depending on climatic conditions and the interaction between row spacing and plant density. In 2024, higher yields were generally obtained at the reduced row spacing of 50 cm, while in 2025, the highest yields were recorded at the conventional spacing of 70 cm. Across the two experimental years, the density of 65,000 plants/ha produced the highest average grain yield, whereas higher densities slightly reduced productivity (by 230 kg/ha at 80,000 plants/ha). Hybrid response differed depending on environmental conditions and plant density. Row spacing, planting density, and hybrid selection are critical agronomic factors that directly affect plant architecture, resource use efficiency, and overall maize productivity.

Key words*: climatic conditions, plant density, row spacing, maize hybrids, yield.*

ASSESSMENT OF HETEROSIS PERFORMANCE IN SUNFLOWER HYBRIDS DERIVED FROM INBRED PARENTAL LINES

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Abstract

This study investigates the expression of heterosis in sunflower (Helianthus annuus L.) hybrids by analyzing their performance in comparison with newly developed parental inbred lines. The experiment was conducted under field conditions in Romania, within the experimental fields of the Agricultural Research Company Fundulea. A total of four sunflower hybrids and their corresponding parental inbred lines were evaluated. Key agronomic traits, including seed yield and selected morphological characteristics, were recorded and subjected to statistical analysis. Heterosis effects were quantified relative to both mid-parent and better-parent values, providing a comprehensive assessment of hybrid vigor. The results indicated consistent positive heterosis across most traits, with several hybrids surpassing their parental lines. Significant differences among genotypes ($p < 0.05$) emphasized the influence of genetic background on heterosis expression. Variability among hybrid combinations further highlighted the importance of selecting genetically diverse and complementary parental lines for breeding programs.

Key words*: sunflower hybrids, heterosis, inbred lines, hybrid vigor, genetic variability.*

EVALUATION OF THE BIOLOGICAL RESPONSE OF *Sorghum halepense* (L.) Pers. TO NICOSULFURON UNDER CONTROLLED AND FIELD CONDITIONS

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Abstract

Sorghum halepense (L.) Pers. is one of the most problematic perennial weeds in maize cropping systems and is commonly controlled using acetolactate synthase (ALS)-inhibiting herbicides such as nicosulfuron. This study evaluated the biological response of a local Sorghum halepense population to different nicosulfuron doses under controlled and field conditions in western Romania. Germination assays were conducted using increasing concentrations of nicosulfuron, while field experiments were established in a randomized design with three replications. Herbicide efficacy was assessed at 14 and 28 days after application (DAA). Germination was significantly reduced with increasing herbicide concentration; however, inhibition was not complete even at the highest tested dose. Under field conditions, nicosulfuron resulted in low control levels at 14 DAA (2-18%), while a moderate increase in efficacy was observed at 28 DAA, reaching a maximum of 40% at a dose of 100 g a.i. ha^{-1}. Plants originating from rhizomes were poorly controlled, whereas seed-derived plants exhibited higher sensitivity. These results indicate reduced sensitivity of the studied Sorghum halepense population to nicosulfuron, possibly associated with repeated use of ALS-inhibiting herbicides.

Key words*: herbicide efficacy, maize, nicosulfuron, reduced sensitivity, Sorghum halepense.*

THE USE OF SENSORY VEGETATION INDICES IN POTATO CLONAL SELECTION FOR THE IDENTIFICATION OF RESILIENT GENOTYPES

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Abstract

At NIRDPSB Brasov, in order to evaluate the response to the thermo-hydric stress of 2025, NDVI and SPAD vegetation indices were dynamically evaluated. Their quantification allowed obtaining a predictive image on the growth, development and adaptive capacity of plants, underpinning the efficient selection of the most valuable potato genotypes. Of the 28 genotypes evaluated in relation to the control variety Castrum, genotypes 1979/5, 2011/5 and 2018/1 maintained a high photosynthetic capacity until the end of the season (late maturity), unlike the genotype 2151/10 which, although it preserved a reasonable leaf cover (NDVI 0.89), manifested rapid cellular senescence through drastic pigment degradation (decrease to 38.8 SPAD units), standing out as a potential new early potato variety.

Key words*: breeding, NDVI, SPAD, phenotypic selection.*

RESEARCH ON THE INFLUENCE OF SOWING TIME ON THE HEIGHT OF CORN GROWN IN THE CARACAL AREA

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Abstract

Six Corteva hybrids placed in three FAO groups (300-350, 350-450, 450-500): P 8834, P9398, P9889, P9944, P0450, P0710, were sown on four different dates, two weeks apart, on the chernozem of Caracal in 2024 and 2025. The aim of the paper was to establish the influence of the sowing date on the height as well as to carry out the distribution of yields according to the height of the plants but also to the earliness groups. The distribution of the height according to the FAO groups was also established. The height was influenced by the sowing period, the ascending order of the height values being period I, period II, period IV and period III. The distribution of yield by height showed that the most productive hybrids were placed in the 190-200 cm and over 200 cm height groups. Regardless of the sowing date, among the tested hybrids, the P0710 hybrid from the FAO 450 group was the most productive - 7087 kg/ha.

Key words*: corn, sowing season, chernozem, height, yield.*

TECHNOLOGICAL AND BIOCHEMICAL PARAMETERS OF *Triticum durum* INFLUENCED BY NPK FERTILIZATION

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Abstract

The aim of the study was to track the change in the values of some technological and biochemical parameters under the influence of prolonged application of synthetic nitrogen, phosphorus and potassium. The experiment was conducted in the experimental field of the Field Crops Institute-Chirpan, Bulgaria. The study showed data from 2020/2024. The results of the study showed that meteorological conditions strongly influenced the biochemical traits and to a small extent on the technological parameters. Nitrogen fertilization had a major impact on the technological and biochemical traits of durum wheat compared to phosphorus and potassium fertilizers. High nitrogen rates strongly influenced biochemical traits, while moderate fertilization was more effective for technological parameters. Average for the test period, fertilization with $N_{80}P_{120}$ increased thousand kernel weight (47.1 g) to the greatest extent. Combined fertilization with $N_{40}P_{40}$ had the strongest effect on test weight (78.5 kg/hl). Grain vitreousness and protein content were highest under the influence of N_{160} (75.6% and 15.2%). Gluten content was maximized by fertilization with $N_{160}P_{40}$ (32.3%).

Key words*: biochemical traits, nitrogen, phosphorus, potassium, technological traits, triticum durum.*

BIOMASS PRODUCTIVITY OF THREE CORN HYBRIDS AFTER OPTIMIZING THE NUTRIENT AND IRRIGATION REGIME

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Abstract

A field experiment was conducted with three maize hybrids: DKC4416, LG 31.390 and Premeo under irrigated and non-irrigated conditions. The experiment was carried out during the period 2022-2024 at the Academic Technological Complex (ATC) of Trakia University, Stara Zagora, Bulgaria. The productivity of the green mass of the three maize hybrids was determined. After foliar fertilization with a complex of fertilizers Aminosol, Lebosol B, Lebosol Zn and Nutriplant 36, an increase of 22.8% (for LG 31.390), 24.4% (for DKC 4416) and 31.8% (for Premeo) was determined, on average for the three-year study period. The parameters of the additional yield of green mass have been calculated. Optimization of nutrients and irrigation regime contributes to increasing the values of additional yield by 276.8% (Premeo) to 353.5% (DKC 4416). An increase was also reported after applying the organic fertilizer Kinsidro Grow and the nitrogen stimulator N-Lock of 338.3% in DKC 4416, 318.6% in LG 31.390 and 276.8% in Premeo. The efficiency coefficient of irrigation water use has been established. The highest values were recorded for variant 3 with the highest coefficient calculated for DKC 4416 (40.0).

Key words*: corn, irrigation, fertilization, yield, efficiency.*

ENERGY AND PROTEIN NUTRITION OF THE GRAIN IN THREE MAIZE HYBRIDS

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Abstract

In order to study the nutritional and energy value of the grain of three corn hybrids, with different genetic origins, an experiment was conducted with DKC4416, LG 31.390 and PREMEO. The grain yield parameters of the studied corn hybrids have been established. A trend towards increased productivity has been registered under the influence of the factors of irrigation and foliar fertilization. The highest grain yield was calculated for the hybrid DKC 4416, 12722,7 kg/ha, on average for the study period. An increase in the crude protein content in the grain was found after optimizing the moisture and nutritional regime. After foliar fertilization with the products Aminozol and the inorganic Boron, Zinc and Nutriplant 36, crude protein levels are in the range of 1154.7 to 1220.0 kg/ha in CB. The values for CEM and CER were determined for the different hybrids, and a tendency towards increase was noted after applying fertilization during the growing season. The content of digestible and metabolizable energy of pigs and poultry in 1 kg of dry matter was calculated, and a tendency towards an increase was deduced after optimizing the factors of moisture supply and foliar fertilization of plants. A strong positive relationship was found between grain yield and crude protein content, in kg per hectare, with coefficient values: r = 0.897 (LG 31.390), r = 0.946 (DKC 4416) and r = 0.972 (Premeo).

Key words*: corn, energy digestibility, protein digestibility, digestible energy, metabolizable energy.*

PERFORMANCE PARAMETERS OF GRAIN CORN FED WITH FOLIAR FERTILIZERS

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Abstract

The field experiment was conducted during the period 2022-2024, at the Agricultural Technical Park (ATP) of Trakia University, Stara Zagora, Bulgaria. The parameters of the grain yield, as well as the productivity of 5 hybrids corn under the influence of different fertilization levels, have been established. A positive trend towards increasing values of the indicator „number of grains per row" was established for all hybrids. The effect of fertilization, including the products Aminosol + Lebosol B + Lebosol Zn, Nutriplant 36, was highest in DKC 4416b (33.1%). The most responsive to foliar fertilization, with the products Kinsidro Grow, N-Lock, is the Premeo hybrid (1.2%). By means of variance analysis, the influence of the hybrid and foliar feeding on the structure-determining indicators of grain yield was determined. A trend towards an increase in the "grain yield" indicator was established for all five tested corn hybrids. On average for the period, it was found that the greatest influence on the grain yield was the factor of "foliar fertilization" products (72.3%), and the influence of the "hybrid" factor was 15.3%.

Key words*: corn, irrigation, fertilization, yield, efficiency.*

MULTI-ANNUAL ANALYSIS OF THE PERFORMANCE OF MAIZE HYBRIDS CULTIVATED UNDER A MINIMUM TILLAGE SYSTEM IN IRRIGATED CONDITIONS IN DOBROGEA (2022-2025)

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Abstract

The paper presents the results of a field experiment conducted between 2022 and 2025 in the Dobrogea region, under an irrigation system, evaluating the behavior of three maize hybrids (P9911, P9889, and MAS43P) cultivated under a minimum tillage system. The study aimed to assess the influence of the technological itinerary on grain yield, thousand kernel weight (TKW), test weight (TW), plant height, and plant density at harvest. Weed control was achieved through an integrated management system using pre- and post-emergence herbicides (Callisto and Clinic Xpert), in order to reduce weed infestation and preserve soil moisture. The data were statistically analyzed using the ANOVA method, highlighting significant differences among hybrids regarding average yield, which ranged from 7.8 to 9.2 t/ha. Hybrid P9889 showed the highest adaptability and yield stability under irrigated conditions. The combination of minimum tillage, irrigation, and effective weed control contributed to maintaining soil fertility and increasing the energy efficiency of maize cultivation. The results indicate that thermal stress during the May-July period represents the main limiting factor for maize productivity in Dobrogea, even under irrigated conditions, while hybrid-specific adaptability plays a decisive role in ensuring yield stability under increasing climate stress.

Key words*: hybrids, irrigation system, maize, minimum tillage, weed control.*

THE USE OF URBAN SEWAGE SLUDGE IN AGRICULTURE - A SOURCE OF ORGANIC MATTER AND NUTRIENTS OR A SANITARY AND ENVIRONMENTAL RISK?

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Abstract

Urban sewage sludge generated by municipal wastewater treatment plants represents a resource for agricultural use due to its high content of organic matter and plant nutrients, particularly nitrogen and phosphorous. When it is applied as an organic soil amendment, sewage sludge can restore soil fertility, improve soil structure, stimulate biological activity and reduce dependence on mineral fertilizers. However, sewage sludge may also contain hazardous substances, including heavy metals, organic contaminants, micro plastics and pharmaceutical residues. Moreover, it can act as a vector for pathogenic microorganisms, such as bacteria, viruses and helminth eggs, poising risk to soil, water resources and public health. Consequently, agricultural reuse of sewage sludge is regulated by strict legislative frameworks defining permissible pollutant concentrations and requiring stabilization and hygienization before application. Sludge application must be carefully managed through appropriate dosing, crop selection, avoidance of fresh-consumed crops and regular monitoring of sludge and soil to ensure environmental and human health protection.

Key words: *urban sewage sludge, sustenable agriculture, organic matter, nutrients, environmental risk.*

INFLUENCE OF DIFFERENT FERTILIZATION RATES ON THE ECONOMICALLY VALUABLE INDICATORS OF *Agastache foeniculum* L.

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Abstract

Agastache foeniculum L. has found its application in medicine, cooking and other branches of the national economy. The material for the research was plant samples of A. foeniculum sv. 'Synii veleten`' and sv. 'Leleka'. Plant seeds were obtained from the National Botanical Garden named after M.M. Grishko of the NAS of Ukraine. The experiment involved 5 variants in three replications. The variants differed in the rate of application of fertilizer Quantum Diaphan ACTion 10-10-10 (control - without fertilizer; 4.0 l/ha; 5.0 l/ha; 6.0 l/ha; 7.0 l/ha). Fertilizers were applied in the tillering phase. The highest yield of above-ground mass ('Leleka' variety was 312 g, 'Synii veleten' variety was 296 g) and the yield of essential oil ('Leleka' variety was 1.09 g, 'Synii veleten`' variety was 1.07 g) from one plant was obtained when applying fertilizer Quantum Diaphan ACTion 10-10-10 at a rate of 5 l/ha.

Key words*: Agastache foeniculum L., cultivation technology, essential oil plants, foliar fertilization.*

IMPACT OF NATIVE SOIL MICROBIOTA ON NODULATION AND SEED YIELD IN WHITE LUPIN (*Lupinus albus* L.) CULTIVARS

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Abstract

During the 2025 growing season, a field experiment was conducted at the University of Agronomic Sciences and Veterinary Medicine of Bucharest to evaluate the effect of native soil microbiota on biological nitrogen fixation and seed yield in four white lupin (Lupinus albus L.) cultivars. The results showed that, even without artificial inoculation, plants developed an average of 10.59 nodules per root. The cultivars Medi and Mariuca exhibited the highest nodulation (11.33 and 11.15 nodules, respectively) and achieved the highest seed yields: 1,440 kg ha^{-1} and 1,363 kg ha^{-1}. These values represent an increase of 13.11% and 7.06%, respectively, over ***the trial mean (****1,273 kg ha^{-1}). A strong positive correlation ($r = 0.962$; $R^2 = 0.926$) between nodule count and seed yield suggests that nodulation serves as a key indicator of nitrogen fixation potential and overall productivity. These findings indicate that native soil microbiota significantly support lupin development, with important implications for cultivar selection and sustainable crop management focused on reducing synthetic nitrogen inputs.*

Key words*:* **Lupinus albus** *L., native soil microbiota, nodulation, biological nitrogen fixation, seed yield, correlation.*

EFFECTS OF SOWING DENSITY, TILLAGE SYSTEM (PLOWING VERSUS SCARIFICATION), AND FERTILIZATION LEVEL ON THE PERFORMANCE OF WINTER OILSEED RAPE

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Abstract

The study evaluated the effects of sowing density, tillage system, and fertilization level on the performance of winter oilseed rape (Brassica napus L.). The research was conducted under field conditions at the Agricultural Research and Development Station (SCDA) Lovrin, Romania. A factorial experimental design was used, including two sowing densities, two tillage systems (plowing and scarification), and two fertilization levels, with emphasis on nitrogen input. The observations focused on the production components (thousand kernel weight and seed production). Sowing density significantly influenced plant architecture and yield formation, while the tillage system affected crop establishment and growth dynamics. Plowing generally ensured better early development, whereas scarification represented a suitable alternative depending on soil and climatic conditions. Higher fertilization levels led to increased yield performance, with responses varying according to sowing density and tillage practice. The interaction between experimental factors highlighted the importance of integrated crop management for optimizing winter oilseed rape productivity. The results contribute to improving cultivation strategies adapted to local pedoclimatic conditions in western Romania.

Key words*: winter oilseed rape, sowing density, tillage system, nitrogen fertilization, yield.*

HYBRID PERCOLATION-ULTRASOUND TECHNOLOGY TO IMPROVE EXTRACTION OF BIOACTIVE SUBSTANCES FROM HEMP BUDS FOR AGRICULTURAL APPLICATIONS

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Abstract

The increasing interest in hemp (Cannabis sativa L.) as a source of high-value bioactive compounds has driven the development of efficient and environmentally responsible extraction technologies. Hemp buds contain substantial levels of polyphenols with antioxidant, anti-inflammatory, and antimicrobial properties, making them valuable for functional food, nutraceutical, and cosmetic applications. Conventional extraction methods often require long processing times, high solvent volumes, and provide limited recovery of thermolabile compounds. This study evaluates a hybrid extraction technique that combines percolation with ultrasound-assisted extraction to improve the yield and functionality of polyphenolic fractions from hemp buds. Key parameters - solvent type, percolation rate, ultrasound intensity, and extraction duration - were systematically varied and optimized using response surface methodology. Extraction performance was assessed through total polyphenol content, total flavonoid content, and antioxidant activity, with chromatographic analyses used to quantify major phenolic constituents. The hybrid system outperformed individual techniques, achieving higher polyphenol yields with shorter extraction times and reduced solvent consumption. The resulting extracts showed strong antioxidant capacity associated with their enriched chemical profiles.

Key words*: ultrasound-assisted extraction, bioactive substances, polyphenols, percolation, flavonoids.*

INFLUENCE OF BIOFERTILIZERS TO ORGANIC WINTER PEA CROP IN THE CONDITIONS OF THE COBADIN PLATEAU

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Abstract

Organic peas (Pisum sativum L.) play an important role in agroecology by naturally fixing nitrogen, improving soil health through crop rotation and organic matter, and reducing the need for synthetic fertilizers and pesticides. Agroecological practices like using organic peas increase the resilience of farming systems to climate change. By boosting soil fertility, reducing chemical inputs, and supporting a healthier ecosystem, they contribute to a more sustainable and stable food production system. From an agronomic point of view, peas are of great importance, because the crop is fully mechanizable, it is harvested early, being a very good previous crop for many crops, especially autumn crops as wheat; it improves soil fertility, enriching it with nitrogen. This paper presents the results obtained on an organic winter pea crop to which 7 variants of biofertilisers were applied, in three repetitions. The results demonstrated the importance of applying these products in ensuring a balanced nutrition of the crop for achieving a good production under the conditions of the Cobadin plateau.

Key words*: agroecology, biofertilisers, organic winter pea, production, soil fertility.*

ALLELOPATHIC EFFECT OF WATER EXTRACTS OF *Festuca rubra* VARIETIES ON SOME PERENNIAL FORAGE SPECIES

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Abstract

The aim of this study was to evaluate the allelopathic effect of cold aqueous extracts of aboveground vegetal biomass of three Festuca rubra romanian varieties: Caprioara, Peisaj and Cristina on seed germination and initial seedling development of some perennial forage species: Festuca arundinacea (tall fescue), Dactylis glomerata (cocksfoot), Lolium perenne (perennial ryegrass), Trifolium repens (white clover), Lotus corniculatus (birdsfoot trefoil).Two concentrations of leachates were used: 5% and 10%, considering the dry weight of plant material and volume of distilled water used. Germination rate was counted and the length of roots and shoots were measured for each concentration and species. Seed germination was negatively affected at both leachate concentrations. At the 5% concentration, the strongest negative effect was on Lotus corniculatus (0%) and Phleum pratense (0.3%). At 10% concentration, Lolium perenne and Lotus corniculatus were totally inhibited. The effect of the extracts on coleoptile growth was different, depending on the species treated, being even stimulated in Lolium perenne (101.2%) and Trifolium repens (101.5%) at the 5% concentration. Root growth was negatively influenced, with a more pronounced effect at 10%, solutions concentration.

Key words*: allelopathy, perennial forage species, germination, seedlings roots and shoots length, water extracts.*

INCREASING AMARANTH SEED PRODUCTIVITY UNDER CLIMATE CHANGE CONDITIONS OF THE SOUTHERN STEPPE OF UKRAINE

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Abstract

Climatic transformations require the introduction of new drought-resistant and heat-resistant plants into the crop rotation system, which includes amaranth. Amaranth is a crop that has an extremely wide range of uses in various sectors of the national economy. In modern conditions, the production of plant products grown under organic farming is becoming increasingly relevant. At the same time, much attention is paid to the use of biological preparations that act as plant growth stimulants, increase plant stress resistance and ensure compliance with all requirements and standards. As a result of the research in 2023-2025 in the conditions of the Southern Steppe of Ukraine, a positive effect of the use of biological products on the formation of the yield of amaranth plants was established. It was proven that the combination of pre-sowing seed treatment and foliar feeding in the phase of 4-6 true leaves with the preparation "NMC-U (Universal)" contributed to obtaining the highest yield of amaranth grain (1.07 t/ha). Correlation-regression models of the dependence of amaranth grain yield on plant height were determined

Key words*: amaranth, biological products, cultivation technology, seeds, yield.*

INFLUENCE OF MORPHOLOGICAL, PHISICAL AND BIOCHEMICAL SEED CHARACTERISTICS ON WATER ABSORPTION IN BARLEY

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Abstract

One of the key aspects of the winter barley breeding programme, as well as the malt industry, is understanding the influence of water on seed germination after sowing and during the steep regime, which is closely related to malt quality. Barley seed samples with different characteristics were collected from the experimental field of the National Agricultural Research and Development Institute Fundulea, and a study was conducted to analyse how morphological, physical, and biochemical characteristics affect water absorption in fifteen winter barley genotypes. The seed assortment, along with the length and width of seeds, one-thousand-grain weight, protein, and starch content of the studied genotypes, was characterised. To evaluate differences between genotypes in water absorption, barley samples were subjected to continuous water immersion, and the amount of water absorbed was measured after 2, 4, 6, 24, 28, 30, 48, and 50 hours. Statistically significant differences ($p<0.05$) were observed among the different cultivars and lines analysed. The results indicated that the barley genotype, due to individual seed traits, plays a significant role in determining the amount of water absorbed by the grain.

Key words*: barley genotype, seed size, length and width of seed, protein and starch content, water absorption.*

STUDY ON THE EFFECT OF BIOLOGICAL FOLIAR AND SOIL FERTILIZERS AND CONVENTIONAL FERTILIZERS ON THE YIELD OF COMMON WINTER WHEAT

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Abstract

The aim of the present study is to investigate the effects of biological soil improvers - liquid organic fertilizers obtained by different methods - through nanotechnology and through hydrolysis of plant meals - and to determine the optimal doses of these preparations for maximizing grain yields from new genotypes of common winter wheat (Triticum aestivum) developed by the method of combinatorial breeding. The experimental plot is established in the biological experimental field of the Institute of Plant Genetic Resources in Sadovo (Bulgaria), with three replications of seven fertilization treatments, over two consecutive growing seasons: 2023/2024 and 2024/2025. In the older hybrid wheat selections, grain yields are more strongly influenced by the type and quantity of applied fertilizers, as well as by agrometeorological conditions. The highest and most stable yields are obtained from the newest breeding lines. The effect of the fertilizer containing phytohormones depends primarily on agrometeorological conditions; when sufficient moisture is available, the active ingredients of the fertilizer are effectively absorbed, and increasing the dose leads to higher grain production. The effect of the nanofertilizer liquid humus on yields is weaker, limited at a level of 1000 ml/da, and the results of its use depend on the sink capacity of the genotype.

Key words*: Triticum aestivum, nanofertilizer, grain yield.*

PHYSIOLOGICAL AND AGRONOMIC RESPONSE OF MAIZE TO FOLIAR APPLICATION OF UTRISHA N: EVIDENCE FROM REAL FARM FIELD TRIALS IN WESTERN ROMANIA

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Abstract

The present study evaluated the effectiveness of the biological product Utrisha™ N (Methylobacterium symbioticum) on maize cultivated under real commercial farming conditions, without major changes to standard crop management practices. The experiment was conducted in 2024 at the Neudorf experimental field (Arad County, Western Romania) using a paired strip design consisting of four independent strip pairs (Utrisha N vs. untreated control), each covering 1 ha. Statistical analysis was performed using a paired t-test (n = 4). Application of Utrisha N resulted in a significant mean grain yield increase of +461 kg ha^{-1} (+7.0%, $p < 0.001$). This yield response was associated with a significant increase in chlorophyll index (+3.05 AT Leaf units, $p = 0.007$), indicating enhanced photosynthetic activity. The physiological benefit confirmed by chlorophyll measurements suggests a measurable and biologically relevant mechanism, supporting the scientific credibility of the treatment. Grain moisture at harvest was slightly higher in the treated variant (+0.45 percentage points, $p = 0.016$), indicating a marginal delay in physiological maturity. Overall, the results confirm the effectiveness of Methylobacterium symbioticum in improving maize yield performance and physiological status under the pedoclimatic conditions of Western Romania.

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Key words*: biofertilizer, chlorophyll index, Methylobacterium symbioticum, Utrisha N.*

ARTHROPOD FAUNA BIODIVERSITY IN ALFALFA AGROECOSYSTEMS UNDER HYDRIC STRESS CONDITIONS: A PRELIMINARY STUDY

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Abstract

Alfalfa (Medicago sativa L.) provides a long-term agricultural habitat in which arthropod assemblages can develop and persist, making it a suitable system for examining faunal responses to environmental constraints. In recent climatic contexts, hydric stress has emerged as a key factor shaping arthropod distribution and community structure within agroecosystems. This study was conducted during the 2024 growing season in an experimental alfalfa field located in Ghilad, western Romania, at a stage corresponding to the third year of crop establishment and under conditions of reduced water availability. Arthropod fauna was surveyed from April to September through monthly sampling events using sweep netting and direct visual observations, followed by laboratory-based taxonomic identification. The arthropod fauna recorded under hydric stress conditions comprised eight major taxonomic orders, with Coleoptera and Hemiptera accounting for the highest numerical dominance. Community composition was strongly skewed toward phytophagous species, particularly Phytodecta fornicata and Aphis craccivora, which together represented a substantial proportion of the total abundance. Statistical analyses revealed significant differences among orders, families, and species, indicating a pronounced functional imbalance within the assemblage. Overall, the observed taxonomic and functional patterns highlight the influence of hydric stress on the distribution and relative dominance of arthropod groups associated with alfalfa agroecosystems.

Key words*: arthropod fauna, alfalfa agroecosystem, hydric stress, community structure, taxonomic diversity.*

EVALUATION OF RAPESEED HYBRID RESPONSES TO PATHOGENIC AGENTS IN THE ZIMNICEA REGION, TELEORMAN

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Abstract

Rapeseed hybrids differ in susceptibility to key pathogens under local conditions. We evaluated six Clearfield rapeseed hybrids (KWS SAUROS, DK IMARET, DK IMMORTAL, INV1166 CL, INV1266 CL and LG CALVIN CL) under natural infection by Leptosphaeria maculans, Sclerotinia sclerotiorum and Alternaria brassicae in Zimnicea (Teleorman County, Romania) during 2024-2025. On a 0.5-ha field, disease frequency and intensity were recorded and integrated as degree of attack in untreated and chemically treated variants, together with seed yield. In untreated plots, mean degrees of attack across pathogens ranged from 4.50% to 6.71%. INV1166 CL was most affected by L. maculans (98.36% intensity), whereas INV1266 CL showed the lowest susceptibility to S. sclerotiorum. Chemical treatments increased yield by 30-501 kg/ha, depending on hybrid. INV1266 CL achieved the highest treated yield (2321 kg/ha) while maintaining moderate disease levels. These results highlight hybrid-specific responses and support localized testing for optimal hybrid choice and disease management.

Key words*: hybrid, pathogen, rapeseed, treatment.*

APPLICATION OF IMAZAMOX FOR WEED CONTROL IN SORGHUM (*Sorghum bicolor* (L.) Moench)

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Abstract

In 2023 and 2024, a field trial with sorghum, hybrid Sentinel IG in the experimental field of the Agricultural University - Plovdiv, Bulgaria, was conducted. The experience variants include: 1. Untreated control; 2. Pulsar 40 - 1.20 L ha^{-1} (BBCH 14-16); 3. Pulsar 40 + Tonivit in rates of 1.20 L ha^{-1} + 1.00 L ha^{-1} (BBCH 14-16); 4. Pulsar 40 - 1.20 L ha^{-1} (BBCH 14-16) + Apetayzer -0.50 L ha^{-1} (BBCH 17-19); 5. Pulsar 40 + Tonivit in rates of 1.20 L ha^{-1} + 1.00 L ha^{-1} (BBCH 14-16) + Apetayzer - 0.50 L ha^{-1} (BBCH 17-19); 6. Pulsar 40 - 4.80 L ha^{-1} (BBCH 14-16). The application of Pulsar 40 (4.80 L ha^{-1}) provides one hundred percent control against Amaranthus retroflexus L., Xanthium strumarium L., Solanum nigrum L., Sinapis arvensis L., and Setaria viridis L. On the 7th day after application of Pulsar 40 (4.80 L ha^{-1}) it causes phytotoxicity with a score of 3 - slight chlorosis on the leaves, and by the 21st day the crop recovers. The highest yield was recorded after application of Pulsar 40 + Tonivit + Apetayzer (variant 5).

Key words*: sorghum, herbicides, weeds, efficacy, yield.*

PARTIAL FACTOR PRODUCTIVITY AND AGRONOMIC EFFICIENCY OF THE FERTILIZATION IN WINTER BARLEY VARIETIES

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Abstract

The influence of increasing levels of nitrogen fertilization (0, 60, 90 and 120 kg N/ha) on the productivity of winter barley (Emon, Ahil, Kuber) was studied for a three-year period in Bulgaria. The values of the Partial Factor Productivity (PFP) and Agronomic Efficiency (AE) indices of the applied nutrients were determined. The values of the PFP of phosphorus and potassium were proven higher when applied nitrogen fertilization N90 and N120. It was found that the application of 90 kg N/ha in barley leads to a higher AE-N, which was in the range of 24.8-26.3 kg/kg. The AE of nitrogen for grain, in the three barley genotypes, decreased with an increase in the nitrogen rate above N90 and the reduction was on average 24.5%, compared to the N120 rate. On average the values of the two indices AE-P and AE-K increased with an increase in the rate of nitrogen fertilization in all varieties, but a mathematically proven difference in the effect of fertilization with rates N90 and N120, combined with phosphorus and potassium fertilization, was not found.

Key words*: barley, fertilization, productivity, Partial factor productivity (PFP), Agronomic efficiency (AE).*

RESEARCH ON THE MANAGEMENT OF BACTERIAL BLIGHT AND THE COMMON RED MITE IN AN IRRIGATED SOYBEAN CROP

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Abstract

The aim of this work is to highlight an effective treatment scheme for combating bacterial blight of soybean (Pseudomonas savastanoi pv. glycinea) and common red spider mite (Tetranychus urticae) under conditions of natural infection and irrigated cultivation. Observations were carried out in 2023, in the experimental field arranged within I.I. Popescu Iulian, in the city of Ianca, Brăila county. The biological material used was the ES Palador variety. Bacterial blight attack was assessed visually, and mites were captured by shaking the leaves onto a white sheet of paper. The frequency of soybean plants attacked by bacterial blight varied between 4.0 and 82.33% in the experimental variants. The common red spider mite attack reduced soybean production by 16.85%. The highest production, of 4895 kg/ha, was obtained in the variants with two treatments against the two biotic factors. Following the research, it can be concluded that among the limiting biotic factors in soybean culture are both the bacterium Pseudomonas savastanoi pv. glycinea and the mite Tetranychus urticae.

Key words*: soybean, bacterial blight, common red mite, management.*

EVALUATION OF FORAGE PRODUCTION AND QUALITY OF TIMOTHY (*Phleum pratense* L.) IN THE PEDOCLIMATIC CONDITIONS OF BRASOV

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Abstract

The species Phleum pratense (timothy) presents high variability, especially due to its wide distribution and ecological adaptability. It tolerates cold temperate climates and soils with a neutral to slightly acidic reaction. This paper presents the results regarding the evaluation of the production capacity (t/ha DM) and forage quality of 5 Romanian genotypes (Tirom, Carpatica, Rarău, Syn 1.5 and Syn 1.14) and 2 foreign genotypes (Bobr and Liskra) of the species Phleum pratense, studied in comparative crops during 2022-2024, within the Breeding and Genetic Resources Laboratory of the Research and Development Institute for Grassland Brasov. The Romanian varieties respond effectively to the current requirements: high production, good quality of forage, suitability to various type of use, competitiveness and good resistance to disease and pests. The varieties Bobr and Liskra proved to be earlier and more productive in the first years of cropping, but they showed a lower perenniality. Regarding the quality, there were differences depending on the genotype and the phenophase of harvesting.

Key words*: forage quality, forage production, genotype, Phleum pratense L.*

MISCELLANEOUS

STUDY OF PHOSPHORUS AVAILABILITY IN PHOSPHO-COMPOSTS MADE FROM POULTRY MANURE AND PHOSPHATE WASTE

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Abstract

To evaluate phosphorus availability in phospho-composts produced from poultry manure (PM) and phosphate waste (Phosphate Sludge – PS and Screening Residue – SR), six composts (A1: 75% PM + 25% PS; A2: 80% PM + 20% PS; A3: 89% PM + 11% PS; B1: 75% PM + 25% SR; B2: 80% PM + 20% SR; B3: 89% PM + 11% SR) were prepared. The results showed that the initial levels of available phosphorus were low, ranging from 0.101 to 0.114% P_2O_5, indicating that microorganisms were not yet active at the beginning of the composting process. By the end of the process, the concentration of available phosphorus increased significantly, reaching 0.395 to 1.195% P_2O_5, representing an increase of 290 to 1071%. Overall, the composts enriched with phosphate sludge (series A) showed higher levels of available phosphorus than those containing screening residues (series B). These phospho-composts therefore represent promising organo-mineral amendments suitable for direct application in soil fertilization.

***Key words**: phosphorus availability, phosphate waste, poultry manure, compost.*

TOTAL ANTHOCYANINS CONTENT OF TEN POTATO VARIETIES DIFFERENTLY RESISTANT TO POTATO VIRUS M

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Abstract

Potato tubers are staple foods consumed in far greater amounts than most fruits and vegetables, making them an essential component of the human diet. Owing to this high consumption, potatoes constitute a valuable nutritional crop and an important source of health-promoting bioactive compounds. The present investigation focused on determining total anthocyanins content (TAC) in the skin and flesh of ten Romanian potato cultivars displaying different degrees of resistance to Potato Virus M (PVM). The plants were cultivated in the Braşov region over three consecutive years. The analysis revealed substantial variation among cultivars. In all cases, anthocyanins levels were lower in tuber flesh than in the peel. The blue-colored genotype "Blue Purple of Gălăneşti" and the Romanian variety 'Foresta', known for its resistance to PVM, exhibited the highest anthocyanins concentrations. Overall, these results enhance current knowledge of the micronutrient composition of newly developed Romanian potato cultivars, highlighting their nutritional potential and variable resistance to PVM.

Key words*: anthocyanins, potato virus M, cultivar.*

RESULTS REGARDING THE APPLICATION OF AMENDMENTS IN SOYBEAN CULTIVATION

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Abstract

During the research conducted, the positive influence of calcium on soybean plants was noted. Due to the fact that the experiment was located on an acidic soil (pH around 5.0) we used calcium-based products, namely: agrocalcium (93.6% CaCO3), doloflor with CaCO3 and MgO (magnesium oxide) and neutrosol 9 (97.5% CaCO3). Thus, it was found that total biomass production was on average 6.26 t/ha, pod production was 4.19 t/ha, and grain production was 2.46 t/ha, with significant and highly significant positive differences. Analyzing the thousand grain mass (MTG), small significant positive differences were found. Quality indices of soybeans were also determined and thus the protein content was 38%, oil 25%, fiber 5%, and the moisture content of the beans was 10%. The results obtained show that the Cristina TD soybean variety adapts very well to the conditions in the station.

Key words*: amendaments, CaCO3, Cristina TD, soybean.*

SUITABILITY OF POTATO VARIETIES FOR FRENCH FRY PROCESSING UNDER CLIMATIC STRESS

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Abstract

To evaluate the influence of climatic factors on the technological quality of potato tubers during the 2024 and 2025 agricultural years, six potato varieties - Asinaria, Azaria, Castrum, Cezarina, Cosiana, and Darilena - were studied for their suitability for French fry processing. Tubers were analyzed for technological quality parameters, including specific gravity, determined using a PW-2050 digital weigher; dry matter content, assessed by the oven-drying method; and reducing sugar content, measured semi-quantitatively using Quantofix test strips. Frying suitability was evaluated by calculating the frying index, determining the percentage of French fries with brown ends, and assessing the number of colour classes assigned to the fried samples based on comparison with the Munsell USDA Frozen French Fry Color Standard. The frying index ranged from 0.3 to 4.5 among the six varieties, while specific gravity values varied between 1.072 and 1.094.

Key words*: potato varieties, processing, climatic stress.*

COMPARATIVE STUDY ON THE COMPOSITION AND DISTRIBUTION OF EPIGEIC ARTHROPODS IN ORCHARD AND FOREST HABITATS FROM THE NECHIȚ AREA, NEAMȚ COUNTY

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Abstract

This study analyzes the composition and spatial distribution of epigeic arthropods in apple orchards and forest ecosystems located in the Nechiț area, Neamț County. Sampling was conducted using Barber pitfall traps, a standard methodology for monitoring ground-dwelling epigeic arthropods. Biological material was collected periodically between May and October 2025, ensuring representative captures of species active across seasonal intervals. Arthropod specimens obtained from the traps were sorted and taxonomically identified in the Entomology Laboratory of USV Iași through detailed morphological examination under binocular microscopes, supported by specialized identification keys and digital taxonomic resources. This methodological approach enabled an accurate characterization of species diversity and community structure, providing essential faunistic and ecological data on terrestrial epigeic arthropods within the investigated habitats.

Key words*: epigeic arthropods, orchards, forest ecosystems, diversity and community structure.*

ASSESSMENT OF AVIAN SPECIES DIVERSITY ACROSS THREE PEATLAND ECOSYSTEMS OF N-W ROMANIA AND POSSIBLE INFLUENCE ON THE SURROUNDING AGRICULTURAL FIELDS

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Abstract

*Wetlands and their associated birdlife could impact adjacent agricultural land as they set forth synergistic interactions: wetlands provide habitat and food for birds, which in turn support agriculture through pest control and fertilization. As part of a 3-seasons restoration effort (PeatRO4 2024), we assessed the bird and plant species and described the habitats from three peatland ecosystems with different degrees of human impact, from Cluj County (NW Romania): one in the forest (Negruşul-Finciului), two in the vicinity of agricultural lands (Molhaşul Călăţele, Dâmbu-Negru). For the active raised bog habitats (Natura 2000 code *7111) the peatland Dâmbu-Negru bore 40% of avian diversity. Most species listed as Least Concern, with 3 on the Near Threatened National Red List and 8 under the Birds Directive Annex I. We found an increased number of insectivorous bird species correlating positively with the presence of typical bog grasses (Eriophorum-Carex associations), shrubs (Vaccinium sp.) and trees (Picea-Pinus associations). Since protected wetlands reduce pesticide dependence and enhance ecosystem resilience, biodiversity, and crop productivity, conserving these habitats is both an ecological imperative and an agricultural strategy.*

Key words*: bird diversity, peatland, agricultural impact.*

Onobrychis arenaria (Kit.) DC. - PROSPECTS FOR ITS USE AS A MELLIFEROUS PLANT

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Abstract

The present study was beased on the investigation of the biological characteristics of growth and development of Onobrychis arenaria (Kit.) DC. under the climatic conditions of the Republic of Moldova, with emphasis on its potential use as a melliferous plant. The research was conducted on the experimental plots of the "Alexandru Ciubotaru" National Botanical Garden (Institute). O. arenaria belongs to the family Fabaceae and is a perennial, long-day, heliophilous, polycarpic species. The onset of growth occurs early. The period from the start of the growing season to flowering is approximately 67 days, while seed maturation takes 103-110 days. The flowers are arranged in elongated racemes, comprising 20-100 flowers per inflorescence. Flowering is staggered and prolonged, lasting approximately 20-30 days, depending on plant age and prevailing climatic conditions. Onobrychis arenaria exhibits high melliferous potential, providing nectar and pollen resources for a wide spectrum of insects over an extended period.

Key words*: Onobrychis arenaria (Kit.) DC., development, insects.*

POTENTIAL APPLICATIONS OF *Sida hermaphrodita* (L.) RUSBY UNDER THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

Sida hermaphrodita (L.) Rusby, commonly known as Virginia mallow, Pennsylvanian malva, River mallow, or Virginia fanpetals, is a promising species within the Sida genus, which includes nearly 200 species primarily found in warmer regions of the world. The cultivar 'Energo' of Sida hermaphrodita, registered in the Catalogue of Plant Varieties of the Republic of Moldova, was the subject of this study. This species exhibits significant potential due to its multiple applications. It is recognized as a high-yield forage plant, with natural forage productivity ranging from 123.9 to 187.7 tons per hectare and high protein content. The species also demonstrates considerable potential as an energy crop, with yields of 350-380 GJ per hectare. Furthermore, its honey production is notable, with an average yield of 150-230 kg of honey per hectare. The flowering phase lasts approximately 51-60 days, during which the plant produces compound inflorescences bearing 20-30 yellow flowers, each 3-5 cm in diameter.

Key words*: Sida hermaphrodita (L.) Rusby, potential usage, multipurpose plant.*

THE QUALITY INDICES OF PHYTOMASS AND BIOFUELS FROM ENERGY CROPS IN MOLDOVA

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Abstract

This research was conducted to determine the quality indices of phytomass from energy crops Helianthus tuberosus, Heracleum sosnowskyi, Macleaya cordata, Spartina pectinata, and Salix sp., grown in the experimental plot of the NBGI Chişinău. It was determined that the harvested phytomass had 493-872 g/kg dry matter content. The concentration of structural carbohydrates was 40.1-49.5% cellulose, 19.1-27.4% hemicellulose, 7.6-10.9% acid detergent lignin and the estimated theoretical ethanol yield varied from 430 L/t in Salix sp. substrate to 552 L/t in Helianthus tuberosus stem substrate. The investigated phytomass are characterized by 1.98-5.82% ash, 17.91-19.21MJ/kg gross calorific value and 16.82-17.89MJ/kg lower calorific values. The collected phytomass from Helianthus tuberosus, Macleaya cordata and Spartina pectinata may be used directly for prepared densified solid biofuels, briquettes and pellets, while Heracleum sosnowskyi phytomass as mixtiure.

Key words*: cell walls composition, elemental composition, energy crops, phytomass, theoretical ethanol yield.*

THE ENERGY POTENTIAL OF CROP RESIDUE BIOMASS

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Abstract

Crop residues represent an abundant and underutilized source of renewable energy, offering a sustainable alternative to fossil fuels. This study assessed the physicochemical properties and bioenergy potential of post-harvest residues from Helianthus annuus, Zea mays, Sorghum sp., Fagopyrum esculentum, Silybum marianum and Rumex patientia × Rumex tianschanicus, to evaluate their suitability for biogas/biomethane, bioethanol, and solid biofuel production. The residues contained 32-89 g/kg crude protein, 69-112 g/kg acid detergent lignin, 348-507 g/kg cellulose, and 208-292 g/kg hemicellulose. Biochemical biomethane potential ranged from 213 to 287 L/kg of dry organic matter, while theoretical ethanol yields reached 404-562 L/t. Net calorific values were 15.33-16.97 MJ/kg, demonstrating substantial energy content. These results highlight the versatility of crop residues as a renewable energy feedstock and support their strategic utilization for sustainable bioenergy production in the Republic of Moldova.

Key words*: biochemical composition, biochemical methane potential, crop residues, quality indices, solid biofuel, theoretical ethanol yield.*

MINERAL PROFILING OF CHESTNUT-MOUNTAIN HONEY FROM KOSOVO`S DUKAGJIN PLAIN

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Abstract

Kosovo chestnut honey is currently missing vital mineral profile information required for EU PDO certification. This research sets foundational characteristics for 42 samples of chestnut-mountain honey sourced from Dukagjin`s limestone area, utilizing MP-AES analysis. The samples were subjected to microwave digestion followed by analysis using the Agilent 4200 MP-AES. The findings demonstrated heightened levels of potassium (3400±978 ppm), calcium (516±142 ppm), magnesium (84±29 ppm), and sodium (905±482 ppm), alongside trace amounts of zinc (0.64 ppm), iron (1.99 ppm), copper (0.99 ppm), and manganese (6.05 ppm). A robust correlation between manganese and potassium (r=0.84) affirmed the botanical uniformity. PCA discerned the unique chestnut profile (PC1 accounting for 48% variance through K/Fe), while LDA achieved an impressive 89% classification accuracy when compared with European reference datasets. The calcium levels in Dukagjin surpassed those of Italy, pointing to distinctive terroir characteristics. MP-AES demonstrated comparable sensitivity to ICP-MS but at a reduced cost, making it suitable for regular profiling in the Balkan region. These results lay the groundwork for authentication that supports a premium market presence and PDO ventures for Kosovo`s relatively unexplored chestnut honey production.

Key words*: chestnut honey, mineral profile, MP-AES, chemometrics, Dukagjin terroir.*

RESEARCH ON THE INFLUENCE OF PLANTING DENSITY ON THE DYNAMICS OF BIOMASS ACCUMULATION IN BAMBOO PLANTATIONS UNDER THE CLIMATIC CONDITIONS SPECIFIC TO THE EMILIA-ROMAGNA REGION, ITALY

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Abstract

Although the cultivation of moso bamboo is currently seen as a challenge, in the near future this crop will certainly be regarded as a sustainable source of biomass, not only because it makes very good use of soils considered unsuitable for other crops, but especially due to the long lifespan characteristic of this species, its accelerated growth rate, the extraordinary capacity of plants for annual regeneration and the amount of biomass produced per unit area. The aim of the research was to determine the dynamics of biomass accumulation in distinct vegetation phases in 8-year-old bamboo plantations under the specific conditions of the temperate humid climate typical of the Emilia-Romagna region, Italy. The research results highlighted that, in an 8-year-old bamboo plantation, after 6 months of growth, the average of fresh and dry aboveground biomass yields were over 796 tons/ha, respectively over 619 tons/ha of dry biomass, thus demonstrating the importance of cultivating moso bamboo as a sustainable alternative energy source.

Key words: *moso bamboo, aerial biomass, alternative energy source, sustainability.*

STUDY ON THE IMPACT OF CO_2 SEQUESTRATION ON THE REDUCTION OF GREENHOUSE GAS EMISSIONS IN MOSO BAMBOO PLANTATIONS

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Abstract

Due to the intense rate of growth and annual regeneration of moso bamboo (Phyllostachys edulis), its long lifespan (80-100 years), as well as the high and consistently productive biomass yields per unit area and its extraordinary ability to sequester CO_2 from the atmosphere, establishing new plantations represents a viable alternative to counteract the impact of climate change on ecosystems, by reducing greenhouse gas (GHG) levels through environmentally friendly practices. The results of this study demonstrated that 7 and 8-year-old moso bamboo plantations are capable of sequestering over 262 tons of carbon per hectare after 9 months of growth, thus reducing greenhouse gas emissions by more than 963 tons of CO_2 equivalent per hectare and contributing to the significant reduction of environmental pollution.

Key words*: Phylostachys edulis, carbon sequestration, GHG reduction, ecofriendly practices.*

THE QUALITY INDICES OF ENERGY BIOMASS FROM AGRICULTURAL RESIDUES OF *Asteraceae* SPECIES

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Abstract

The objective of this research was to evaluate the quality indices of the dry matter from agricultural residues - stems of Asteraceae species: Artemisia absinthium, Cynara cardunculus, Silphium integrifolium, Silphium perfoliatum, Solidago canadensis collected in the experimental plot of the NBGI Chişinău. It has been found that elemental composition of the collected stems dry matter was 41.36-50.00% carbon, 4.32-6.14% hydrogen, 0.62-1.37% nitrogen, 0.03-0.10% sulphur, 2.18-5.66% ash and gross calorific value varied from 18.2 to 19.0 MJ/kg dry matter. The dry biomass contained 461-545 g/kg cellulose, 180-320 g/kg hemicellulose, 85-112 g/kg acid detergent fibre and the estimated theoretical ethanol yield varied from 522 to 575 L/t organic dry matter and biomethane potential from 167 to 266 L/kg VS. The investigate agricultural residues have optimal concentration of structural carbohydrates and energy value, which make them suitable to be used as a part of a diverse mix for solid biofuel production and feedstock for cellulosic bioethanol as renewable energy.

Key words*: agricultural residues, Asteraceae species, biomethane potential, quality indices of biomass, theoretical ethanol yield.*

THE EVALUATION OF THE QUALITY INDICES OF PHYTOMASS FROM SOME *Fabaceae* SPECIES AND THEIR POTENTIAL APPLICATION

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Abstract

This study evaluated the quality indices of phytomass from Fabaceae crops Astragalus galegiformis, Cicer arietinum, Glycine max, Melilotus albus, Pisum sativum subsp. arvense and Vicia faba. Phytomass collected after seed threshing contained 845-928 g/kg dry matter. Its biochemical composition comprised 67-128 g/kg crude protein, 57-134 g/kg ash, 380-464 g/kg crude fibre, 400-489 g/kg acid detergent fibre, 593-654 g/kg neutral detergent fibre, 62-95 g/kg acid detergent lignin, 328-427 g/kg cellulose, 118-284 g/kg hemicellulose and 40-132 g/kg total soluble sugars. Forage quality indices included 508-577 g/kg digestible dry matter, 7.7-9.4 MJ/kg metabolizable energy and 4.41-5.43 MJ/kg net energy for lactation. The estimated biochemical biomethane potential ranged from 252 to 300 L/kg dry matter. These results indicate that Fabaceae phytomass can serve as a valuable source of roughage for livestock and as a cosubstrate for biogas production.

Key words*: biochemical composition, biomethane potential, Fabaceae species, forage value, phytomass crop residue.*

EXPLORATORY STUDIES ON MYCOBIOTA AROUND THE ROOTS OF INVASIVE PLANTS - CASE STUDY *Ailanthus altissima*

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Abstract

It is known that specific and common fungal species can synthesize hydrolytic enzymes (amylases, proteases, cellulases, lipases, pectinases, xylanases) and organic acids, thus causing changes in soil pH and reducing the rate of decomposition processes in the soil. Ailanthus altissima is an aggressive invasive tree in Romania. We aim to analyse if fungal communities from soil are altered by the presence of A. altissima; thus we conducted a field soil sampling in micro-habitats with different Ailanthus individuals' density and age. Mycological analysis assessed the fungal load of the samples and the species with the highest frequency. In the field, we also measured the Ailanthus tree DBH in all stands, recording trees' life stages, and their connection with the mycobiota`s species diversity. Results showed mycobiota`s biodiversity and its capacity to synthesize metabolites involved in soil decomposition. Analysis of the mycobiota around the roots of adults and root sprouts of A. altissima showed that the composition of the soil fungal community and the fungal activity require a longer invasion time to be affected.

Key words*: Ailanthus altissima, around the roots, hydrolytic enzymes, soil mycobiota.*

TOWARDS SMART IRRIGATION SYSTEMS: A MULTI-TECHNOLOGY ARCHITECTURE FOR AGRICULTURAL WATER OPTIMIZATION: A REVIEW

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Abstract

Increasing pressure on water resources, amplified by climate variability and the intensification of agricultural production, has accelerated the development of smart irrigation systems aimed at improving water-use efficiency. This paper presents a review of scientific literature published between 2015 and 2025, focusing on multi-technology architectures used for agricultural water optimization. The review analyses the role of Internet of Things (IoT) sensor networks for monitoring soil moisture, temperature, and plant water status, together with smart irrigation control panels and agro-meteorological stations used for real-time irrigation management and short-term water demand estimation. In addition, complementary technologies frequently reported in the literature, such as satellite remote sensing, decision support systems, variable rate irrigation, cloud and edge computing, and artificial intelligence-based data analysis, are reviewed in the context of irrigation management.

Key words*: Smart irrigation, water management, IoT sensors, UAV remote sensing, artificial intelligence, precision agriculture, irrigation technologies, review.*

BIOSTIMULATORY MECHANISMS OF *Trichoderma asperellum* IN CEREAL CROPS: A REVIEW

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Abstract

As global agriculture shifts towards sustainable practices, the use of microbial biostimulants has emerged as a key strategy to enhance crop productivity. Among these, Trichoderma asperellum stands out not only as a biocontrol agent but as a potent biostimulant capable of modulating plant growth and development. This review synthesizes current knowledge on the biostimulatory effects of T. asperellum specifically on cereal crops, including wheat, maize, barley and rice. We analyze the intricate mechanisms involved, such as the production of secondary metabolites and improved nutrient solubilization. Furthermore, we discuss the role of T. asperellum in bolstering plant resilience against abiotic stresses, such as drought and salinity, which are increasingly threatening cereal yields. By integrating recent findings, this article provides a clear overview of the potential of T. asperellum to support plant development, offering a useful perspective on how this fungus can contribute to more efficient cereal production systems.

Key words*: cereal crops, plant biostimulants, sustainable agriculture, Trichoderma asperellum.*

AGROECONOMIC POTENTIAL OF SMOOTH BROME *(Bromus inermis)* AND TALL FESCUE *(Festuca arundinacea)* UNDER THE CLIMATIC CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

This study was aimed to evaluate the quality indices of green biomass and hay of local ecotype of smooth brome (Bromus inermis Leyss.) and tall fescue (Festuca arundinacea Schreb.) cultivated at the "Alexandru Ciubotaru" National Botanical Garden (Institute) of Moldova State University. The biochemical composition of the green biomass varied between grass species: 12.4-13.1% crude protein (CP), 33.6-34.7% crude fibre (CF), 62.9-66.6% neutral detergent fibre (NDF), 36.9-37.8% acid detergent fibre (ADF), 2.8-3.6% acid detergent lignin (ADL), and 11.7-13.5% total soluble sugars (TSS). The forage quality of the green biomass included 594-602 g/kg dry matter digestibility (DMD), 553-563g/kg total digestible nutrients (TDN), relative feed value (RFV) of 87-90, and metabolizable energy (ME) of 9.67-9.76 MJ/kg. The hay had 10.3-12.4% CP, 36.0-36.9% CF, 65.0-69.1% NDF, and 6.2-9.4% TSS, with 528-543g/kg TDN and ME of 9.45-9.60 MJ/kg. The biochemical methane potential of the substrates ranged from 331 to 366 L/kg volatile solids. These findings suggest that smooth brome and tall fescue are both suitable as high-quality forages for livestock and as promising substrates for biomethane production within renewable energy systems.

Key words*: biochemical methane potential, Bromus inermis, Festuca arundinacea, forage value, nutrient content.*

STUDY OF THE INFLUENCE OF SOME PARAMETERS ON THE QUALITY OF SOWING WITH A PRECISION SEED DRILL

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Abstract

The experiments were conducted at two speeds – 10 and 13 km/h, with an average soil moisture of 40.5%, varying in the range from 38.6% to 43.2%. The results of the one-way analysis of variance (One-Way ANOVA) show that changing the speed does not lead to statistically significant differences in either the seeding depth ($F(1,18)=1.786$, $p=0.198$, $R^2=0.09$) or the seed spacing ($F(1,18)=0.626$, $p=0.439$, $R^2=0.03$). Pearson`s correlation analysis established a moderate negative correlation between soil moisture and sowing depth ($r = –0.71$, $p < 0.05$), as well as a weak positive correlation between moisture and seed distance ($r = 0.38$, $p > 0.05$). Regression models were derived describing the dependencies between moisture and the main sowing parameters. The results obtained show that in the range of 10–13 km/h, the speed of movement has a minimal impact on the quality of sowing, while soil moisture is a decisive factor determining the depth and uniformity of seed placement. The pneumatic seeder demonstrates high stability of operation, and even at higher speeds it maintains uniform seed distribution within agrotechnically acceptable limits.

Key words*: seed drill, quality of sowing, seed spacing, soil moisture.*

USING FRESH AND COMPOSTED MANURE IN CROP PRODUCTION: ADVANTAGES AND DISADVANTAGES

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Abstract

Manure from animal husbandry represents the most valuable source of organic matter and nutrients that can be used to improve soil properties, restoring its stability and fertility diminished by plant cropping. In Romania, there are a large number of small farms with mixed production (plant cropping and animal husbandry) but also farms whose production is simplified, either plant or animal. Often, farms based exclusively on animal husbandry face problems generated by manure management, while those that have only plant production face a lack of organic fertilizers. Composting can be a solution for an efficient management of organic farm manure, which will lead both to reducing the impact of animal manure storage on the environment but also to provide added value to them through the product obtained, namely compost, which can be efficiently used in farms that need it. This paper presents the results of a study on the most efficient ways of managing organic manure with their advantages and disadvantages from a technological, economic and ecological point of view, with a strong emphasis on composting and compost.

Key words*: animal manure management, environmental impacts, composting, value-added compost.*

IMPACT OF VERMICOMPOST ORGANIC FERTILISER ON PRODUCTIVITY AND BOTANICAL COMPOSITION OF SEMI-NATURAL MEADOW GRASSLAND IN THE CENTRAL BALKAN MOUNTAIN REGION

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Abstract

From 2020 to 2023, the potential of the organic fertiliser Lumbrical (an organic soil improver of the vermicompost group) was studied under the conditions of the Central Balkan Mountain (Bulgaria) on productivity parameters and botanical composition of a semi-natural meadow. It was found that the organic compost input on the grass cover had a favourable effect on the vegetative aboveground biomass. It also exceeded the average values of the parameter during the experiment from 71.09% (400 l/da) to 141.87% (1000 l/da), compared to the control, which was not fertilised. The vermicompost fertilising rates achieved the intended changes in the different groups and species in the grassland botanical composition. It was established that after the input of various fertilising rates, Festuca rubra was no longer an edificator species in the studied grassland. In contrast, Agrostis capillaris was established as an edificator species dominating in the aboveground biomass.

Key words: *semi-natural grassland, vermicompost fertilising, productivity, botanical composition.*

POLLINATION OF SUNFLOWER CROPS AND NECTAR SECRETION

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Abstract

The successful use of bees in the pollination of sunflower crops is possible only if the sunflower inflorescences have a high nectar secretion. In turn, this determines the intensity of the attraction of honey bees to them. If the flowers do not secrete enough nectar, the bees will ignore the sunflower crops and will turn to other more attractive sources in the area. The lack of data characterizing different sunflower hybrids in terms of nectar secretion is largely due to the fact that the assortment of hybrids has increased considerably in recent years, these being replaced more and more rapidly by the new more performant homologated hybrids. The evaluation of nectar secretion (by using the capillary method) was conducted in 2025 in several sunflower crops located in South of Romania, in different growing conditions. The studied sunflower crops presented relatively similar values in terms of nectar secretion per flower.

Key words*: sunflower, honey bees, nectar secretion.*

COMPARATIVE STUDY OF INVASIVE INSECT AND DISEASE COMPLEXES IN SOYBEAN CULTIVATED UNDER THE AGRO-CLIMATIC CONDITIONS OF THE NORTH-CENTRAL REGION OF THE REPUBLIC OF MOLDOVA

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Abstract

Soybean (Glycine max) is a key field crop in the Republic of Moldova, known for its ecological adaptability and productivity. However, it is frequently affected by harmful organisms that significantly impact the yields. The study assesses phytosanitary control during soybean growth, focusing on the pathological impact and parasitic effects of pest species. The research involves identifying invasive organisms, determining their level of infestation, and analysing the structure, frequency, and abundance of pest associations, along with evaluating ecological protection measures. This study presents data on the inventory of harmful organisms, as well as prevention and control strategies. The research was conducted in soybean fields in the North and Central regions of Moldova. Results show that soybean crops are affected by 11 species of pathogens, with plant infestation rates ranging from 7.0% (for Phaseolus virus) Ascochyta and sojaceola) to 40.0%. Regarding harmful pest insects, 13 species of oligo-polyphagous and specific pests were identified. The frequency of pest attacks ranged from 30% (Aphis glycines) to 25-30% (Etiella zinckenella).

***Key words**: Glycine max (L.) phytosanitary monitoring, pests.*

GROWTH AND DEVELOPMENT OF THE WEED JOINTED GOATGRASS (*Aegilops cylindrica* Host) EMERGING FROM DIFFERENT DEPTHS

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Abstract

Jointed goatgrass is an overwintering plant from the Poaceae family. It is used as a gene donor for winter wheat in different breeding programs. Nevertheless, in some countries and in Bulgaria as well it has turned into a big issue as a weed in the winter wheat. The plants are resistant to most of the herbicidal substances registered for weed management in wheat. Therefore, different approach for control has to be performed. One of the options is to apply "weed seed burial method" - turning over the arable layer trough plowing. A pot experiment for studding the germination depth and development of the jointed goatgrass was performed. The depths of placing the weed's seeds from 0 to 14 cm were studied. The period of emergence from each sowing depth, number and percent of germinated plants, total plant length, aboveground and root length, total plant weight, aboveground and root weight were evaluated. With increasing the depth, a delay of the germination and decreasing of the weed's biomass development was recorded. Plants sown on 12 and 14 cm did not emerge.

Key words*: Aegilops cylindrica, weed, germination, growth.*

THE TAXONOMIC STRUCTURE OF INVERTEBRATE POPULATIONS FROM SUNFLOWER CROPS PROTECTED BY *Robinia pseudoacacia* L. SHELTERBELTS IN CONSTANŢA COUNTY

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Abstract

Among the species of oil plants grown in Romania, sunflower occupies an important place both as cultivated area and as the role of seeds in the food industry. As far as its importance is concerned, it is necessary to take into consideration the agro-phytosanitary protection measures, the wide spectrum of diseases and pests present in the cultures of our country, especially in the southern area of the country. This paper presents for the first time in our country the structure of the invertebrate communities in the sunflower culture in the context of climatic changes and in the conditions specific to an experimental crop protected by Robinia pseudoacacia L. shelterbelts. The collection of biological material at ground level and from the soil was carried out using Barber traps and soil fauna was extracted by soil surveys with the dimensions of 25/25/30 cm. The obtained results refer to the main invertebrate groups, the dominant species, and relative abundances of the main families with the indication of the ecological role depending on the trophodynamic module in which the useful or harmful species fall.

Key words*: agroforestry, biodiversity, helterbelts.*

COMPARATIVE ANALYSIS OF THE STANDS' STRUCTURE OF VIRGIN AND MANAGED BEECH FORESTS FROM THE SEMENIC MOUNTAINS

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Abstract

This paper presents the results of a comparative analysis of the structural characteristics of virgin and managed beech forests in the Semenic Mountains. The research was conducted in eight sample areas, each measuring 2,500 m², with two areas in each forest category (virgin and managed) at two altitudes (1200 m and 1350 m). The structural characteristics were compared using the following parameters: diameter distribution, height distribution, maximum dimensions of living trees (with emphasis on thick trees), Gini index, Shannon index, slenderness coefficient, and regeneration. The density of the stands and their productive characteristics were also studied, using the number of trees, basal area, and volume as attributes. The greatest differences were found in terms of tree diameters, slenderness coefficients, and regeneration, which may lead to the conclusion that silvicultural interventions carried out in managed forests over time have significantly affected their structure.

Key words*: beech forest, virgin forest, managed forest, structural diversity.*

COMPARATIVE ANALYSIS OF MICROHABITAT TYPES IN VIRGIN FOREST AND MANAGED FOREST IN BEECH STANDS IN THE SEMENIC MOUNTAINS

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Abstract

Along with other structural indicators of forests, tree microhabitats (TreMs) are one of the essential factors in terms of forest ecosystem diversity. The aim of this article is to make a comparative qualitative analysis of the types of microhabitats on trees in a virgin forest (Izvoarele Nerei Nature Reserve) and a managed forest (with varying degrees of forestry intervention intensity). The research was carried out in beech forests in the Semenic Mountains, at two altitudes (1200 m and 1350 m), with information collected from eight 2500 m^2 sample areas (two at each altitude and for each type of forest). The results of the research highlight the important roles of large-diameter trees and dead wood as factors that directly and significantly influence microhabitat diversity in beech forests, with forest category and altitude level having a lesser influence on microhabitat quality.

Key words*: beech forest, managed forest, microhabitat, virgin forest.*

SCIENTIFIC CONSIDERATIONS REGARDING THE PRESENCE OF CONTINENTAL DUNE HABITATS IN ROMANIA

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Abstract

There are continental dunes habitats of Community interest on the territory of Romania outside the checklist for which two reports were made and submitted to European Commission (2013 and 2019). In the initial checklist for Romania, there were five types of continental dune habitats, present in two biogeographical regions (Black Sea - BLS and Pannonian - PAN) for which seven Natura 2000 sites were designated. In 2025, for the preparation of the third report under Article 17 of the Habitats Directive, it was proposed to extend the list based on information collected from the field and documents referring to dune habitats. During field identification, species characteristic of the plant communities that define the habitats were taken into account. The new list confirmed the presence of all five habitat types, with these being highlighted in nine Natura 2000 sites, including Continental (CON) and Steppic (STE) biogeographical regions. The presence of these habitats in the mentioned biogeographical regions requires the updating and revision of two documents: the standard forms and site management plans, as well as their adoption in appropriate legislative acts.

Key words*: checklist, conservation, dunes habitats, Habitats Directive.*

Marsilea quadrifolia, A VULNERABLE SPECIES IN ROMANIA IN THE CONTEXT OF ITS CONSERVATION STATUS REPORTED TO THE EU

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Abstract

Marsilea quadrifolia L. is a vulnerable species in Romania and threatened with extinction throughout Europe. The main threat is represented by the reduction of the species' habitat caused by various anthropogenic activities. In 2025, for the preparation of the third report under Article 17 of the Habitats Directive, the conservation status was carried out using the reporting guide for plant species of Community interest. For M. quadrifolia it was assessed as Unfavourable-Bad (U2) in all biogeographic regions. The short-term trends of the species in its distribution area are decreasing for all biogeographic regions: Continental, Pannonian and Steppe. In the period 2019-2024, the same short-term trend is maintained for both the population and the habitat of the species. For the three reporting periods carried out by Romania (2013, 2019 and 2025), the trend remains decreasing in all biogeographic regions. The remaining habitats of M. quadrifolia require appropriate conservation measures and management plans based on long-term sustainable development.

Key words*: conservation, distribution, Marsilea quadrifolia, Habitats Directive.*

THE IMPACT OF FERTILIZER ON FLORISTIC COMPOSITION AND BIODIVERSITY OF FOREST-STEPPE GRASSLANDS (HNV) IN THE NORTH EASTERN OF ROMANIA

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Abstract

National natural conditions strongly influence the floristic structure of meadows, creating a wide range of meadow types and formations. This diversity of species ensures the functionality, efficiency and resilience of the ecological balance within these natural ecosystems. The objective of this study was to determine the effect of the applied management on the phytodiversity of a Dichanthium ischaemum permanent meadow in the Moldavian forest-steppe. The experimental factor was: fertilization with seven treatments: T_1- unfertilized (control), T_2- $N_{50}P_{50}$ kg/ha annually, T_3- $N_{75}P_{75}$ kg/ha annually, T_4- $N_{100}P_{100}$ kg/ha annually, T_5-10 t/ha sheep manure annually, T_6-20 t/ha annually and T_7-30 t/ha annually sheep manure applied at two years. The applied fertilizers influenced the floristic composition, producing appreciable, 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 NP, the amount of manure, but also by the number of years of the fertilization period.

Key words*: forest-steppe grasslands, Dichanthium ischaemum, fertilizer treatment, diversity, species frequency, sustainable management.*

ANALYSIS AND ASSESSMENT OF HEALTH RISKS OF POLYCYCLIC AROMATIC HYDROCARBONS IN CEREALS IN ROMANIA

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Abstract

Cereal contamination with polycyclic aromatic hydrocarbons (PAHs) has become a food safety issue due to their carcinogenic and genotoxic effects on human health. EFSA has identified 4 PAHs to monitor: benzo[a]anthracene (BaA), chrysene (Chr), benzo[b]fluoranthene (BbF), and benzo[a]pyrene (BaP). PAH contamination in 82 wheat samples harvested from all counties of Romania in 2024 was investigated, and exposure and potential health risks associated with the dietary intake of cereals were evaluated by toxic BaP equivalent concentrations (TEQBaP), incremental lifetime cancer risk (ILCR), and margin of exposure (MOE), associated with the BaP and ∑4PAH intake. Analysis was performed using d-SPE QuEChERS-GC-MS/MS method. LOQ and LOD for the 4PAHs were 0.20-0.35 µg/kg and 0.06-0.11 µg/kg. Only ChR was quantified with a maximum value of 0.49 µg/kg. The average ∑4PAH content varied between not found and <1.32 µg/kg. TEQBaP values were between 0.054-0.179 µg/kg, average ILCR values were <1.37x10^{-6}, and MOE>10,000 for BaP and ∑4PAH was obtained, indicating that PAHs in Romanian wheat do not represent a concern.

Key words*: ILCR, MOE, PAHs, TEQBaP, wheat.*

CHOROLOGY, ECOLOGY AND PHYTOSOCIOLOGY OF THE ALPINE SEDGE SPECIES IN NORTHERN OLTENIA, ROMANIA

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Abstract

The alpine sedge (Carex curvula All.) is an endemic species, characteristic of alpine meadows. This species of conservation interest has a limited distribution at European level, being found in: the Alps, the Pyrenees, the French Massif Central, the Carpathians and part of the highest mountains in the Balkans. Alpine sedge grow on flat or slightly sloping terrain, on humic-silicate soils, strongly acidophilic, oligotrophic and covered with snow until the beginning of summer. In Oltenia, this species is found in the Parâng, Țarcu, Godeanu, Cernei, Lotru and the Căpățânii Mountains. From a phytocoenotic point of view, this alpine meadow species forms the plant community Primulo-Caricetum curvulae Br.-Bl. 1926 em Oberd. 1957, whose composition and floristic physiognomy vary depending on the ecological conditions existing in the different mountain groups in Oltenia. At the same time, this species is part of the floristic composition of other alpine plant communities of Ericaceae and other types of secondary alpine meadows, the species presenting a special conservation interest.

Key words*: chorology, alpine sedge, phytosociology, distribusion, plant communities.*

PHYTO-ECOLOGICAL STUDIES OF THE SPECIES *Angelica arhangelica* L. FROM THE SOUTHWESTERN CARPATHIANS, ROMANIA

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Abstract

Phyto-ecological studies are essential in understanding the plant cover structure, organization and their response to changes in other environmental factors. In In this study, we analyzed the phytosociological, chorological and ecological characteristics of the Angelica arhangelica species and their correlation with the current eco-pedoclimatic conditions in the studied area. Angelica archangelica L. 1753 is a biennial or perennial plant from the Apiaceae family, being an aromatic, robust plant, widespread in the hilly regions of central Europe and Asia, with conservative but also medicinal value. The article presents the results of 10 years of geobotanical monitoring of the species Angelica arhangelica in the southwestern Carpathians of Romania. Long-term studies have shown that this species is found especially in shady valleys with excess humidity in the mountain floor, participating in the formation of the coenotic nucleus of mesophilic and meso-hygrophilic plant communities, forming distinct phytocoenoses in which the dominant abundance of the species is quite high (3-4), especially in some stages of successive transformation of the vegetation in forest clearings or areas subject to eco-pedo-climatic transformations.

Key words*: Angelica arhangelica, plant communities, ecology, coenotic structure.*

CO-COMPOSTING AND VERMICOMPOSTING OF LAVENDER WASTE AND THE QUALITY OF THE RESULTING COMPOST

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Abstract

This research investigates the transformation of lavender waste through co-composting and vermicomposting, focusing on the composting process and compost quality. Ten compost variants were made using lavender residues (distilled stems and undistilled biomass), wheat straws, and manure from sheep, goats, and cattle. Five of these were produced through conventional co-composting, while the remaining five were produced via vermicomposting using the redworm species (Eisenia fetida). Phytotoxicity assays were performed, and the chemical properties (pH, U, OM, Ct, Nt, P, K and heavy metals) of the final products were analysed. The results showed that vermicomposting accelerated the transformation of lavender waste (6 months) compared with traditional composting, which took up to 12 months to mature. However, traditionally produced composts tend to achieve better quality. Chemical analyses of all final products revealed a pH between 7.82 and 9.67, well-balanced C/N ratios, OM between 25.33% and 46.77%, high nutrient (NPK) content and low concentrations of heavy metals. Germination tests, using compost teas, were made to evaluate compost maturity and phytotoxicity. Most composts surpassed the 80% germination index benchmark, demonstrating good stability.

Key words*: co-composting, vermicomposting, compost quality.*

VEGETATION AND THE PRODUCTIVE POTENTIAL OF PERMANENT GRASSLANDS DOMINATED BY *Festuca rupicola* Heuff. IN BIHOR COUNTY (NORTH-WESTERN ROMANIA)

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Abstract

The present study proposed two main objectives, the first was to investigate Festuca rupicola Heuff. grasslands in Bihor County in terms of productivity and biodiversity. The second main objective involves analyzing the floristic composition and comparing the productivity of Festuca rupicola Heuff. grasslands in Bihor County with similar phytocoenoses from nine locations elsewhere in Romania. To study the productive potential of Festuca rupicola Heuff. grasslands, two plant associations were studied: Festucetum rupicolae Burduja et al. 1956 and Thymo comosi-Festucetum rupicolae (Csűrös et Gergely 1959) Pop et Hodișan 1985, from seven locations in Bihor County. Festuca rupicola Heuff. grasslands are characteristic of the plains and hilly zones of Bihor County, occurring on moderately sloping terrain with generally sunny exposures. Due to less pronounced xerothermic ecological conditions, these grasslands exhibit a complex floristic composition, consisting mainly of xerophilous species, as well as mesoxerophilous ones. The pastoral value and productivity of these grasslands in Bihor County are weak-medium to middle-good, with a yield of 6.07-11.80 t/ha of green mass and a capacity of 0.57-0.98 LU/ha. To obtain a clearer understanding of the pastoral value, green mass production and livestock carrying capacity of these grasslands in Bihor County, a correlation analysis was conducted on Festuca rupicola Heuff. dominated grasslands originating from nine distinct regions of Romania.

Key words*: grasslands, pastoral value, green mass production, carrying capacity.*

RESEARCH ON HARMFUL ARTHROPOD SPECIES AND THEIR ANTAGONISTS IN SEVERAL RAPESEED CROPS

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Abstract

Research on arthropods associated with rapeseed crops was conducted at the Ezăreni Research and Student Training Station of "Ion Ionescu de la Brad" Iaşi University of Life Sciences during the 2025 growing season. Sampling employed yellow pan traps, Barber-type pitfall traps, sweep nets, and direct plant observations. All collected material was labeled with the sample number, collection method, and experimental variant. In the laboratory, specimens were cleaned of soil, plant debris, and other impurities, then preserved in ~20% ethanol until identification. Taxonomic determination was performed using standard keys, to class, order, family, and species levels. Collected taxa belonged to Arachnida, Insecta, and Crustacea. The most abundant and diverse class was Insecta, with species from Coleoptera, Diptera, Hymenoptera, Heteroptera, Homoptera, Lepidoptera, and others. Coleoptera was the dominant order in both abundance and species richness. Frequently collected beetle species included Ontophagus ovatus, Pseudophonus pubescens, Amara familiaris, Opatrum sabulosum, Coccinella septempunctata, Harpalus calceatus, Tanymecus palliatus, Idiocroma dorsalis, Amara aenea, Anisodactylus spp., and Pterostichus spp., reflecting the key Coleoptera fauna of rapeseed agroecosystems. This version keeps all essential details while staying concise and clear.

Key words*: yellow pan traps, rapeseed crops, harmful arthropod.*

COMPARATIVE ANALYSIS OF BIOACTIVE COMPOUNDS IN FENNEL AND CARAWAY SEEDS

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Abstract

Foeniculum vulgare Mill. (fennel) and Carum carvi L. (caraway) are aromatic plants widely used in the food, pharmaceutical, cosmetic, and feed industries due to their essential oils rich in biologically active compounds. This study characterized and compared the chemical composition, total phenolics, flavonoid content, and antioxidant capacity of essential oils and extracts from four fennel samples and one caraway sample. Essential oils were obtained by hydrodistillation and analyzed using gas chromatography–mass spectrometry (GC-MS). Fennel oils displayed a largely consistent qualitative profile, with trans-anethole as the predominant constituent (up to 60.5% in cv. Hestia), accompanied by minor compounds such as fenchone, α-pinene, β-pinene, limonene, and estragole, which varied quantitatively among cultivars. Caraway oil showed a distinct profile dominated by carvone and D-limonene, accounting for over 97% of the total volatile fraction. Caraway seeds exhibited the highest flavonoid content, while certain fennel cultivars accumulated more total phenolics, resulting in measurable differences in antioxidant capacity. These findings highlight the influence of species and cultivar on the accumulation of bioactive compounds and suggest that both fennel and caraway seeds have potential as natural feed additives to enhance antioxidant defenses, support metabolic efficiency, and improve dairy animal productivity.

Key words*: Foeniculum vulgare, Carum carvi, bioactive compounds, volatile compounds, feed.*

MACROPHYTES AS ECOSYSTEM ENGINEERS: IMPLICATIONS FOR BIODIVERSITY, WATER QUALITY, AND AGRICULTURAL SUSTAINABILITY

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Abstract

Macrophytes are recognized as ecosystem engineers that strongly influence freshwater and wetland ecosystems by shaping habitat structure, regulating nutrient cycling, and supporting key ecosystem services. Through their structural and functional diversity, macrophyte communities sustain high biodiversity, stabilize sediments, and enhance the resilience of aquatic food webs. Macrophytes play a central role in water quality regulation by retaining excess nutrients, reducing turbidity, and supporting biogeochemical processes that mitigate pollution. At the interface between aquatic ecosystems and agricultural landscapes, they contribute to sustainable agriculture by buffering nutrient runoff, improving water availability, and offering potential for nature-based solutions such as phytoremediation and nutrient recovery. Despite these benefits, macrophyte communities are increasingly threatened by eutrophication, habitat alteration, invasive species, and climate change. This paper emphasizes the need to integrate macrophyte conservation and management into water and agricultural policies to enhance biodiversity, maintain water quality, and support long-term agricultural sustainability.

Key words*: macrophytes, ecosystem engineering, biodiversity, water quality, agricultural sustainability.*

CONTRIBUTIONS TO THE KNOWLEDGE OF THE MORPHO-ANATOMY OF THE CARNIVOROUS PLANTS *Darlingtonia californica* AND *Cephalotus follicularis*

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Abstract

This paper focuses on the morpho-anatomical characteristics of the carnivorous plants Darlingtonia californica and Cephalotus follicularis, which, although not native species, provide valuable information for multiple scientific and practical fields. The analysis includes both the morphological examination of the vegetative organs and the anatomical structure revealed through transverse sections taken from different regions of these organs. Although they originate from completely different families and continents, these plant species have evolved traps that are functionally similar but structurally distinct-both internally and externally-as adaptations to extreme environments. Their study contributes to understanding the relationship between form and function, ecological and physiological adaptations, and the development of conservation strategies. It was also examined the current literature regarding their importance and methods of propagation, particularly since Darlingtonia californica is known for its richness in compounds with potential pharmaceutical and medical applications, while also having a restricted natural habitat. In this context, future research aims to develop conservation methods, cultivation techniques adapted to local climate conditions, and even micropropagation approaches to support the maintenance of existing populations.

Key words*: carnivorous plants, Cephalotus follicularis, Darlingtonia californica, trap structures.*

PRELIMINARY ASSESSMENT OF THE WATER QUALITY AND LENGTH-WEIGHT RELATIONSHIP IN FISHES OF IALOMIȚA RIVER: A NOTE FROM FIERBINȚI-TÂRG

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Abstract

In 2024 and 2025, several specimens of Blicca bjoerkna and Carassius gibelio were captured from the Ialomița River, near the locality of Fierbinți-Târg. The length-weight relationship indicated that the white bream and Prussian carp exhibited positive allometric growth. To complete the habitat assessment, two water samples, collected from the fish capture site (S1) and from another section of the same river (S2), were analyzed for physico-chemical parameters and compared with the limits established by national quality standards and recommended values for fish. Considering all measured quality parameters, water from S2 is of lower quality than that from S1. Microbiological analyses revealed the presence of Gram-positive cocci, bacilli Gram-positive, filamentous micromycetes and yeasts. Correlating the biometric data of the fish with the physico-chemical and microbiological parameters of the water could suggest that both B. bjoerkna, an autochthonous species, and C. gibelio, an invasive species, show positive allometric growth in a less polluted environment, characterized by reduced organic load.

Key words*: fish species, Ialomița river, length weight-relationship, water analysis.*

INTEGRATED ASSESSMENT AND MONITORING OF MINING WASTE DEPOSITS IN ROMANIA: ENVIRONMENTAL RISKS AND SUSTAINABLE REMEDIATION APPROACHES

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Abstract

Mining waste deposits represent a persistent environmental issue in Romania, generated by both historical and recent mining activities. Waste rock dumps, tailings ponds, and ash disposal sites continue to affect soil quality, surface and groundwater, air pollution levels, biodiversity, and public health. This paper presents an integrated assessment of mining waste deposits, focusing on their typology, physicochemical composition, geometric and geotechnical characteristics, and associated environmental risks. The study emphasizes major pollution mechanisms, including heavy metal contamination and acid mine drainage, as well as structural instability processes that may lead to environmental hazards. Based on recent national data and selected case studies, the research highlights the importance of continuous monitoring. An integrated monitoring framework is proposed, combining classical topographic and geodetic methods with modern technologies such as GNSS, UAV-based surveys, satellite InSAR, and real-time in situ sensors. Sustainable remediation and valorization solutions are discussed to support risk reduction and the long-term redevelopment of former mining areas.

Key words*: acid mine drainage, environmental risk, mining waste deposits, sustainable remediation, tailings management.*

THE INFLUENCE OF HORMONAL COMBINATIONS WITH AUXINS ON POTATO VITRO PLANTS DEVELOPMENT

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Abstract

*In 2024, at NIRDPSB Brasov, Romania in Laboratory of Plant Tissue Culture was undertaken a study with whose main objective was to follow the evolution of the development of potato microplants under the influence of various concentrations of auxins. Bifactorial experiment, of the type: 4*12 with 48 variants, divided into 3 repetitions included: the experimental factor a, variety with four gradations: a1 - Azaria, a2 - Braşovia, a3 - Cosiana, a4 - Cezarina (considered control variety) and the factor b the culture medium with different amounts of auxin, with 12 graduations. Braşovia variety stood out with the highest average value of plant height (10.86 cm), followed by Cosiana variety (10.39 cm); for the other analysed parameters (number of leaves, root length and number of internodes), Cosiana variety records the highest values (leaves: 8.36; root length: 5.14 cm; number of internodes: 5.53). Significant differences existed among hormonal treatment, cultivars for all determinations. The differences in data across interaction between hormonal treatment and cultivar was not significant.*

Key words*: auxins, growth regulators, microplants, potato, variety.*

THE BIOCHEMICAL COMPOSITION OF BIOMASS FROM INTERMEDIATE WHEATGRASS (*Agropyron intermedium)* AND POTENTIAL USES IN MOLDOVA

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Abstract

This research was conducted to determine biomass performances of intermediate wheatgrass (Agropyron intermedium) and its potential uses. We found that the dry matter content, biochemical composition and nutritive value of intermediate wheatgrass whole plants was characterized by the following indices: 13.1% CP, 39.0% CF, 67.2% NDF, 40.7% ADF, 3.6% ADL, 7.5% TSS, 9.1% ash with nutritive energy values 57.2% DMD, RFV = 79, 11.37MJ/kg DE, 9.34MJ/kg ME and 5.55MJ/kg NEl. The dry matter of prepared hay from intermediate wheatgrass contained 122g/kg CP, 94 g/kg ash, 398 g/kg CF, 412 g/kg ADF, 682g/kg NDF, 37 g/kg ADL with 55.8% DMD, 11.30 MJ/kg DE, 9.28 MJ/kg ME, 5.30 MJ/kg NEl. The obtained silage is characterized by pleasant smell and dark green colour, the nutrient content and feed energy values of dry matter were: 144 g/kg CP, 120g/kg ash, 395g/kg CF, 399 g/kg ADF, 654 g/kg NDF, 21 g/kg ADL, 57.8% DMD, 11.48MJ/kg DE, 9.43MJ/kg ME, 5.45MJ/kg NEl. The biochemical methane potential of the intermediate wheatgrass substrates ranged from 320 to 333 L/kg volatile solids.

Key words*: Agropyron intermedium, biochemical composition, biomethane potential, green mass, hay, nutritive value, silage.*

THE QUALITY OF PHYTOMASS FROM FENUGREEK *Trigonella foenum-graecum* IN THE REPUBLIC OF MOLDOVA

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Abstract

The objective of this research was to evaluate the quality indices of harvested green mass, hay and straw from fenugreek Trigonella foenum-graecum grow in monoculture in the experimental plot of the NBGI MSU Chişinău. It was established the biochemical composition and nutritive value of dry matter of the harvested green mass was 216 g/kg CP, 119 g/kg ash, 244g/kg CF, 261g/kg ADF, 416 g/kg NDF, 37 g/kg ADL, 224 g/kg Cel, 155 g/kg HC with 11.01 MJ/kg ME, 7.02 MJ/kg NEl. The prepared hay contained was 209 g/kg CP, 124 g/kg ash, 310g/kg CF, 326 g/kg ADF, 501 g/kg NDF, 47 g/kg ADL, with 63.5% DMD, 10.26 MJ/kg ME, 6.28 MJ/kg NEl. The collected straw after grain threshing had 114 g/kg CP, 123g/kg ash, 459g/kg CF, 517 g/kg ADF, 706 g/kg NDF, 107 g/kg ADL, with 9.82 MJ/kg ME. The phytomass from Trigonella foenum-graecum may be used as feed for livestock, also as feedstock for biomethane production.

Key words: *biochemical composition, biomethane production, green mass, hay, nutritive value, straw, Trigonella foenum -graecum.*

BIOMETHANE: PRODUCTION, USES AND ENVIRONMENTAL IMPACT

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Abstract

The climate changes of last decades require more and more the finding of alternative solutions for the provision with electrical and thermal energy of at the farm level. The first biomethane plant from biogas was put into operation in Germany in 2006, thus offering an alternative to fossil fuels. Biomethane is used in liquid form as bio-LNG or in gaseous form as bio-CNG. In addition to its use in the electricity and heating markets, biomethane is particularly suitable for freight transport, while bio-CNG is more suitable for passenger cars, delivery vehicles, public transport and tractors. At the same time, at the farm level, biomethane offers a decarbonisation tool by providing electricity and heat with a closed carbon cycle, being a renewable gas that can replace fossil fuels. At present, depending on European and national legislation, each of the European countries has its own means to support the biomethane market. This paper aims to present the current situation of biomethane production technologies, the possibilities of their use at farm level and the impact on the environment.

Key words*: biomethane, biogas upgrading, climate change, renewable energy, carbon cycle.*

INTEGRATED UAV AND GIS-BASED TECHNOLOGIES FOR EARLY DETECTION AND SITE-SPECIFIC MANAGEMENT OF WEEDS IN ARABLE CROPS UNDER CLIMATE CHANGE CONDITIONS

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Abstract

Climate change and increasing environmental constraints require more precise and adaptive approaches to crop protection. This study investigates the use of integrated unmanned aerial vehicle (UAV) imagery and Geographic Information Systems (GIS) for early weed detection and site-specific management in arable crops. Multispectral UAV data were collected during key crop development stages and processed to produce high-resolution RGB, NIR and vegetation index-based orthophotoplans. Spatial analysis techniques were applied to distinguish crop rows from weed-infested areas and to evaluate the intensity and distribution of infestations. The results show that combining UAV-derived data with GIS analysis allows accurate identification of weed patterns at field level and supports targeted management decisions. Field observations were used to validate remote sensing outputs and to improve interpretation accuracy. The proposed approach contributes to reducing unnecessary agrochemical applications while maintaining effective weed control. Overall, the study demonstrates that UAV-GIS integration can provide a reliable decision-support tool for sustainable weed management and climate-resilient arable farming systems.

Key words*: precision agriculture, UAV, GIS, weed detection, climate change.*

SYNERGISTIC DIGITAL AND AGROECOLOGICAL TECHNOLOGIES FOR INTEGRATED WEED MANAGEMENT IN FIELD CROPS: A SYSTEMS-BASED APPROACH

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Abstract

Sustainable weed management increasingly depends on the integration of digital tools with agroecological principles. This paper presents a systems-based approach to integrated weed management in field crops, focusing on the combined use of UAV-based remote sensing, GIS spatial analysis and agroecological management strategies. Experimental data obtained from field trials were analyzed together with spatial vegetation indicators to evaluate weed distribution and management efficiency. Particular attention was given to the interaction between early weed detection, spatial variability and environmentally adapted intervention measures. The results indicate that digital monitoring tools, when embedded in an agroecological decision framework, can significantly improve weed control efficiency while reducing reliance on chemical inputs. This integrated approach supports current Green Deal objectives and contributes to more resilient cropping systems. The study provides a practical and replicable model for implementing data-driven, environmentally responsible weed management strategies within precision agriculture.

Key words*: integrated weed management, agroecology, remote sensing, GIS, sustainability.*

STUDY OF SENSITIVITY TO DIFFERENT CONCENTRATIONS OF KCL IN SAMPLES OF THE SPECIES *Aegilops geniculata* Roth

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Abstract

The study investigated the sensitivity of Aegilops geniculata Roth to salinity stress from varying concentrations of potassium chloride (KCl) during seed germination and early seedling development. The research utilized five accessions of Aegilops geniculata Roth sourced from the Genebank of Bulgaria's working collection. A completely randomized experimental design was employed, incorporating seven KCl concentrations (0 mM—control, 50, 100, 150, 200, 250, and 300 mM), with two replicates per treatment. Results revealed significant adverse effects on germination rates and seedling traits, except for an extended germination period under saline conditions. Notably, shoot growth was more hindered by high salinity than root development, particularly at 300 mM KCl. At this concentration, all genotypes except BGR43677 failed to germinate or sustain shoot and root growth. In contrast, the BGR43677 genotype exhibited exceptional salt tolerance, maintaining viable germination and promoting both shoot and root growth under extreme salinity. These findings underscore the variability in salt tolerance among A. geniculata accessions and highlight BGR43677 as a promising candidate for further study in saline environments.

Key words*: Aegilops geniculata Roth, salinity, KCl, sensitivity, germination, seedling growth.*

TURNING SHEEP WOOL INTO FERTILIZER: A SUSTAINABLE APPROACH FOR CABBAGE PRODUCTION

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Abstract

Modern agriculture faces the challenge of reducing waste while maintaining soil fertility, underscoring the importance of sustainable, circular approaches. Sheep wool, often considered a livestock waste, can be recycled into an organic fertilizer that enhances soil properties and supports sustainable vegetable production. This study assessed the potential of sheep wool fertilizer in cabbage cultivation compared to other organic and mineral fertilizers. The experiment was conducted at the University of Sarajevo, Faculty of Agriculture and Food Sciences, using a randomized block design with three replications. Five treatments were tested: control with no fertilizer, pelleted cattle and horse manure, pelleted poultry manure, pelleted sheep wool fertilizer, and mineral fertilizer NPK 10:20:30. Cabbage yield, bioactive compound content, and macro- and microelement concentrations, including N, P, K, Ca, Mg, Fe, Cu, and Zn were measured. The control exhibited higher bioactive compounds due to nutrient stress, but had the lowest yield. Sheep wool fertilizer achieved yields comparable to those from poultry and cattle manure, demonstrating its effectiveness as a sustainable alternative for cabbage production, combining productivity with environmental and circular economy benefits.

Key words*: Circular economy, sheep wool, bioactive compounds.*

STUDY OF SOME PHYSICAL PARAMETERS AND ENTOMOLOGICAL EVALUATION OF SEEDS OF COMMON WHEAT LINES

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Abstract

Eight lines of common soft wheat from the breeding program of IASS "Obraztsov chiflik" - Ruse were studied for yield, physical and entomological characteristics of the seeds obtained. The experiment was carried out under natural infestation ground of sunn pest, using "free choice" host condition. During the two years of the study, the average seed yield, 1000-kernel weight, test weight, damaged seeds and yield loss were respectively: 618 and 625 kg da^{-1}, 37.5 and 40.36 g, 71.62 and 75.54 kg hl^{-1}, 1.89 and 4.99%, 2.30 and 5.32 kg da^{-1}. The percentage of damaged seeds was determined both by the genotype and by the year (when the weather conditions were favourable for the development, multiplication and harmful activity of the pests). Yield loss was determined mainly by the year and to a lesser extent by the interaction of genotype x year. In the complex assessment of the studied parameters, L05 line showed the best results and can be used as a starting material in the breeding program.

Key words*: wheat lines, sunn pest, physical parameters, yield loss.*

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