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Faculty of Agriculture

International Conference

"Agriculture for Life, Life for Agriculture"

BOOK OF ABSTRACTS

Section 1

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2025
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SUMMARY

SOIL SCIENCES

CROP SCIENCES

MISCELLANEOUS

SOIL SCIENCES

DETERMINATION OF THE EFFECT OF SILICON, MYCORRHIZA AND PHOSPHORUS BACTERIA APPLICATION ON INCREASING PHOSPHORUS UTILIZATION EFFICIENCY AND STEM RESISTANCE IN SUNFLOWER (*Helianthus annuus*)

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Abstract

Today, the intensive use of chemical fertilizers causes various environmental problems. Inoculation of microbial preparations as an alternative to chemical fertilizers to plants can be an effective method for sustainable production efforts. Silicon application shows potential to increase nutrient uptake by roots and nutrient availability in the rhizosphere through complex mechanisms, can increase P availability in the soil. In this study, the effects of silicon application and inoculation of phosphorus solubilizing bacteria and mycorrhiza on sunflower plant growth and phosphorus utilization efficiency were investigated. Oil sunflower seed, Glomus etunicatum, mycorrhiza complex and with phosphorus bacteria were inoculated. Si application was also made at doses of 0-30-60 kg/da. After the sowing of the experimental plants, mycorrhiza and P bacteria were inoculated. The experiment was terminated when 50% of the flowers bloomed. According to the results, average plant height, flower wet and dry weights showed significant differences with Si treatments, Si with mycorrhiza and P bacteria treatments. 30 Si kg/ha dose had more positive effects on plant growth.

***Key words**: silicon, phosphorus, mycorrhiza, phosphorus bacteria.*

ASSESSMENT OF HYDROCARBON CONTAMINATION USING GEOPHYSICAL METHODS AND ITS IMPACT ON SOIL QUALITY IN AGRICULTURAL CONTEXT

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Abstract

This paper presents an integrated investigation of hydrocarbon-contaminated soils near the Petromidia refinery using advanced geophysical and hydrogeological methods, with implications for soil sciences in agriculture. The main goal was to identify and monitor contamination to assess its impact on soil quality and support sustainable land management strategies. Methods included electrical resistivity measurements (Vertical Electrical Soundings - VES), ground-penetrating radar (GPR) with 100 and 500 MHz antennas, and hydrogeological drilling for soil and groundwater sampling. Geophysical data were integrated with hydrogeological results to develop a hydrogeophysical model. The study revealed contaminants as thin hydrocarbon films within sandy layers and localized accumulations along NW-SE fault zones. Contamination is influenced by active infiltration, precipitation, and continuous pollutant influx. The resulting hydrogeophysical model accurately mapped the spatial distribution and migration pathways of pollutants, emphasizing soil vulnerability in the area. These findings are critical for assessing impacts on soil fertility and the agricultural potential of adjacent lands. This integrated approach provides a solid basis for remediation strategies and sustainable soil resource management.

Key words*: hydrocarbon contamination, geophysical methods, VES, GPR, hydrogeophysical model, soil quality.*

STUDY ON LAND AFFECTED BY EROSION IN GORJ COUNTY

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Abstract

In Gorj County, water erosion is the most common form of soil degradation, affecting an area of 139,027.95 ha, i.e. approximately 57.04% of the total agricultural land. Of these, 134,940.26 ha are affected by surface erosion, and 4,087.69 ha by depth erosion. The diversity of the relief, anthropogenic productive activities and climate change contribute to the extension of these erosion processes, significantly affecting agricultural productivity on the affected areas. Soil erosion in Gorj is thus a major problem for the agricultural sustainability of the region. In the internal hollow, more precisely in the secondary hollows of Tismana, Peştişani, Crasna, Novaci, Polovragi, there are soils evolved on fluvial gravels with a strong acidic character, brought from the mountains. These soils contain a high percentage of skeletal material, which acts as a limiting factor by reducing the edaphic volume of the soil. In these areas, the land has slopes greater than 5%, and surface erosion occurs over the following areas: 7,793.52 hectares in Padeș, 5,733.88 hectares in Crasna, 4,194.32 hectares in Tismana, 3,824.80 hectares in Novaci, and 1,971.58 hectares in Polovragi.

Key words*: surface erosion, depth erosion, soil, slope, hollow.*

THE INFLUENCE OF TILLAGE METHODS AND FERTILIZATION ON SOME PRODUCTIVITY ELEMENTS IN GRAIN SORGHUM CULTURE IN THE CLIMATIC CONDITIONS OF THE SĂRĂŢENI-IALOMIŢA AREA

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Abstract

Sorghum is a drought-tolerant plant and grows well in arid conditions, a fact for which it has earned its reputation throughout the world, being able to grow in areas with limited rainfall, with poorly fertile soils and in unfavorable conditions. Regarding mmb, the data of this study show that most fertilizations have significantly lower values than the unfertilized controls, reaching differences of +2.5 g in the case of the discussed variant with a fertilization of 100 kg nitrogen + 50 kg phosphorus/ha. Fertilization based on nitrogen 100 kg/ha + phosphorus 50 kg/ha had a significant contribution to protein, its values were between 10.6% and 10.8%, with a minimum increase of +0.6%. The most favorable combination of technological factors that ensured the highest value of protein content of 10.8% was represented by soil cultivation by scarification at 45 cm and a fertilization of N100 + P50.

Key words*: Sorghum bicolor L., tillage, fertilization, protein.*

SOIL PHYSICAL PROPERTIES, SPECTRAL RESPONSE AND YIELD OF THE SUNFLOWER UNDER DIFFERENT TILLAGE SYSTEMS AT EZARENI FARM, IASI COUNTY, ROMANIA

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Abstract

The study analyzes the short-term effect of tillage systems on soil physical properties, spectral response and sunflower yield, was based on three tillage system NT (No-tillage); MT (Minimum tillage); and CT (Conventional tillage). Data collected include soil physical properties (PR: Penetration resistance, VWC-Soil water content, Ks-Soil hydraulic conductivity), crop's spectral response through different multispectral sensors, and yield. Results showed that the for Ks, the highest value was obtained with NT at depth 0-10 cm. Concerning PR, high values were respectively recorded with CT (3.54 Mpa) during the vegetative period of the plant and with MT (2.54 MPa) during the harvesting period. Grain yields were also influenced by the tillage systems and reached values of 2.105, 2.631 and 3.052 kg/ha, respectively for the NT, MT and CT systems. Yield was also affected by heavy draught.

Key words*: tillage systems, soil physical properties, spectral response, yield, sunflower.*

STUDY ON THE ANALYSIS OF THE MAIN AGROPRODUCTIVE PROPERTIES OF THE EUTRIC PSAMOSOL IN DOLJ

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Abstract

The study analyzes the main agroproductive properties of eutric psamosols in Dolj County, identified on large areas between Craiova and Dăbuleni, in areas with dunes subject to wind deflation. They contain a very high percentage of sandy material, being very dry and permeable. These soils benefit from a deficient moisture regime, are much poorer in humus, clay and nutrients, which is why they have a very low natural fertility, being generally used as poor quality pastures. Based on the results carried out in the field and in the laboratory, it is recommended that in order to be cultivated, these soils require radical improvement works, including: irrigation, organic and mineral fertilization with large quantities of fertilizers, combating wind deflation and cultivating with plants specific to sandy areas. The application of improvement measures has increased the bonitization scores, which demonstrates that eutric psamosols can also achieve medium fertility.

Key words*: agroproductive properties, eutric psamosol, amelioration measures, bonitation grades, fertility.*

RESEARCH ON THE INVENTORY OF THE MAIN PHYSICAL-HYDRIC AND CHEMICAL PROPERTIES OF THE MOLLIC PSAMOSOL IN THE SOUTHERN AREA OF OLTENIA (LEFT OF THE JIU RIVER)

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Abstract

The paper presents the main properties of the mollic psamosols from the left bank of the Jiu River, starting from the climatic conditions, the lithology of the area, hydrography, hydrology, natural vegetation. The research included the documentation, field and laboratory stages. This type of soil has somewhat better relations with water and air, is richer in the colloidal complex, in humus and nutrients, for this reason it has somewhat higher fertility compared to other sandy soils. Based on these properties and the natural conditions in the area, bonitation grades can be assigned and classes of favorability can be established for different crops. It should be taken into account that in the climatic conditions of recent years in Oltenia, in order to improve the mollic psamosols, a series of measures must be taken, including: deep loosening, enrichment in humus and clay, application of organic and chemical fertilizers, but especially the completion of the moisture deficit through irrigation.

Key words*: soil profile, horizon, physical-hydric and chemical properties, psamosol.*

SOIL QUALITY IN PADDY FIELDS OF COASTAL KARNATAKA, INDIA

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Abstract

Coastal soils are typically nutrient-dense, acidic and extremely saline. Synthetic N:P:K supplementation and biofertilizers are essential for paddy cultivation. Global warming causes the ozone depletion, creating a harsh agro-environment for crop plants and beneficial soil organisms. Physico-chemical analysis was carried out for the twenty-five soil samples collected from the paddy fields of Coastal Karnataka in the present study. The results of the soil experiment indicated that TMR_3 (S_2) was more acidic (4.06), and the pH was essentially supported by the extremely low amount of organic carbon material in the HK (S_2) region (0.63%). With the exception of sulphur (S), which is less available and negatively correlated with other soil properties, it also exhibits a positive correlation with micronutrients (Ca, Mg, Zn, Cu, Fe, Mn and B). The highest content of macronutrients is nitrogen 502.00 kg/ac in the GSUK region, phosphate 27.30 kg/ac in the SK (S_1), and potassium 402.66 kg/ac in the HUK region. The results indicate that the more acidic-saline soil is harmful to rice crops, and less beneficial to agriculture.

Key words*: paddy soil, algal bloom, cyanobacteria, global warming, synthetic and biofertilizers.*

BEHAVIOR OF WHEAT UNDER DIFFERENT TILLAGE SYSTEMS IN THE PEDOCLIMATIC CONDITIONS OF THE TRANSYLVANIAN PLATEAU

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Abstract

Modern agriculture's challenges are being addressed by implementing agricultural methods that improve the soil's condition and decrease CO_2 emissions. Through the research carried out at the Agricultural Research and Development Station Turda we aim to highlight, by comparison with the conventional system (CS- plough) the effectiveness of unconventional tillage systems (MTC- chisel, MTD- disk, NT- direct sowing) at winter wheat cultivation, in the soybean-wheat-maize rotation, from the perspective of technological implications. The experience is organized according to the subdivided plots method, with two replications. The biological material used in this experiment is the „Andrada" winter wheat variety. In the 11 vegetation periods (2013/2014…..2023/2024), the average of winter wheat yield was highest in the MTC system (6,662 kg/ha), but with an increase in yield below 100 kg/ha compared to CS. Even though in the MTD and NT systems the yield is lower than in the CS, these systems, in addition to the benefits they have on the properties of the soil, also represent a way towards better economic efficiency. Sustainable development principles must be adhered to when adopting unconventional soil tillage systems, considering plant requirements and favorable climate and soil conditions.

Key words*: climate, fertilization, tillage system, wheat, yield.*

DYNAMICS OF SOIL MOISTURE UNDER THE MAIN FIELD CROPS (WHEAT, MAIZE, SUNFLOWER, PASTURE) ON A CLAY-LOAM SOIL IN THE SOUTH-WEST OF ROMANIA

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Abstract

The water consumption of plants is influenced by species, variety, vegetation periods, the degree of root development and intensified by the type of soil and the type of practical agricultural work. This paper presents the evolution soil moisture in 2022 year, depending on the technology applied to wheat, corn, sunflower and pasture crops. Analysing the evolution of soil moisture, under the 4 crops, during the agricultural year, it was possible to observe differences in soil moisture between the applied technologies and, of course, also between crops. For the analysed area, respectively on a clay loam soil, the utilization of the water from the precipitation is better achieved in the conditions of the preparation of the germinal bed by plowing.

Key words*: soil moisture, tillage, precipitation.*

ORGANIC AGRICULTURE HAS DEFECTS IN THE SCOPE OF MINERAL FERTILIZATION

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Abstract

The organic agriculture system refuses mineral fertilizers in a wide range; however, plants utilize essential plant nutrients in mineral forms. This is because the elements bonded to the structure of organic matter are not readily available for plant uptake. Thanks to the mineralization process that leads to mineral nutrients released from organic matter, the decomposition rate depends on several environmental factors. Thus, either lower or higher nutrient amounts may appear in the soil which would be far from meeting plant nutrient requirements or ecological concerns may arise. Nitrogen has a priority in the scope of environmental issues. The results gathered by the working group revealed that nitrate concentration may be even higher in organic farming systems on average. Some researchers draw attention to mineral fertilizer production's economic and environmental costs. Yet ammonia gas sources in the livestock industry threaten the atmosphere and may be sources of organic agriculture-friendly nitrogenous fertilizer. This article was prepared to highlight that using mineral fertilizers from certain sources should be allowed in organic agriculture within certain limits and based on soil analysis.

Key words*: organic agriculture, global warming, ammonia emission, food security.*

A COMPARATIVE STUDY OF THE BENTONITES AND NATURAL ZEOLITES CAPACITIES TO REDUCE THE BIOAVAILABILITY OF HEAVY METALS IN A CONTAMINATED SOIL

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Abstract

Soil contamination with heavy metals is a major environmental challenge, particularly in industrial regions such as Copșa Mică, Romania. Past industrial emissions have resulted in substantial soil pollution, with levels of lead (Pb), cadmium (Cd), and zinc (Zn) exceeding permissible limits. This study investigates the effectiveness of various bentonites and natural zeolites in reducing heavy metal mobility and bioavailability in contaminated soil. Laboratory incubation tests were conducted using six inorganic additives sourced from Romania. The additives were applied at a 3% (w/w) dosage, and their effectiveness was evaluated using single metal extraction methods with DTPA + $CaCl_2$ + TEA (pH 7.3) and 1M NH_4NO_3. The results demonstrate that all amendments significantly reduced heavy metal mobility, with variations depending on the specific metal. Activated bentonite exhibited the highest efficiency in immobilizing Pb and Zn, while zeolite proved most effective for Cd stabilization. This study highlights the potential of natural zeolites and bentonites as cost-effective and environmentally friendly solutions for soil remediation in heavily polluted areas.

Key words*: additives, contamination, immobilization, metals, soil.*

DYNAMICS OF IRON IN SOIL AND ITS INTERACTION WITH FERTILIZATION: IMPLICATIONS FOR PLANT NUTRITION AND GROWTH

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Abstract

The study explores the dynamics of iron in soil, focusing on processes that influence its availability to plants, such as solubilization, complexation, and interactions with pH and organic matter. It analyzes the effects of various types of fertilizers on iron bioavailability and plant health. The research emphasizes the importance of balancing fertilization to prevent iron deficiencies or toxicity, highlighting sustainable management strategies to maximize iron uptake and optimize crop growth.

Key words: *iron, soil, plant nutrition.*

THE FUNCTIONAL MICROBIAL PROFILE IN HEAVY METAL CONTAMINATED SOILS AFTER ONE AND A HALF YEAR OF BIOREMEDIATION

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Abstract

Bioremediation is a sustainable form of improving the health of soils in heavy metal contaminated urban areas. For the research were selected 5 historically polluted sites from Baia Mare city that were phytoremediated for a period of one and a half year. In all sites, microbial functional profile was analysed in Biolog EcoPlates, a method that enables the detection of microbial heterotrophic communities and their activity in relation to a set of standardized substrates. After a year and a half of bioremediation, the basal activity showed small differences between the microbial functional activity in all 5 analyzed sites. Two sites presented the highest sum of functional activities, with more than 30 units recorded in each. The minimum sum of activity recorded was below 20 units. The same site recorded the highest diversity of the total functional microbiome. The presence of heavy metals is visible in the activation of different functional groups from the total microbial community present in these soils.

Key words*: bioremediation, microbial activity, functional microbiome.*

THE BEHAVIOR OF WINTER WHEAT IN THE CONSERVATIVE TILLAGE SYSTEM UNDER THE CONDITIONS AT A.R.D.S. PITEȘTI-ALBOTA

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Abstract

In the conservation agriculture, minimum tillage and direct sowing have been widely spread lately in the wheat crop. The paper presents the experimental results obtained in the agricultural year 2023-2024 regarding the effect of pedoameliorative and basic soil works - conventional and conservative system (direct sowing) on the wheat crop. The research was carried out in the experimental field of the ARDS Pitesti-Albota. The yield varied according to the pedoameliorative works (scarified soil, nonscarified soil), the depth of the basic soil works, but also the climatic conditions recorded during the research period. In the experimental year 2024, the average wheat yield recorded a value of 5683kg/ha in the scarified soil variant and 5399 kg/ha in the nonscarified soil variant, with a difference of 284 kg/ha in favor of the scarified soil variants. From the data obtained in the reserch area of ARDS Pitesti Albota in the conditions of the typical luvosol, the conservation system was favorable to the wheat crop.

Key words*: conservative system, grain yield, luvosol, soil works, wheat.*

ALGAL BIOFERTILIZERS FROM THE GENUS *Nostoc*: A SUSTAINABLE ALTERNATIVE FOR THE CULTIVATION OF *Echinaceae purpurea* L. IN THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

The present paper presents the experimental results established upon combined application of algal biofertilizers from the genus Nostoc, the species Nostoc gelatinosum Schousboe ex Bornet & Flahault, N. punctiforme (K ützing) Hariot and N. linckia Bornet ex Bornet & Flahault to the cultivation of Echinacea purpurea (L) Moench. The obtained results demonstrated that the application of these biofertilizers had a significant positive effect on several phenological and morphological parameters of the plants. An acceleration of the phenological phases of development was found, with a reduction of the vegetation period by up to 7 days in the variants with the application of algal biofertilizers. Also, a significant increase in leaf area, plant length and biomass production was observed in E. purpurea plants treated with algal biofertilizers compared to controls. The best results were obtained when applying a dose of 30 kg/ha of algal biofertilizer from the genus Nostoc. These results suggest that algal fertilizers from the genus Nostoc can be used as an ecological and efficient alternative for increasing the production of Echinacea purpurea crops. (L) Moench. in the specific conditions of the Republic of Moldova.

Key words: *Nostoc genus, Echinacea purpurea, algal fertilizers, growth.*

REGARDING TRANSFER FACTOR OF SOIL POLLUTION WITH HEAVY METALS IN SOIL-PLANT SYSTEM

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Abstract

Heavy metals such as lead (Pb), cadmium (Cd), nickel (Ni), zinc (Zn), copper (Cu) present in large amounts in soil surface horizons are chemically stable compounds. They are complexed with various organic or inorganic ligands, which amplifies their toxicity. They, as we know, produce negative effects in different plant organs, and by transfer in the food chain produce different pathologies in animals and humans. The aim of the present work was to determine the transfer factor of lead (Pb) and cadmium (Cd) from soil to crop plants based on the concentrations determined for these elements. The transfer factor (TF) values were calculated for lead (Pb) and cadmium (Cd). Thus, the transfer factor for Cd was much higher than that for Pb, but the values do not exceed the reference value, namely 1.

Key words*: environmental impact, food chain, heavy metals, soil pollution, transfer factor.*

RHIZOSPHERE MICROBIOTA PROFILES ACROSS DIFFERENT WINTER WHEAT CULTIVARS

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Abstract

Global changes, driven by climate change and the growing human population, have necessitated the development of innovative solutions to maintain agricultural productivity and quality. This has often led to the adoption of intensive agricultural practices, which significantly alter soil properties, including its physical, chemical, and biological characteristics. Soil microbiota are key mediators of essential soil processes, climate regulation, and plant health, influencing nutrient cycling, organic matter decomposition, and overall soil fertility. Plant roots serve as the primary source of nutrients for soil microbiota, releasing organic exudates into the soil. These exudates create a dynamic rhizosphere environment that attracts microorganisms, which, in turn, contribute to plant health by providing nutrients, releasing hormones, and neutralizing toxins. This study aimed to analyse the rhizosphere microbiome associated with three winter wheat (Triticum aestivum L.) cultivars Glosa, PG102, and Miranda. Soil samples were collected during different growth stages to assess the composition and variation of bacterial and fungal communities. Microbiological analyses revealed temporal and cultivar-dependent shifts in microbial abundance. The total number of bacteria was highest in autumn, decreased during winter, and increased again towards the flowering stage. Gram-positive bacteria followed a similar trend, with minor cultivar-specific deviations. Fungal community composition also varied over time. These results suggest that microbial communities are influenced by both environmental conditions and wheat genotype, highlighting the potential role of cultivar selection in shaping rhizosphere microbiota.

Key words*: microbiota community structure, soil microbiota, winter wheat, rhizosphere.*

THE IMPACT OF DCD AND DMPP ON NITRIFICATION IN ALKALINE AND SILTY LOAM TEXTURED SOIL

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Abstract

Nitrogen, which serves an important role in the vital activities of living organisms, is difficult to manage because it is highly mobile in soil. Nitrate, which is a form of mineral nitrogen, can cause economic and environmental effects through losses such as leaching and denitrification. Nitrification inhibitors slow down the biological process of nitrification in soil, preventing nitrate losses. In this study, the effects of DMPP and DCD on the nitrification process in soil with silty loam and alkaline textures were examined in an incubation conditions. The findings showed that the effects of DCD were still present on the 51st sampling day and both inhibitors were successfully inhibiting nitrification for more than 21 days. Soil mineral nitrogen content increased by 9% and 7% in the DCD and DMPP compared to the Control, respectively. DCD was found to be more effective at inhibiting nitrification in alkaline and silty loam soils. The impact of nitrification inhibitors on plant productivity and their function in mineral nitrogen losses require more research.

Key words*: DCD, DMPP, nitrogen, nitrification inhibitors, alkaline soil.*

AGRONOMICALLY VALUABLE SOIL AGREGATS WITH INOVATIVE CULTIVATION TILLAGE

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Abstract

The final process of mechanical impact of the working soil tillage tools is the achievement of a certain aggregate composition regarding the size of the fractions. The object of the study is Innovative working bodies and the certain values of soil fragmentation. The indicator of agronomically valuable soil is determined by the fraction with sizes from 1 to 25 mm. The data are processed at three different indicators regarding the speed of the machine-tractor unit, at two different soil terrains. The experiment was carried out with a tillage mill with non-standard, disk working bodies with a horizontal axis of rotation. The percentage of soil fragmentation into aggregates is determined for each experiment, by taking 5 soil samples at equal distances along the length of the experimental field. The results after the experiment show that with innovative disks at certain indicators such as soil type, humidity and speed, optimal values of the soil aggregate composition are reached.

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

THE EVOLUTION OF MICROBIAL FUNCTIONAL PROFILE INVOLVED IN DECOMPOSITION PROCESSES IN LONG-TERM FERTILIZED EXPERIMENTS

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Abstract

The decomposition of organic matter plays an important role in the release and cycling of nutrients in agricultural soils. The use of 30-day decomposing straw technique, instead of the soil substrate itself, was chosen to highlight the microbial community involved in the decomposition of soil organic matter. EcoPlate (Biolog) readings were used to record daily changes in functional guilds. Dynamics of the Biolog EcoPlate showed the fluctuations within the functional microbial community active in the decomposition process. Both functional guilds presented a differentiated pattern over time. This functional analysis allows a better understanding microbial ability to break down and utilize the available compounds, underline their adaptability and metabolic diversity. The sum of activities recorded was more than 350% increase in NPK-amended variants. AWCD revealed a daily change in the performance of decomposing microbiomes with more than 525% increase in the same variants. Polymers, CH and AM guilds presented increases of over 400%. The interaction of microorganisms with organic matter is visible in the specific dynamics of functional microbiomes.

Key words*: functional microbiome, long-term impact, microbial dynamics, input-based fluctuations.*

AGROGENETIC EVOLUTION OF ARABLE CHERONEZOMS IN THE AREA BETWEEN THE PRUT AND NISTER RIVER: STAGES, TRENDS

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Abstract

*The agrogenetic evolution of arable chernozems in the area between the Prut and the Dniester is examined through the prism of the genetic-evolutionary chain "elementary factors↔regimes↔pedogenetic processes↔soil" taking into account the changes induced in its components by the inclusion of soils in the agricultural regime. In such an approach, agrogenetic pedogenesis is examined through the prism of intercalated interdependent and interdetermined interactions induced by the use of soils in the agricultural circuit and climate change. In this context, the agrogenetic evolution of arable chernozems is genetically determined and the driving force of its development are the functional changes occurring in the organic matter system of so*ils.

Key words: *agrogenetic evolution, organic matter system, bioenergetic resources, energy potential, morphogenetic profile, humiferous profile.*

LAWFUL ANATOMICAL TRANSFORMATION OF THE BASIC PHYSICAL PARAMETERS OF ARABLE CHERONEZH LAND IN THE AREA BETWEEN THE PRUT AND NISTER RIVER

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Abstract

The basic physical parameters of soils are the product of the structural-functional organization of the soil and reflect its reaction to the impact of environmental factors and are materialized in the functioning of the pedofunctional system [bioenergetic system]↔[aggregate system]. From the perspective of the hierarchy of the structural-functional organization of the soil, we propose to use the functional [bioenergetic system]↔[aggregate system] for evaluating the evolution trend of chernozem typogenetic processes.

Key words*: physical parameters, soils, structural-functional, typogenetic, chernozem.*

BIOLOGICAL ACTIVITY OF A TYPICAL CHERNOZEM OF AGROCENOSIS

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Abstract

The biological properties of the soil play a leading role in shaping its fertility and the productivity of cultivated plants. The biological activity of soil is a multifunctional characteristic that depends on the properties of the soil, environmental factors that form this soil, the biological properties of vegetation, and the characteristics of agricultural technology. The activity of cellulose destruction can serve as a characteristic of the biological activity of the soil due to the transformation of organic matter, determine the level of soil fertility and biota productivity. According to the results of the experiments, the dependence of the decomposition of linen cloth on the depth, agricultural landscape culture, amount of moisture and nitrogen content in typical chernozem was established. The biological activity of chernozem typical in terms of cellulose decomposition intensity (% of decomposed linen fabric) in both field and laboratory experiments, regardless of the variant, is estimated at a level close to average in the surface layers of the soil (up to a depth of 30 cm) and at a weak, very weak level in the 30-50 cm layer.

Key words*: biological activity, cellulose destruction activity, typical chernozem, agrocenosi.*

GEOSPATIAL MODELING AND REGIONAL ANALYSIS OF SOIL EROSION RISKS IN ALBANIA

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Abstract

Soil erosion poses a significant threat to Albania's environment and economy, impacting agricultural productivity, food security, public health, and infrastructure. This study conducts a regional assessment of soil erosion risks, identifying the most affected areas, underlying causes, and potential mitigation strategies. According to the World Bank, approximately 70% of Albania's land is affected by erosion, with an estimated soil loss of 20 tons per hectare per year, while only 10% remains minimally impacted. Over 60 million tons of sediment are transported to the Adriatic Sea annually, exacerbating land degradation and reducing agricultural sustainability. In regions such as Fier, where 80% of drainage systems are operational but half of the irrigation infrastructure is damaged, erosion-related flooding further deteriorates land productivity. This study integrates field measurements with geospatial analysis using the Revised Universal Soil Loss Equation (RUSLE) and Geographic Information Systems (GIS) to model erosion risks and propose effective land management strategies. The findings emphasize the urgent need for sustainable land use practices, afforestation efforts, and policy interventions to mitigate erosion and preserve soil resources for future generations.

Key words*: sustainability, soil erosion, land degradation, GIS, land management.*

PHOSPHORUS BALANCE IN LONG-TERM EXPERIMENTS ON THE LEACHED CHERNOZEM WITH DIFFERENT FERTILIZATION SYSTEM

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Abstract

The article presents the results of the phosphorus balance assessment in long-term experiments on leached chernozem during 1991-2020 yrs. at the level of agricultural plants, crop rotation and fertilization system. It was established that the phosphorus balance in the control variant (without fertilizers) was negative throughout the research period, on average constituting minus 30.5 kg/ha. The application of phosphorus fertilizers in doses of 45 kg/ha on the field with mineral application system it almost equilibrated the phosphorus balance, with a negative balance, on average over 30 years, from minus 1.3 to minus12.9 kg/ha annually. Organic-mineral fertilizers led to an increase in the productivity of field crops and a decrease in the negative phosphorus balance in the crop rotation, on average by 19.7- 36.1 kg/ha compared to the unfertilized variant. At the growing of winter wheat, corn for grains, sunflower and leguminous crops on leached chernozem, the application of phosphorus fertilizers at a dose of 45 kg/ha compensated the phosphorus deficit, the balance becoming equilibrated or positive.

Key words*: phosphorus balance, field crops, fertilization level, leached chernozem.*

MICROBIOLOGICAL DIVERSITY AND CONTROL OF SOILS AND WATERS FROM FOREST AND AGROECOSYSTEMS UNDER DIFFERENT HYDROTHERMAL SOIL REGIMES AND AS FACTORS FOR HIGH-QUALITY AND SAFE COMPOSTING

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Abstract

Microbiological indicators of soils and waters from forest and agroecosystems have been studied. The main share in the composition of the soil microflora is occupied by non-spore-forming bacteria, followed by bacilli. Trends for weaker development of mycelial groups of microorganisms – actinomycetes and mold fungi, and an increase in anaerobes in over moistened soils have been established. In general, the total quantity of microorganisms is higher in agrogenic soils, which is also due to the fact that they are arable and with a controlled humidity regime. In these soils, a clearly higher quantity of microorganisms is established in spring compared to summer. The total microflora depends significantly on humidity, and the mineralization activity moderately on soil temperature. Pathogenic microorganisms have been established in some of the soils and waters, and for soils their quantity depends on the presence of pathogens in the waters that moisten them, as well as on other factors. Part of the soils were used as a substrate for composting, and part of the waters were used to moisten the compostable mixtures, after microbiological control.

Key words*: soil microflora, aquatic microflora, microbiological control, forest and agroecosystems.*

RESEARCH ON THE REALIZATION AND OPTIMIZATION OF EQUIPMENT FOR SUSTAINABLE SOIL BIOREMEDIATION

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Abstract

The mobile equipment developed and tested by INMA Bucharest performs sustainable in-situ soil bioremediation, including a dosing device for biocomposites obtained from recycled resources, based on slag, dolomite, grape marc and wine yeast. The optimization consisted in determining the optimal combination between the speed of the biocomposite dosing devices and the working speed of the equipment. To simulate the dosing and distribution process of biocomposite materials, Altair EDEM™ software, was used. In order to validate the theoretical simulation method, the results obtained from the simulation were compared with the experimental results which was carried out according to SR ISO 5690-2:1995. The relative error between the results obtained by simulation and experimental had small values and it could be concluded that the theoretical simulation method has a good predictive capacity. The quantities of biocomposite that the equipment can distribute per hectare at two working speeds indicated in the current regulations were calculated and the optimal combination between the speed of the dosing devices (28 rpm) of the biocomposite materials and the working speed of the equipment (1.5 m/s) was determined.

Key words*: biocomposites, dosing device, mobile equipment.*

CHARACTERISATION OF PEDOGENIC CARBONATES IN CALCOCAMBISOL AT A LOCATION IN THE DINARIC PART OF CROATIA

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Abstract

Pedogenic carbonates are secondary carbonate deposits and are a constitutional part of many soils. We analysed a 95 cm deep Calcocambisol soil profile at a location in the Dinaric part of Croatia. Here, pedogenic carbonates are more abundant in the deeper part of the profile (>23 cm), and their amount and size increase with depth corresponding to soil properties along the profile. These pedogenic carbonates are spherical to irregular in shape and can be classified as nodules. Microscopical analysis of these nodules shows that dissolution and re-precipitation of carbonate take place in situ, without considerable movement through the soil profile. The growth of the nodules starts from multiple centres of nucleation, and their internal structure is a result of spatial and temporal environmental conditions in the soil matrix during carbonate precipitation. The inclusion of noncarbonate particles and preservation of the original soil structure confirm the replacive nature of nodule growth. Furthermore, the internal structure of nodules reveals multiple stages of calcite precipitation, indicating seasonal or event-based precipitation of carbonate.

Key words*: pedogenic carbonates, calcite nodules, Calcocambisol, Croatia, Dinarides.*

SEASONAL VARIATION OF SEVERAL SUSTAINABILITY INDICATORS IN AN SILVOARABLE ECOSYSTEM FROM ROMANIA

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Abstract

The aim of the study was to identify the values of several soil parameters (pH, humus, total nitrogen, plant-available phosphorus, plant-available potassium, particle size composition and bulk density) in a silvoarable ecosystem (agroecosystem) from western Romania, Timiş County (45.45418°N, 20.90334°E). The researched agroecosystem combines two types of plant cultures: a no-till plantation of hybrid poplar (Populus spp.) trees and a conventionally tilled rapeseed crop (Brassica napus). The studied parameters have been chosen because these are sustainability indicators used in the monitoring of the agricultural ecosystems in general and have been monitored in autumn season (November) and in the spring season (May). Higher values of the soil parameters pH, humus, plant-available phosphorus and plant-available potassium have been found in the soil cultivated with rapeseed than in the soil planted with hybrid poplar, in both seasons. However, the statistical analysis showed low differences regarding the studied sustainability indicators in the two analyzed seasons, results interpreted in the terms of timing necessary for agroecosystems to be able to shift their sustainability indicators during their settlement.

Key words*: silvoarable, poplar, rapeseed, nutrients, physical indicators, soil.*

EARTHWORM CASTS AS INDICATORS OF SOIL SUSTAINABILITY IN A SILVOARABLE ECOSYSTEM FROM WESTERN ROMANIA

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Abstract

The research aimed to characterize a silvoarable ecosystem from western Romania through an indirect biological indicator of soil sustainability: the earthworms' casts. The ecosystem consisted of two components: a no-tilled woody perennial plant - Euro-American hybrid poplar trees (Populus deltoides x Populus nigra) and a conventional tilled agricultural crop – the rapeseed (Brassica napus L.) - hybrid LG Architect. The earthworms' casts have been identified as belonging to two ecological groups: epigeic and anecic earthworms in the poplar plantation and anecic earthworms in the rapeseed plantation. For both categories, the analyzed parameters of the earthworm casts were pH, organic matter (humus), total nitrogen, plant-available phosphorus, and plant-available potassium. The values of these chemical parameters were higher for the earthworm casts collected from the rapeseed crop than those collected from the poplar plantation. The results showed statistically significant differences ($p<0.05$) between certain analyzed cast characteristics (total N, plant-available P, plant-available K) of the two plant sub-systems and the same characteristics of the surrounding soil, suggesting that the differences arise from the microhabitat ecological conditions provided by the establishing of the silvoarable system.

Key words*: agroforestry, intercropping, canola, Oligochaeta, Lumbricidae.*

THE IMPACT OF CLIMATE CHANGE IN THE MANAGEMENT OF SOIL RESOURCES

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Abstract

The efficient use of soil resources is a real challenge in the current context in which we find ourselves, given the impact that climate change has on soils. Therefore, good management of soil resources plays an essential role in adapting to climate change. The paper presents 10 different locations located in the western part of Romania. Within each location, the soil resources, climatic conditions, the way crops adapt, the technologies used and the new trends in adapting to these changes are described. Following numerous studies, it was concluded that each location is highlighted by certain specific pedo-climatic features and as a result, different measures need to be applied, from case to case. Good management involves mitigating the effects of climate change. For example, capturing organic carbon from the soil, which improves soil functions, expanding irrigation systems, cultivating varieties that are suitable for the respective areas, applying technologies to preserve soil moisture and avoid compaction.

Key words*: climate change, soil resources, organic carbon, management.*

STUDY ON LAND SUITABILITY IN BUCU AREA, IALOMITA COUNTY, FOR FORESTRY USE

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Abstract

The studied sector is deficient in terms of forest vegetation, with an obvious tendency to increase the average annual temperature, especially the summer ones. In order to reduce the effects caused by climate change, biodiversity conservation and implicitly the protection of agricultural land, it is intended to establish a forest on an area of 55.6 ha., with forest species suitable from a pedoclimatic point of view. As a result, a complex pedological study was carried out, in different plots, by performing a soil profile and several control surveys, in order to establish the suitability of the land for forestry facilities. The soil type identified is calcaric fluvisols, formed in Ialomita meadow, on account of alluvium, with flat configuration, clay-sandy texture and contrasting distribution. Based on these local pedoclimatic conditions, the formula for afforestation with xerophyte species was established, with fast growth and low requirements in terms of soil trophicity.

Key words*: shelterbelts, mixed forest, species composition, calcaric fluvisols, planting schemes.*

SUITABILITY OF LAND FOR FORESTRY USE IN GALATI COUNTY, TECUCI-MATCA AREA

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Abstract

In addition to being deficient in terms of the forestry sector, the studied territory presents pedoclimatic conditions less suitable for agricultural crops, because the rainfall is quantitatively reduced and the land is poor quality and prone to deflation. In order to reduce the effects caused by climate change, biodiversity conservation and implicitly the protection of agricultural land, it is intended to establish a forest on an area of 150.76 hectares, with forest species suitable from a pedoclimatic point of view. A complex pedological study was carried out, in different plots, by performing a soil profile and several control surveys, in order to establish the suitability of the land for forestry facilities. The soil type identified is typical arenosols, formed in the Tecuci Plain, due to the deposition of coarse and fine sand. The surface of land is a relatively flat configuration, loamy-sandy texture in the bioaccumulative horizon and sand on the depth of the soil profile, with contrasting distribution. For these pedoclimatic conditions with local specificity, the formula for afforestation with adapted species, with fast growth and low requirements in terms of soil trophicity was established.

Key words: *shelterbelts, windbreaks, mixed forest, species composition, typical arenosols.*

SUSTAINABLE USE AND MANAGEMENT OF SOIL RESOURCES IN THE ALMAJ VALLEY AREA, COUNTY CARAȘ-SEVERIN

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Abstract

The proposed scientific paper focuses on "Sustainable use and management of soil resources in the Almajului Valley area, County Caraș-Severin". It will look at the importance of soils as essential resources for agriculture, biodiversity, sustainability and environmental sustainability. The study will highlight the current practices of agricultural land use (arable, pasture, hayland, trees and vineyards) and the impact of mainly agricultural activities on their quality. In addition, it will examine sustainable management/stewardship strategies that can be implemented to prevent degradation, soil pollution to promote an increase in fertility in the medium and long term. The paper will propose specific and concrete measures to protect and prevent soil clearance, such as crop rotation, use of organic fertilisers according to legal management requirements (SMR) and standards on good agricultural and environmental conditions of land (GAEC), rational grazing, application of agroforestry systems and ecosystem restoration, thus also highlighting the role of local communities in the implementation of these sustainable and sustainable practices.

Key words*: soil, use, management, sustainable, resources, fertilization.*

SOIL NUTRITIONAL STATUS FUNCTION OF BIOMASS HARVESTING IN NORTHWESTERN ROMANIA

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Abstract

The removal of biomass disrupts the natural nutrient cycle in forest ecosystems. Organic materials like leaves and branches, which would typically decompose on the forest soil, are essential for replenishing soil nutrients. Key nutrients such as nitrogen, phosphorus, and potassium are particularly affected. These nutrients are vital for plant growth and soil health, and their depletion can lead to reduced soil fertility over time. These nutrients are crucial for maintaining soil health and supporting plant growth. The present study carried out in forest area of Cluj County, Northwestern Romania, during summer and autumn of 2024, explores the relationship between biomass harvesting practices and the nutritional status of soil in forest ecosystems. Raw data collected from field were statistically processed using XLSTAT program. The results of our research show that removal of biomass, including branches, leaves, and other organic materials, can significantly impact soil fertility by depleting essential nutrients such as nitrogen, phosphorus, and potassium.

Key words: *deforestation, forests ecosystem, nutrients, plants growth.*

MORPHOLOGICAL IDENTIFICATION AND BIOCHEMICAL ANALYSIS OF RHIZOBACTERIAL DIVERSITY IN CHILLI AND THEIR ANTAGONISTIC ACTIVITY AGAINST *Colletotrichum jasminigenum* SPTD17

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Abstract

Anthracnose, a drastic fungal disease caused by Colletotrichum spp. is a significant constraint to chilli production all over the world, resulting in substantial yield losses across all major chilli-producing areas. Management of plant diseases using biocontrol agents is one of the best methodologies that may reduce the use of synthetic chemical based formulations. A total of fifteen rhizospheric bacteria were isolated from chilli fields. Preliminary morphological identification was done followed by scanning electronic microscope and then subjected for biochemical characterization. Antagonistic activities of all isolates were evaluated in vitro against Colletotrichum jasminigenum SPTD17. Based on the morphological and biochemical characterization six isolates categorized to Bacillus, two Lysinibacillus, one Paenibacillus, five Pseudomonas and one Acinetobacter genera*. were identified. Seven isolates (PS1, PS4, PS6, PS8, PS9, PS10 and PS11) showed strongest antagonistic activity and more than 80% zone of inhibition against Colletotrichum jasminigenum SPTD17. The results of this study suggest that chilli rhizosphere bacterial diversity can be resource for biocontrol of chilli anthracnose pathogens; further research may encourage the molecular characterization and PGRP applications of rhizospheric bacterial biocontrols.*

Key words*: biocontrol, morphological characterization, scanning electron microscopy, biochemical characterization, antagonistic bacteria.*

IMPACT OF DIGESTATE AND COMPOST APPLICATIONS ON SOIL CHEMICAL CHARACTERISTICS AND METALS AVAILABILITY IN A CONTAMINATED SOIL

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Abstract

Applying organic amendments such as digestate and compost is increasingly recognized as a sustainable strategy for improving soil quality, particularly in contaminated sites. This study investigates the effects of digestate and compost applications on the chemical characteristics of heavy metals-polluted soil and their influence on metal availability. The research was carried out in the greenhouse conditions, using maize as test plant. The main parameters analyzed were pH, organic carbon (Corg), total nitrogen (Nt), mobile phosphorus (P_{AL}), mobile potassium (K_{AL}), and the bioavailable forms of heavy metals (Pb, Cd, Cu, Mn, Ni, and Zn). Results revealed that both amendments enhanced soil pH, P_{AL}, and K_{AL}, reducing the bioavailability of heavy metals. The compost has proven to have very good performance in decreasing the mobility of heavy metals, mainly Cu, Mn, Ni, and Zn. This study highlights the suitability of these organic amendments for remediating polluted soils and improving soil fertility, offering a sustainable approach to land management in polluted areas.

Key words*: digestate, compost, soil fertility, contamination/pollution, heavy metals.*

CORRELATION BETWEEN HEAVY METALS IN SOIL AND *Lotus corniculatus* IN A STUDY ACHIEVED IN COPȘA MICĂ

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Abstract

Heavy metals pollution is a global issue in the whole word. All soils contain heavy metals, but their concentrations usually are very low. According to the literature, bird's-foot trefoil (Lotus corniculatus) is used as adsorbent of heavy metals from soil. The study was achieved in Copșa Mică area, known for a long time in the top of the most polluted cities in Europe, due to the emissions from two factories. In article it is described the correlation between total forms and DTPA extractable forms and concentrations in Lotus corniculatus plants of cadmium, lead, copper and zinc. In conclusion, cadmium was most easily absorbed of Lotus corniculatus, while lead was identified as having the lowest accumulation in Lotus corniculatus, so it can be used for the removal of some heavy metals from soil.

Key words*: soil, heavy metals, Lotus corniculatus, Copșa Mică.*

DYNAMICS OF FUNCTIONAL MICROBIOME IN POLLUTED SOIL AFTER ONE YEAR OF BIOREMEDIATION

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Abstract

Heavy metal pollution is a worldwide major concern. It represents a threat to humans, animals, plant health, and has negative impact on the environment. The Biolog Ecoplate approach was used to observe the daily changes in soil functional microbiome, in 5 sites from Baia mare exposed to historical pollution and after one year of bioremediation. The study has shown that EcoPlates are an effective tool for the assessment of microbial activity in heavy metal contaminated soils in Baia Mare. Microbial activity and diversity decreased with the degree of pollution, highlighting the impact of contamination on the soil microbiome. Within the analysed functional guilds, the values extracted showed a high range of activities. Polymers guild showed the highest activity in CT site, with a similar trend of carbohydrates and the maximum form of activities. Site FR induced the highest activity for carboxylic & acetic acids and amino acids, while the AWCD recorded its maximum.

Key words*: heavy metal, pollution impact, microbiome changes, guild activity.*

RESEARCH ON THE INFLUENCE OF ORGANIC AND MINERAL FERTILIZATION ON THE PHYSICAL PROPERTIES OF THE SOIL IN COVASNA COUNTY

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Abstract

As an important pawn in intensive agriculture, fertilizers are identified, whether organic or mineral, whit their specific effects on the physical properties of the soil, which is what this study aims to do. The application of mineral fertilizers has a quick and predictable effect, but with higher acquisition and application costs. At the same time, for a long term, they have side effects, such as decreased soil fertility and soil toxicity. Organic fertilizers improve soil structure, texture and water retention capacity, leading to more optimal development conditions for the plant root. Also, organic fertilizers are a much more affordable option for farmers, but somehow more difficult to handle and manage. Therefore, the work will track the value of some important soil physical properties such as soil reaction, humus content, bulk density, degree of settling and porosity, in relation to different doses of organic, mineral and organo-mineral fertilizer applied in an experimental sugar beet field in Covasna County.

Key words*: compaction degree, density, mineral fertilizer, organic fertilizer, porosity, soil fertility.*

THE ALLUVIAL SOLS OF THE LOWER JIU FLOODPLAIN AND THEIR MAIN AGROPRODUCTIVE PROPERTIES

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Abstract

Geomorphologically, the lower Jiu floodplain, located south of the city of Craiova, covers an area of approximately 40.000 hectares and is more developed on the left side of the river. Based on the materials deposited during floods, it includes three zones: the littoral zone, situated near the watercourse, where coarse alluvial materials were deposited; the central zone, the most extensive, where medium-textured materials were deposited; the pre-tertiary zone, the lowest and farthest from the watercourse, where the deposited alluvial materials are the finest. The alluvial soils identified in the researched area are typical, mollic, gleyic, and salic. Typical alluvial soils are specific to the littoral zone, where soil formation processes are weakly differentiated, resulting in low fertility. Mollic alluvial soils are found in the central zone, where the genesis processes are more advanced, making these the most fertile soils of the floodplain. Gleyic and salic alluvial soils occupy the pre-terrace zone, where groundwater is shallow, leading to gleying and even salinization processes at the base of the soil profile.

Key words*: alluvial soils, floodplain, texture, structure, soil formation, fertility.*

EVALUATION OF TRANSFORMATION OF THE QUALITY COMPOSITION OF ORGANIC MATTER AND PARTICLES SIZE DISTRIBUTION OF SOLUTION OF HUMIC ACID OF SODDY-PODZOLIC SOIL AFTER LONG-TERM APPLICATION OF VARIOUS FERTILIZATION SYSTEMS

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Abstract

Soil organic matter play crucial role in soil functions, physicochemical properties and structure stability, which determined main soil properties - fertility. The objective is to study transformation of the quality composition of organic matter of soddy-podzolic soil with the application of various fertilization systems in relation to deleted of nano-, micro-size particles distribution of alkali solutions of isolated humic acids (HAs) from soil. Via UV-visible spectroscopy and gel-permeation size-exclusion chromatograph, determined structural molecular complexity of isolated HAs and by dynamic light scattering and visual observing of dried drops of HA solutions was evaluate particles size of HA in solution at micro- and nano-level of secondary or colloid structural organization. Revealed relation between fraction compositions of organic matter that causing by fertilizer systems and molecular complexity with particles size distribution of isolated HA in alkali solution. We showed that under long-term application of mineral and organo-mineral fertilization systems significant increase ratio of small nanoparticles population and decrease of big microparticles in alkali HA solution of soddy-podzolic soil with highest degree of fulvatiozation.

Key words*: soddy-podzolic soil, soil organic matter, fertilizers, humic acid, particles size distribution.*

MICROBIOLOGICAL AND ENZYMATIC ACTIVITY OF TYPICAL CHERNOZEM UNDER DIFFERENT TILLAGE AND FERTILIZATION SYSTEMS

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Abstract

Studies (2021-2023) conducted on a typical low humus chernozem (Bila Tserkva, Ukraine) showed that in the arable layer, microbiota on starch-ammonium agar (SAA) is highest in non-fertilized plots under differentiated tillage and in fertilized plots under disc tillage. On meat peptone agar (MPA), the highest microbiota activity is observed under differentiated tillage across all plots. Microbiota on pectin-glucose agar with soil extract (PGASE), as well as nitrifying bacteria and actinomycetes, had the highest number under differentiated tillage, while the mineralization and pedotrophic coefficients had the lowest values. The lowest number of denitrifying bacteria and the highest number of nitrogen bacteria were recorded in the differentiated tillage. The activity of invertase, phosphatase dehydrogenases and polyphenol oxidases is higher, while catalase activity is lower under differentiated tillage compared to mouldboard and mouldboardless tillage. The coefficient of humus accumulation was higher under differentiated tillage and significantly lower under chisel and disking tillage. Increasing organic and mineral fertilizer rates with mouldboardless and disc tillage enhances the biological diversity of the arable layer.

Key words*: fertilization, crop rotation, microbiota, enzymes, activity, productivity.*

IDENTIFICATION AND CHARACTERIZATION OF SOIL RESOURCES SPECIFIC TO THE FLOODPLAIN AREA OF ROSEȚI COMMUNE, CĂLĂRAȘI COUNTY

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Abstract

The primary objective of this research is to evaluate the possibilities of maintaining the optimal natural potential of soils within a sustainable land use framework. This involves assessing the land's capacity to support various agricultural activities without compromising natural resources while ensuring long-term soil fertility. In the studied area, the floodplain of Roseți commune, Călărași County, four main soil types were identified: Alluvisols, Gleysols, Psamosols and Anthrosols. These soils reflect ecological diversity and pedological conditions specific to floodplain areas, exhibiting a slightly alkaline pH (7.2-7.6). Alluvisols are fertile soils formed through alluvial deposits and have a moderate humus content (3.92%). In contrast, Gleysols are characterized by poor drainage and intense gleying processes due to high moisture excess, with a low humus content (1.68%). Psamosols, with a high sand content, have a reduced water retention capacity and a moderate humus supply (2.56%), whereas Anthrosols are soils modified by human activity. The identified soils are well supplied with phosphorus (65-71 ppm) and potassium (160-360 ppm), ensuring the agricultural and ecological potential of the region.

Key words*: soil, evaluation marks, quality class.*

RESEARCH ON THE EVALUATION OF SOIL RESOURCES SPECIFIC TO THE TERRACE AND FLOODPLAIN AREAS OF ROSEȚI COMMUNE, CĂLĂRAȘI COUNTY

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Abstract

The main objective of the research was to evaluate the morphological, agrophysical, and agrochemical characteristics of the soils in the terrace and floodplain areas of Roseți, Calarasi County. Environmental and geographical conditions influencing soil quality and its agricultural potential were also analyzed. The research also aimed to identify the characteristics that determine the adaptability/suitability of the land for various types of agricultural use.The studied area is characterized by a diversity of soils that support a variety of agricultural and ecological uses. In the terrace area, Chernozems and Phaeozems provide a suitable environment for cereal or leguminous crops, with a slightly alkaline pH (7.2-7.6), good to very good phosphorus (61-64 ppm) and potassium (160-400 ppm) supply, and a medium to good humus content (2.6-4.30%). In the floodplain area, the dominant soils are Alluvial soils, with a slightly alkaline pH (7.3-7.6) and a humus content of 2.69-3.5%, indicating a medium supply. These alluvial soils are in different stages of development but are relatively young, still evolving, and formed from alluvial deposits.

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

DEGRADED LANDS IN THE ABANDONED RICE FIELDS FROM BANAT REGION. CASE STUDY: DEGRADED SOILS IMPROVEMENT OF BEREGSĂU SETTLEMENT - COMTIM

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Abstract

In the Low Plaine from rivers Mureș - Timiș - Bârzava interfluve, during the 18th and 19th centuries has been existed about 14-15 rice – fields, for example at Banloc, Valcani, Sânnicolau Mare, Beregsău, Uivar, Otelec, Denta, Partoș, and other settlements. In the present time only the rice - field of Banloc functions, during of 124th years. The majority of rice - fields have been abandoned because of a wrong management, which has caused the water table to rise and the soils became gleyic - salic and/or sodic. We consider that the majority great areas with Gleysols and Solonetz, and also gleyic - salic - sodic soil types like Chernozems, Vertisols and Fluvisols which cover the Low Plaine, belongs to the abandoned rice - fields. There are present also, some aspects of the geological, geomorphological and the variation of the depth of ground water layer. Analytical data of the soil types dominantly for the rice - fields have been permited to establish the methods for improvement the former areas of rice - fields. The case study relates to the complex improvement measures for a plot of 53 ha which has been radically transformed really in a new soil type Anthrosols, much more productive.

Key words*: rice field, degraded lands, analyse improvement, fertility.*

THE TECHNOLOGIC PROCEDURES OF UTILIZING STRAW SURPLUSES AS FERTILIZER ON THE CHERNOZEMIC SOILS

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Abstract

Tillage and removal of agricultural production from fields leave the soil increasingly poor in organic matter. Currently, the reimbursement of organic fertilizers to the soil, with rising fuel prices, has become very expensive, exceeding €30/t within a three-km radius. In this context, straw surpluses from cereal crops are welcome to meet the soil's organic matter needs. They do not require loading, transportation and distribution costs, increasing the profitability of application. Experience has shown that on the chernozemic soils, straw incorporated during cereal harvesting does not affect the nitrogen supply of plants. This process makes it possible to fertilize with straw without supplementing with nitrogen, especially where nitrogen fertilizers are not available. It was shown that among the organic fertilizers, straw combined with nitrogen fertilizers has the highest humus restoration potential. The research show, that humus content increase between 150 and 270 kg/t of straw, humifying 14-30% of organic matter from straw.

Key words*: chernozemic soils, nitrogen fertilizers, organic matter, straw surpluses.*

ASSESSMENT OF PHYSICAL, CHEMICAL AND MINERALOGICAL CHARACTERISTICS OF SOILS ACROSS TWO CROPPING SYSTEMS IN GOMBE STATE, NIGERIA

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Abstract

This study aimed at evaluating the physical, chemical and mineralogical characteristics of soils across two cropping systems (rice and tomato) in Gombe State. To achieve this aim, two soil profile pits were dug in each of the cropping systems, described and sampled. The collected soil samples were then analyzed using standard Laboratory procedures. The results reveled that sand (73.38-84.8%) was the dominant particle size, while bulk density, particle density and total porosity values varied between 1.60 to1.67 g/cm^3, 2.57 to 2.71 g/cm^{3}and 35.82 to 40.41%, respectively. The soil reaction was slightly acidic to neutral (pH 6.39-6.68), while organic carbon, total nitrogen and available phosphorus content of the studied soils were rated high, low and low, respectively. The results for soil mineralogy Indicated that Quartz was the dominant clay minerals. It was observed, that the major agronomic constraint of the studied soils was low nutrient reserve. Therefore, management practices such as, addition of organic manure, use of inorganic fertilizer and liming is recommended for sustainable agriculture.

Key words*: assessment, clay, cropping systems, minerals, quartz.*

DECREASE IN THE ACTIVITY OF SOIL FUNCTIONAL MICROBIOMES IN HEAVY METAL POLLUTED SOILS

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Abstract

The presence of heavy metals in urban soil is a consequence of anthropogenic activities and represents a continuous source of changes in microbial communities. The DEMSA model was used to analyse a series of decreases in the soil microbial functional profile, with a target on the groups and guilds that suffer a reduction due to the presence of heavy metals. The presence of heavy metals in the 5 sites analysed is visible in the reduction of the soil microbiome general activity. The Index of Narrowing is set in a very large interval, which indicates the absence of multiple functional groups from the altered community. The diversity indices show a large variability associated with the reduction of specialized functional activity. The sum of activities is a good indicator of functional contraction, with most of the functional guilds showing activities below 1.0 units, and a large variability between functional groups. Soil microbiomes show powerful changes due to the presence of heavy metals in soil, which is visible in the decrease of multiple groups functional activity.

Key words*: functional narrowing, index of contraction, indicator guild, microbial communities.*

ASSESSMENT OF MICRO AND MACROELEMENTS UPTAKE IN MAIZE PLANTS IN RESPONSE TO DIFFERENT NITROGEN AND PHOSPHORUS FERTILIZATION RATES

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Abstract

This paper aims to evaluate the effects of nitrogen and phosphorus mineral fertilization, applied in varying doses, on the quality of maize crops grown in acidic soils. The study is based on a long-term bifactorial experimental design, involving progressively increasing doses of nitrogen and phosphorus (arranged in a 5P × 5N scheme, with N_0-N_{160} combined with P_0, P_{40}, P_{80}, P_{120}, and P_{160}), alongside lime application. The findings offer valuable insights into the long-term impacts of these fertilization practices on crop quality. Results show that long-term fertilization combined with calcic amendments induces statistically significant changes in the macroelements content of maize leaves specifically nitrogen, phosphorus, potassium, calcium, and magnesium and the microelements content, including copper, zinc, manganese, and iron.

Key words*: acidic soil, maize, mineral fertilization.*

SOIL PHOSPHOMONOSESTERASES ACTIVITY AND PHOSPHORUS AVAILABILITY IN DIFFERENT TILLAGE SYSTEMS AND INOCULATIONS WITH *Bacillus megaterium* var. *phosphaticum*

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Abstract

Phosphorus (P) is a crop-limiting nutrient, and its availability is challenging due to low solubility and high fixation rate. Rhizosphere activity, which mediates P uptake, can be promoted by inoculating phosphorus-solubilizing bacteria (PSB). This study aimed to evaluate soil total and accessible phosphorus (TP and AP), acid and alkaline phosphatases activity in response to PSB inoculation in different tillage practices. The field experiment was conducted on winter wheat, cultivated under conventional (CT), no-tillage (NT) and reduced tillage (RT). Both inoculations and the tillage systems were found to be associated with changes in TP and AP. In the CT and RT systems, alkaline phosphatase showed an increase in the bacterial inoculum treatments, 2-31% higher than the control in CT and 15-41% in RT. Across tillage systems, acid phosphatase activity was highest in RT (1.59-1.86 μg p-nitrophenol g^{-1} h^{-1}), followed by NT (1.46-1.72 μg p-nitrophenol g^{-1} h^{-1}) and CT (1.16-1.28 μg p-nitrophenol g^{-1} h^{-1}). The soil air-water regime controlled by tillage practices influences rhizosphere activity and, together with bacterial inoculation, leads to variations in the investigated parameters.

Key words*: acid phosphatase, alkaline phosphatase, no-tillage, phosphorus-solubilizing bacteria.*

INCREASED ACTIVITY OF SPECIALIZED FUNCTIONAL MICROBIOMES IN HISTORICALLY POLLUTED SOILS AFTER BIOREMEDIATION

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Abstract

Soil heavy metal pollution is one of the major concerns in urban habitats, due to the associated human and environmental risks. Materials and methods: The aim of this research is to use the DEMSA model to explore the increases in the soil microbial functional profile, based on Biolog Ecoplates results, due to historical pollution with heavy metals. The historical pollution of the 5 sites analyzed induces a high variability in the soil functional microbiomes. The functional intensification is visible in the sum of all activities and the Index of Intensification from each site. At this niche level the Carboxylic and acetic acids guild shows the highest share of activities. Above the intensification level, a guild expansion is observed only in three of the analyzed sites. For these sites, the Index of Expansion is set in the interval of 2.5-6.0, which indicates the presence of multiple functional groups adapted to heavy metals. Historical pollution alters the assemblage of soil general microbial community, by increasing the activity of a small number of very specialized groups.

Key words*: functional increase, intensification matrix, guild expansion, index of alteration.*

CROP SCIENCES

EFFECTS OF SOME BIOSTIMULATORS AT TWO POTATO CULTIVARS CULTIVATED AT DIFFERENT PLANT DENSITIES

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Abstract

The application of biostimulators to plants leads to the accumulation of a higher content of nutrients in their tissue and to positive metabolic changes improving plant nutrient use efficiency and tolerance to stress factors. The aim of this paper is to present the effects of some biostimulators at potato crop according to variety and plant density. The research was conducted in the years 2023 and 2024 at the National lnstitute of Research and Development for Potato and Sugar Beet Brasov, Romania. The experimental variants were the following: potato variety (Darilena; Ultra); plant density (45.000 plants/ha; 53.000 plants/ha); Biostimulator product (no biostimulator - control variant; Genaktis 1; Irys; Terram Number One; Wuxal Macromix). Compared to control (untreated) variant, all the used biostimulator products determined an increased number of stems per hill, an increased aerial part weight, and an increased tuber yield regardless the potato variety, plant density and climatic conditions of the year. The tuber yield increase determined by using biostimulators is higher in better climatic conditions and at higher plant density. Having all these into account, the inclusion of the biostimulators in the potato crop technology can be considered as a good strategy.

Key words*: biostimulator, potato, cultivar, plant density, plant traits.*

Zea Mays: MORPHOLOGY OF TASSEL COMPONENTS THAT CAN INFLUENCE THE AMOUNT OF POLLEN

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Abstract

Pollination is a critical element in the production of hybrid seeds, as its effectiveness hinges on the quantity of pollen generated by inbred male plants. To achieve optimal kernel development and preserve genetic purity in maize crops, precise management of pollination is crucial. This process not only guarantees seed formation but also ensures the creation of high-quality, genetically uniform hybrids. Pollination entails the movement of pollen from the male reproductive parts (stamens) to the female reproductive parts (pistils) of flowers, a key biological mechanism that drives seed development and, ultimately, affects yield. Within agricultural practices, pollination holds significant importance, especially in hybrid seed production, where it directly shapes both the volume and quality of the harvest. Efficient pollination is therefore a foundational aspect of successful hybrid seed production programs, solidifying its role as a vital component of contemporary maize farming. A thorough understanding of tassel morphology and its functional components - such as tassel weight, primary branch count, spikelet number, and Tassel Area Index (TAI) - is crucial for enhancing pollen production in inbred plants. These characteristics play a vital role in determining the pollen-producing ability of male plants, which directly influences the success of hybrid seed production. From a practical standpoint, breeding initiatives should focus on optimizing tassel traits to strike a balance between adequate pollen production and minimizing undesirable effects, such as shading. Additionally, targeted breeding approaches could integrate genetic and phenotypic evaluations to improve pollination efficiency and reliability. Such strategies not only guarantee optimal kernel development and genetic purity but also contribute to the creation of hybrids that are more resilient to varying environmental conditions, thereby strengthening the sustainability of maize cultivation.

Key words*: pollen. Zea mays L., tassel morphology, pollination.*

INFLUENCE OF CHANGING CLIMATIC CONDITIONS ON THE QUALITY TRAITS OF COMMON WINTER WHEAT GROWN IN THE PAZARDZHIK REGION

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Abstract

The trial was conducted for a 5-year period (2019-2023) on the experimental field of irrigated agriculture experimental station Pazardzhik. In the period 2019-2023 in the field of irrigated agriculture experimental station Pazardzhik on cinnamon forest soil at humus 1.2-1.5% and pH 5.5-6 is set trial, which includes 9 varieties of common winter wheat selection of IPGR Sadovo. It was laid out using the long strip method in four replications with a harvest plot size of 10 m2. The sowing rate is 550 gs/m2. Fertilization was with phosphorus (20 kg/da), applied as triple superphosphate pre-sowing. The entire nitrogen fertilizer rate was applied as N12 (applied as ammonium nitrate). The quality parameters sedimentation value; grain vitreousness; fermentation number; crude protein; wet gluten content; gluten release, dry gluten; bread making strong index were monitored in the grain quality laboratory at IPGR, Sadovo. Gluten relaxation, baking stomg index and dry gluten were determined. ANOVA, Duncan test, cluster and correlation analysis were used for mathematical treatment of data.

Key words*: common winter wheat, grain quality, changing climatic conditions.*

PEA PROTEINS AS AN ALTERNATIVE TO PROTEINS OF ANIMAL ORIGIN FOR WINE CLARIFICATION – A MINIREVIEW

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Abstract

Pea (Pisum sativum) is a leguminose crop cultivated worldwide for its high protein content. Pea protein is already used as a nutraceutical or food ingredient due to its low allergenic effects. In recent years it started to be applied in wine clarification as an alternative to the use of proteins of animal origin (casein, ovalbumin, gelatin), which are not suitable for vegetarians and can also cause allergic reactions in some people. As an adjuvant for wine fining, the pea protein removes some of the undesirable oxidisable polyphenols in wines and some other compounds, with good effect on the colour and taste. This paper discusses the types of pea extracts and their advantages and limitations as replacements of animal proteins in winemaking. Mechanisms of molecular interactions with the wine compounds and effects are presented in comparison with those produced by fining with traditionally used agents.

Key words*: pea proteins, pea extracts, wine, fining agents.*

SUNFLOWER PRODUCTION OF SOME GENOTYPES IN YEARS 2022, 2023 AND 2024, IN ROMANIA

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Abstract

In this paper we present results about seed yield of some sunflower genotypes in the period 2022-2024, in nine counties from Romania. Three genotypes belonging to NARDI Fundulea were analysed, two experimental sunflower hybrids HS 1112 and HS9233 and one commercial sunflower hybrid FD15E27. In year 2023 was registered the best average seed yield of all three sunflower hybrids of 3189 kg/ha followed by year 2022 with 2930 kg/ha and the lowest average seed yield was registered in year 2024 with 2310kg/ha. Experimental sunflower hybrid HS9233 which is suitable for Clearfield Plus system, registered the highest seed yield of 3045 kg/ha in year 2022 and 3241 kg/ha in year 2023. In year 2024, commercial sunflower hybrid FD15E27 registered the highest seed yield with 2417 kg/ha which is suitable for Express system. The agricultural year 2024 remains representative for the sunflower culture regarding lowest seed yield, because the climate changes were most evident through very high temperatures during the summer.

Key words*: sunflower, seed yield, drought, extreme heat.*

TILLAGE AND NITROGEN RATE EFFECTS ON MAIZE GRAIN YIELD IN THE SPECIFIC CONDITIONS FROM DANUBE MEADOW

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Abstract

Maize is a crop of great importance in the world as well as in Romania where it was cultivated in the last years on more than 2.3 million ha and produced over 9-10 million tons of grains. Tillage is an important tool in crop technology to ensure good growing conditions for maize plants, decrease production costs, and improve soil characteristics. Also, nitrogen has a significant effect on crops, especially when it comes to maize, which is the most important nutrient that affects plant growth and yield capacity. Starting from the points stated earlier, this paper aims to present the effects of different tillage and nitrogen rates on maize grain yield in the specific conditions of Danube Meadow. The application of 160 kg/ha of nitrogen and the deep tillage led to grain yield between 9170 kg/ha for plowing and 10017 kg/ha for scarification. The lowest grain yield was recorded for 0 kg/ha of nitrogen and tillage with disc, with 8926 kg/ha.

Key words*: grain yield, maize, nitrogen rate, plant characteristics, tillage.*

EFFECTS OF TILLAGE AND NITROGEN RATE ON SUNFLOWER IN THE SPECIFIC CONDITIONS FROM DANUBE MEADOW

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Abstract

Sunflower is the most important oil crop in Romania, with more than 1 million ha cultivated annually, which places Romania on first place in European Union. The high demand for sunflower oil, as well as the ease of cultivation and the tolerance of the sunflower plants to drought, are among the main reasons farmers grow this oil crop. Within sunflower crop technology, tillage and nitrogen rate are among the most important factors significantly affecting the yielding plant capacity. Therefore, this paper aims to present the effects of different tillage and nitrogen rates on sunflower grain yield in the specific conditions of Danube Meadow. In terms of sunflower grain yield, tillage had a significant influence, plowing and scarification giving the highest grain yields especially when they are associated with a high nitrogen rate (120 kg/ha of nitrogen).

Key words*: grain yield, nitrogen rate, plant characteristics, sunflower, tillage.*

AFTER EFFECT OF THE HERBICIDE ENVOKE ON THE ROOT WEIGHT AND THE SPROUT WEIGHT OF COTTON SEEDS (*Gossypium hirsutum* L.)

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Abstract

The after effect of the herbicide Envoke on the root weight and the sprout weight of cotton seeds was studied in two cultivars - Chirpan-539 and Helius (Gossypium hirsutum L.). The herbicide was applied during the crop's vegetation, once during the 4-5 leaf stage and twice during the 4-5 leaf and budding stages of the cotton. It was tested at the doses - 10 g.ha^{-1}, 15 g.ha^{-1} and 20 g.ha^{-1}. Seed germination samples taken from cotton plants treated with the herbicide Envoke during the growing season were placed. The root weight and the sprout weight were recorded on the 7th day after the samples were planted. The results obtained from each herbicide variant were compared with those of the two controls - the untreated control and the economic control. The herbicide Envoke, applied during the growing season of the two cotton cultivars - Chirpan-539 and Helius, did not have aftereffect the root weight of the cotton seeds. The herbicide had not negative affect on the sprout weight of the cultivar Helius, but did effect on this indicator of the cultivar Chirpan-539.

Key words*: cotton, herbicides, foliar treatment, cultivars, root weight, sprout weight.*

THE IMPACT OF PEDOCLIMATIC CONDITIONS ON THE PRODUCTION OF ESSENTIAL OIL AND LAVENDER HYDROLATE

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Abstract

Lavender is a particularly valuable plant, having multiple uses and economic benefits (oil production, derived products, tourism), medicinal (aromatherapy, therapeutic properties) and gastronomic. Its cultivation combines economic and ecological benefits, contributing to the creation of sustainable agricultural practices. The present study refers to the amount of lavender essential oil and hydrolate, that can be extracted depending on the year of cultivation and the specific pedoclimatic conditions of three cultivation areas: Deta (Timiş County), Mailat and Vinga (Arad County). The climatic conditions of the analyzed period had a positive impact on the amount of volatile oil and lavender hydrolate. The amount of lavender oil, ranged from 10.7 liters/hectare at Deta and 13 liters/hectare at Vinga, in the second year and between 31 liters/hectare at Deta and 35 liters/hectare at Mailat, in the third year. Regarding the amount of lavender hydrolate, was between 111 liters/hectare in Deta and 129 liters/hectare in Vinga, in the second year and between 310 liters/hectare in Deta and 392 liters/hectare in Mailat, in the third year.

Key words*: essential oil, hydrolate, Lavandula sp., sustainable agriculture.*

RESEARCH REGARDING THE AMOUNT OF FLOWERS AND AERIAL PARTS OF LAVENDER ACCORDING TO PEDOCLIMATIC CONDITIONS

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Abstract

The present study refers to the amount of fresh flowers (inflorescence) and fresh aerial parts of lavender (herba), depending on the year of cultivation and pedoclimatic conditions. The study was carried out in 3 locations: Deta City (Timiş County), Mailat locality (Arad County) and Vinga locality (Arad County), on different soils. The amount of fresh flowers per plant and per hectare ranged from 70 grams/plant to 1322 kg/hectare at Deta and between 82 grams/plant and 1476 kg/hectare at Vinga, in the second year and between 214 grams/plant and 3638 kg/hectare at Deta and between 245 grams/plant and 4375 kg/hectare at Mailat in the third year. Regarding the amount of fresh herba per plant and per hectare, they ranged from 140 grams/plant to 2380 kg/hectare at Deta and between 162 grams/plant and 2916 kg/hectare at Vinga, in the second year and between 411 grams/plant and 6987 kg/hectare at Deta and between 487 grams/plant and 4696 kg/hectare at Mailat, in the third year.

Key words*: aromatic plant, crop yield, Lavandula sp.*

INFLUENCE OF CLIMATIC CONDITIONS ON POTATO TUBERS QUALITY

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Abstract

The classification of potato tubers into usage types (human consumption, industrial processing, or animal feeding), in addition to factors such as variety and fertilization, can be influenced by the crop climatic conditions. Over three years of non-irrigated potato crop in Țara Bârsei - Brașov (2022–2024), the varying climatic conditions affected the culinary and technological quality parameters of potato tubers. The dry matter content, consistency, mealiness, moisture of the potato tubers, and the structure of starch granules were influenced by air temperature and precipitation levels during the growing season, as these conditions impact growth, metabolism and the accumulation of reserve substances in the tubers. The variation in these culinary quality traits of potato tubers was analyzed across the production of 12 potato varieties. The varieties were classified into the following usage types: A, AB, B, and BC. Over the three years of observations, the varieties Azaria and Ervant recorded the highest and respectively the lowest accumulation of dry matter. Careful management of environmental factors, combined with the use of well-adapted varieties, can optimize the potato quality for various usage types.

Key words*: potato, climatic condition, tubers quality.*

PHENOLIC COMPOUNDS AND ANTIOXIDANT ACTIVITY IN IRONWORT (*Sideritis syriaca* L.) FROM STRANDZHA MOUNTAIN

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Abstract

The current investigation aimed to evaluate total carotenoids, chlorophylls, phenols, flavonoids, as well as the individual phenolic compounds and antioxidant potential in ironwort (Sideritis syriaca L.) collected from Strandzha mountain in Bulgaria and Turkey. Five phenolic acids (chlorogenic, caffeic, p-coumaric, ferulic and sinapic acids) and ten flavonoids (lavandulifolioside, verbascoside, forsythoside A, isoscutellarein 7-O-allosyl(1→2)glucoside, apigenin 7-O-allosyl(1→2)glucoside, isoscutellarein 7-O-allosyl-(1→2)-[6''-O-acetyl]-glucoside, hypolaetin 7-O-allosyl-(1→2)-[6''-O-acetyl]-glucoside 3'-O-Methylhypolaetin 7-O-[6'''-O-acetyl]-allosyl(1→2) glucoside, 4'-O-methylhypolaetin 7-O-[6'''-O-acetyl]-allosyl(1→2)glucoside, apigenin 7-(6''-p-coumaroylglucoside) and apigenin 7-4''-p-coumaroylglucoside) were detected. The samples collected from the Bulgarian part of Strandzha mountain showed 1.5 to 2.5 times higher values for individual phenolic compounds and twice higher antioxidant activity and total carotenoids content in comparison to Turkish samples. Ferulic acid (8173 µg/g dw) and isoscutellarein 7-O-allosyl-(1→2)-[6''-O-acetyl]-glucoside (4452 µg/g dw) were detected in the highest content in Bulgarian ironwort.

Key words*: Sideritis syriaca L., antioxidant activity, phenolic acids, flavonoids.*

MODERN MAIZE CULTIVATION TECHNOLOGIES IN THE CONTEXT OF CLIMATIC CHALLANGES

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Abstract

Maize is one of the most important agricultural crops globally duet o its higt productivity and various applications in food, feed and industry. The study was carried out in the area of gleic soils in the west of Romania and aimed to optimize the tillage system and test the performance of some maize hybrids in the context of climate change, comparing two tillage – minimum and conventional tillage systems – in terms of the impact on average production. The results obtained show that the minimum tillage system led to an increase in avarage production by 1,117 kg/ha compared to the conventional system. In the dry year 2022, the difference was 603 kg/ha, and in 2023, more climatically favorable, the difference was more pronounced, reaching 1,608 kg/ha. The technology of maize cultivation in a minimum tillage system and the adaptability of hybrids are the viable solution for increasing the harvest in unfavorable climatic conditions.

Key words*: corn hybrids, yield performance, sustainable agriculture.*

STUDIES ON THE ADAPTABILITY OF SOME ROMANIAN VARIETIES OF AUTUMN WHEAT TO THE CURRENT CLIMATE CHANGES IN NORTHERN BĂRĂGAN

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Abstract

The paper presents the climate evolution in Northern Baragan Plain and the impact of current climate changes on the autumn wheat crop, with the formulation of some recommendations for farmers in this agricultural area. Five Romanian varieties of wheat were studied, which are multiplied at the Agricultural Research and Development Station Braila, in the last five agricultural years, which were the most difficult because of climate changes, due to the pedological drought recorded in Northern Baragan Plain. Atmospheric heat negatively influences the physiology of agricultural plants, through deficiencies in root absorption and photosynthesis, increasing evapotranspiration and having the effect of drying leaves, deficient pollination of flowers and lack of fruiting, i.e. seed formation. The study carried out aims to support the revitalization of the Romanian seed market to ensure better access for farmers to the most efficient seed material in the zonal pedo-climatic conditions. Recommendations were formulated for choosing the best performing wheat varieties, in the pedo-climatic conditions of Northern Baragan.

Key words*: wheat, productivity, climate changes, pedological drought, wheat varieties.*

REVIEW ON FERTILIZER IN ORGANIC PRODUCTION OF *Lavandula angustifolia* Mill SPECIES

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Abstract

Lavandula angustifolia Mill. (lavender), is an aromatic plant that is part of the Order Lamiales, Family Lamiaceae (Mint), Genus Lavandula L., having various uses among which we can mention: medical and therapeutic, cosmetic and pharmaceutical, dendrological and ornamental, alimentary, industrial. The genus Lavandula includes approximately (about 47 species), and the most important in culture is Lavandula angustifolia Mill. The present paper reviews the specialized literature and the research carried out, regarding the fertilization of the species Lavandula angustifolia Mill., under ecological culture conditions. The electrical conductivity of nutrient solutions affects growth, nutrient levels and essential oil composition. The foliar enrichment of copper nanocomplexes leads to variations in the chemical characteristics of the species, and the effect of different sources of fertilizers and the type of harvest, have an effect on the growth characteristics, absorption of nutrients as well as the productivity of the obtained essential oil, changing its chemical composition. have larger sizes compared to the Emilia variety.

Key words*: biometric parameters, fertilization, Lavandula.*

VARIATION IN CBDA AND CBD CONTENT IN SOME INDUSTRIAL HEMP GENOTYPES

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Abstract

The content of CBDA and CBD was determined in three hemp genotypes, sown in two different seasons. Six experimental variants resulted, V1 (Silvana, S1), V2 (Silvana, S2), V3 (Loja, S1), V4 (Loja, S2), V5 (Finola, S1), and V6 (Finola, S2). The CBDA content varied between CBDA = 0.43±0.04% (V4) and CBDA = 0.70±0.04% (V5). The CBD content varied between CBD = 0.52±0.06% (V1) and CBD = 0.88±0.06% (V2). The CBDA/CBD ratio varied between CBDA/CBD = 0.5774±0.0688 (V2) and CBDA/CBD = 1.0577±0.0688 (V2). The CBD/CBDA ratio varied between CBD/CBDA = 0.0455±0.1115 (V1) and CBD/CBDA = 1.7320±0.1115 (V2). Compared to the mean value of the experiment, in the case of the CBDA, variant V5 presented positive differences, and variant V4 negative differences ($p<0.05$). In the case of the CBD, compared to the mean of the experiment, variant V1 presented negative differences ($p<0.05$). Based on PCA, PC1 has explained 64.27% of variance, and PC2 has explained 35.134% of variance. Cluster grouping and a ranking of the experimental variants were generated, in relation to the considered indices.

Key words*: clustering, cannabidiol (CBD), cannabidiolic acid (CBDA), industrial hemp, principal component analysis (PCA), ranking.*

EXPLORING MORPHOLOGICAL VARIABILITY IN CHICKPEA CULTIVATION

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Abstract

This study aimed to evaluate the performance and morphological variability of ten chickpea (Cicer arietinum) lines, utilizing biological material from the Vegetable Research and Development Station Bacău. Data collection included key phenological and agronomic parameters: germination days and rate, days to first flowering, 50% and 100% flowering, and pod maturity stages (50% and 90%). Morphological traits assessed included flower colour, number of flowers per peduncle, plant growth habit, pigmentation, leaf type, leaflet count, and plant height. Additionally, yield-related traits such as pod insertion height, number of pods per plant, seeds per pod, total seeds per plant, seed mass per plant, seed shape, surface texture, and colour were evaluated. Results highlighted significant variability among the lines in flowering time and pod maturity, with L4 showing early, synchronized flowering and L6 exhibiting the longest flowering period. Pod maturity analysis showed that most lines reached 50% maturity between 115-119 days, indicating a consistent development rate. This comprehensive evaluation provides valuable insights into chickpea genetic diversity, supporting future breeding programs, with phenotyping playing a key role in understanding the genetic potential and adaptability of the accessions.

Key words*: agronomic parameters, morphological traits, genetic diversity, breeding programs.*

THE IMPACT OF HERBICIDE TREATMENTS IN THE CONTROL OF WEED SPECIES PRESENT IN THE MAIZE CROP IN THE PEDOCLIMATIC CONDITIONS AT NARDI FUNDULEA

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Abstract

Maize (Zea mays) is the most valuable and important crop, the sown surfaces show a high degree of infestation with annual and perennial weeds. Weeds are usually characterized by rapid and abundant seed production, spread easily and grow quickly. They usually have very well developed root systems and are adapted to most pedoclimatic conditions. The researches were carried out in the experimental field from NARDI Fundulea, in the pedoclimatic conditions existing in the south of the country. The main objective of the work is to study the selectivity and effectiveness of herbicide treatments on the fight against annual and perennial weeds present in the maize crop. 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 in the research area.

Key words*: maize, weed, herbicide, efficacy, selectivity.*

INFLUENCE OF TILLAGE AND VARIETY ON YIELD AND QUALITY OF CHICKPEA CROP ON THE REDDISH PRELUVOSOL FROM MOARA DOMNEASCĂ, ROMANIA

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Abstract

In grain legume crops, cultivated varieties and basic tillage are the first important factor for improving yield and quality indicators, especially in recent years when climate change has induced long dry periods during the growing season. Thus, the research focused on the influence of tillage and chickpea varieties on production, productivity elements and quality indicators in the reddish preluvosol zone, knowing the less favorable characteristics of the soil type. The research was carried out over two agricultural years period respectively, 2022-2024 under climatic environment of Moara Domneasca, Ilfov county. Three tillage variants were evaluated: plowing at 25 cm depth, chiseling at 35 cm depth and disc harrowing at 12 cm depth and 4 chickpea varieties: Burnas, Rodin, Flamenco and CDC Orion. The results obtained showed differences between the varieties of chickpeas taken in the study but especially between the tillage. The highest yield was obtained by CDC Orion variety in the experimental trial in which the soil was ploughed, but Flamenco variety had a higher protein and lipid content in the kernels.

Key words*: chickpea varieties, tillage, yield, quality.*

SOME Asteraceae SPECIES (*Asteraceae martinov*) IN THE COLLECTION OF "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE) AS POTENTIAL HONEY PLANTS

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Abstract

This article describes some plant species from the Asteraceae Martinov family, species with melliferous potential and multiple utility, from the collection of fodder, honey and energy plants of the "Alexandru Ciubotaru" National Botanical Garden, which includes a wide range of plants of various botanical families. Four species of non-traditional plants for the Republic of Moldova, belonging to the Asteraceae family, were selected as research subjects: Helianthus giganteus L., Silphium perfoliatum L.*, Cynara cardunculus* L.*, Inula helenium L. These plants are known for their high potential as fodder, honey, medicinal and energy plants. They are characterized by longevity, early onset of vegetation, long and staggered generative period, attractive flowers for a wide spectrum of pollinating and honey-bearing insects. The researched species can significantly contribute to the diversification of the honey base, as an additional source of nectar and pollen for useful entomofauna as well as the beekeeping industry of the Republic of Moldova.*

Key words*: Asteraceae Martinov, honey plants, development, flowering stages.*

COMPARATIVE STUDY OF THE INVASIVE ENTOMOFAUNA ASSOCIATED TO THE SPECIES *Phaseolus vulgaris* L. and *Glycine max* (L.) Merr ON EXPERIMENTAL PLOTS IN THE "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE), REPUBLIC OF MOLDOVA

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Abstract

Soybean and common bean are widely grown as food and fodder plants, but also have high estimated energy potential. They are among the most significant field crops, cultivated annually in the Republic of Moldova. These species are economically feasible, versatile crops, but their major disadvantage is their vulnerability to the impact of invasive entomofauna. The phytosanitary monitoring conducted on the experimental sectors of the Botanical Garden, in the collection of fodder, honey and energy plants, in comparison with the productive sectors in agro-industrial areas, resulted in the estimation of the invasive impact, in 2024, of the most harmful insect species for these crops. The phytosanitary monitoring revealed the presence of a significant complex of parasitic insects, represented by 12 species included in four orders (Coleoptera, Diptera, Hemiptera, Lepidoptera) and nine families. The most harmful and invasive pests for both researched plant species were: Acanthoscelides obtectus Say*., Agrotis spp., Sitonia liniatus* L.*, Aphis fabae Scopoli, Myzus persicae Sulzer., Aphis glycines Matsumara; Vanessa cardui L., Delia platura Meigen. The obtained data are useful for adapting pest control measures to the integrated protection system.*

Key words: *common bean, experimental sectors, parasitic insects, phytosanitary monitoring, soybean.*

SUSTAINABLE POTATO PEST AND DISEASE MANAGEMENT: GLOBAL INNOVATIVE PRACTICES WITH A FOCUS ON ROMANIA

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Abstract

Potato crops worldwide face significant challenges from pests and diseases that impact yield, quality, and economic value. This paper provides a comprehensive overview of current pest and disease pressures on potato production, focusing on both global and Romanian contexts. Key pests and pathogens, including the late blight, early blight, dry rot, potato virus Y or Colorado potato beetle are addressed, with discussions on their biology, epidemiology, symptomatology, and economic impacts. For each pest and disease, various control strategies are explored, emphasizing cultural practices as effective, low-cost preventive measures. Detailed tables summarize successful biological, chemical, and plant extract-based treatments. Additionally, the review highlights the importance of selecting resistant varieties and identifies proven chemical treatments for effective management. Through an integrated approach combining cultural, biological, and genetic methods, this paper underscores the critical role of sustainable practices and ongoing innovation in managing pests and diseases in potato crops.

Key words*: potato crop, pest, disease, IPM, Romania.*

BREAKING CYTOPLASMIC MALE STERILITY IN INBRED CORN LINES (*Zea mays* L.): A REVIEW

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Abstract

Cytoplasmic male sterility (CMS) in corn is an important aspect of hybrid seed production, enabling efficient crossbreeding by eliminating the need for mechanical and manual detasseling. However, breaking sterility is a phenomenon that appears often. Research highlights that the breaking of sterility is governed by genetic factors as restorers of fertility (Rf genes), interactions between nuclear and mitochondrial genomes, environmental factors such as temperature and light condition, physiological and biochemical factors, or anthropogenic interventions. While these mechanisms have advanced hybrid crop production, they can also introduce challenges such as reduced genetic adaptability and heightened susceptibility to environmental stressors. A detailed understanding of the factors implications in breaking sterility is vital to optimizing corn production systems while mitigating potential risks. This study consolidates information from the literature on studies of the factors that lead to the sterility breakage of CMS lines in corn.

Key words*: corn, sterility breakage, seed production, cytoplasmic male sterility.*

BIOMORPHOLOGICAL AND PHYTOCHEMICAL STUDY OF SOME PROMISING AROMATIC PLANT SPECIES FROM THE *Lamiaceae* FAMILY INTRODUCED IN THE REPUBLIC OF MOLDOVA

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Abstract

The article summarizes the results of the biomorphological and phytochemical study of some introduced species of aromatic plants from the Lamiaceae family under the pedoclimatic conditions of the Republic of Moldova: Elsholtzia stauntonii Benth., Koellia virginiana (L.) MacM., Agastache urticifolia (Benth.) Kuntze, Monarda fistulosa L., Perovskia atriplicifolia Benth. The biomorphological peculiarities of these species have been highlighted and the content and phytochemical composition of the volatile oil have been revealed. The species E. stauntonii accumulates 0.43% volatile oil and is characterized by a rich content in cinerone (50.8%) and rosefuran (20.6%). K. virginiana contains 1.00 -1.05% volatile oil, the main compounds being pulegone (84.6%) and menthol (2.5%). A. urticifolia plants contain 1.65—1.70% volatile oil with the basic compounds estragole (41.1%), pulegone (20.4%), limonene (15.3%). In the species M. fistulosa, the volatile oil content is noted at 0.75-0.80%, the basic components being carvacrol (54.83%), p-cymene (23.15%). P. atriplicifolia contains 0.54-0.65% volatile oil, rich in limonene (40.13%) and α-pinene (17.87%). The highlighted species can serve as sources of indigenous raw materials for the production and diversification of the range of natural cosmetic and pharmaceutical products.

Key words*: aromatic plants, biomorphology, cosmetics, essential oil, perfumery.*

BEHAVIOR OF AN ASSORTMENT OF SPRING OAT VARIETIES DEPENDING ON THE LEVEL OF MINERAL FERTILIZATION AND SOWING

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Abstract

The study followed the behavior of an assortment consisting of eleven varieties of spring oats, depending on the level of mineral fertilization, on the level of production, crude protein content and fats. Mineral fertilization with nitrogen had five graduations: N0, N30, N60, N90 and N120, applied on a constant background of P60K60. The sowing density also had three graduations: 350 seeds/m^2, 450 seeds/m^2 and 550 seeds/m^2. The lowest production of 2961 kg/ha was recorded for the Lovrin 1 variety on the N0P60K60 agrofund and the density of 350 seeds/m^2, and the highest of 4879 kg/ha for the Gentiana variety, on the N120P60K60 agrofund and 550 seeds/m^2. The values of the protein content depending on the level of mineral fertilization ranged between 13.4 on the N0P60K60 agrofund and 15.05% on the N120P60K60 agrofund. As for the fat content, the highest value of 54.2% was also recorded on the agrofund fertilized with N120P60K60 and the Muresana variety.

Key words*: chernozem, fat content, nitrogen, protein content.*

EVALUATION OF QUANTITATIVE AND QUALITATIVE INDICATORS IN MAIZE HYBRIDS (*Zea mays* L.) CULTIVATED IN NORTH-EASTERN OF BULGARIA

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Abstract

Maize (Zea mays L.) is one of the most produced cereal crops on a global scale. The field experiment was held in the experimental of the selected area in region Razgrad (North-Eastern Bulgaria) during the period 2021-2023. The randomized complete block design with 4 replications and 25 m^2 plot size was applied with five maize hybrids - P9415 (FAO 360); P9889 (FAO 420); P9903 (FAO 420); KAPITOLIS (FAO 380) and INTELIGENS (FAO 420). The purpose of the study was to establish the productivity and quality of some maize hybrids, grown in North-Eastern Bulgarian region. The following characteristics were reported: grain yield; cob length; number of rows per cob; number of grains per row; mass of grain per cob; 1000 grains weight; test weight and crude protein. The analysis of the results showed that the highest grain yield was obtained from P9889 hybrid due to the higher values of yield structural elements, while the highest values of the crude protein were reported by the hybrid INTELIGENS. The values of the indicators 1000 grains weight and test weight were highest by the hybrid KAPITOLIS (313 g and 74.2 kg, respectively).

Key words*: maize, hybrids, grain yield, quality, protein.*

SCREENING OF BARBED GOATGRASS (*Aegilops triuncialis* L.) FOR NACL SALINITY STRESS AT GERMINATION AND EARLY STAGES OF PLANT GROWTHT

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Abstract

The objective of this study was to evaluate the genotypes of barbed goatgrass (Aegilops triuncialis L.) for tolerance to NaCl salinity stress at germination and the early stages of plant growth. Seeds from five populations of Aegilops triuncialis L. were collected from disparate regions of Bulgaria and subjected to salt stress at six distinct NaCl concentrations (50, 100, 150, 200, 250 and 300 mM). The genotypes exhibited considerable variation for the germination and seedling characteristics examined under both control and salinity-stress conditions. The highest value of the relative injury rate was recorded when seeds were treated with 300 mM NaCl. The application of increasing concentrations of the NaCl prolonged the mean germination time and suppressed the studied germination and seedling traits and had a greater inhibitory effect on shoot growth compared to root growth. Genotype BGR43665 was identified as the most tolerant to salinity stress, when exposed to increasing concentrations of sodium chloride ranging from 50 to 250 mM, on the base of the indices values for Mean productivity (MP), Geometric mean productivity (GMP), Harmonic mean (HM), Stress tolerance index (STI), Yield index (YI), Yield stability index (YSI), Relative stress index (RSI), calculated on the based of shoot dry mass. The average of the summary ranks (ASR) also identified BGR43665 as the best genotype.

Key words*: Aegilops triuncialis L., germination, early growing stage, salinity, tolerance.*

YIELD STABILITY AND ITS ELEMENTS IN COMMON WINTER WHEAT VARIETIES UNDER PAZARDZHIK REGION CONDITIONS

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Abstract

In the period 2019-2023 in the field of irrigated agriculture experimental station Pazardzhik on cinnamon forest soil at humus 1.2-1.5% and pH 5.5-6 is set trial, which includes 9 varieties of common winter wheat selection of IPGR Sadovo. The stability of yields and its elements -1000 grains weight, and test weight, kg/hl Yield stability and grain physical properties of the varieties were evaluated using the stability variants σi2 and Si2 of Shukla (1972), the ecovalance Wi of Wricke (1962) and the phenotypic stability criterion (Ysi) of Kang (1993). IPCSSVKYSI (Interactive program for calculating Shukla`s stability index (Ysi)) developed by Kang and Magari (1995) was used to determine the stability index. The objective of our study was to evaluate the stability of common winter wheat cultivars grown in the Pazardzhik region. The results of this study will enable us to make an even more complete evaluation of the varieties of the IPGR Sadovo breeding of common winter wheat. Phenotypic stability is particularly important for practice.

Key words*: winter wheat, stability, yield, yield traits, climate change.*

RESEARCHES ON WATER AVAILABILITY IN FUNCTION OF SOIL TILLAGES

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Abstract

We have researched the water lose in conventional, no-till with and without mulch layer in vegetation vessels and we have found that the upper layer in no-till without mulch layer system conducted to lose of much more water which results in poorer plant development. We have considered that the mulch layer prevents the water lose and improve the better root growing and plant developing. The conventional tillage as well as the minimum tillage helps creating an upper layer with larger pores which slow the water loses, too. Better results of minimal tillage can also be explained by better water keeping due to the loosened upper 5-7 cm of soil. Our conclusion is the need to manage the residue layer in order to reduce water loss which results in better root growth, plant development and better yield than conventional system in high evaporative climates.

Key words*: no till, mulch, water.*

TECHNOLOGIES FOR GROWING MAIZE IN REPEATED AND CONTINUOUS CROPS UNDER IRRIGATION

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Abstract

The use of chemical ameliorant allows maintaining agrophysical soil parameters in dark chestnut medium loam soil with constant corn cultivation under drip irrigation at the initial baseline level. Without the use of ameliorant, the stocking density increased by 1.5...4.8% compared to the base year. The soil was most compacted in the 10-20 cm horizon. The use of ameliorant allowed to maintain the initial soil density during the constant cultivation of corn for 5 years 2020…2024. Soil porosity decreased by 1.5...1.8%, and in relative values by 2.5...3.3% under constant corn crops without the use of chemical ameliorants. The use of a soil improver allowed to slow down the decrease in porosity by almost an order of magnitude – to 0.2…0.3 relative percent. The humus content when using chemical ameliorant was half as low compared to the options without ameliorant. Fluctuations in humus content and a possible downward trend were at a low level - the percentage of fluctuation of the indicator to the base year 2020 was 0.7-1.4% without the use of ameliorant and 0.3% with the use of ameliorant.

Key words: *maize, humus content, soil bulk density, soil porosity, chemical ameliorant.*

GENETIC NATURE OF QUANTITATIVE TRAITS IN DURUM WHEAT

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Abstract

The aim of the study is to determine the genetic nature of quantitative traits associated with productivity in durum wheat and to make recommendations for optimizing the breeding process in the early segregating generations. A diallel cross without reciprocals, was carried out at the Field Crops Institute–Chirpan, with five modern durum wheat varieties. Six quantitative traits were studied. The inheritance of productivity tillering is governed by overdominance, and is possible selection of genotype by phenotype, but in the later segregating generations. For traits such as plant height and thousand kernel weight, inheritance is controlled by incomplete dominance, and genotype selection by phenotype is possible in F_2. The inheritance of spike length is determined by overdominance, and is possible selection of genotype by phenotype in the later segregating generations. The spikelets number per spike is inherited through overdominance, and selection of genotype by phenotype is possible but should be carried out in the later segregating generations. The grains weight per spike is influenced by overdominance, and genotype selection by phenotype is possible after F_5.

Key words: *additive variance, dominance, narrow sense heritability, broad sense heritability, durum wheat.*

GRAPHICAL DIALLEL ANALYSIS FOR QUANTITATIVE TRAITS IN DURUM WHEAT

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Abstract

The aim of the study is to determine the genetic system controlling traits related to productivity in durum wheat and to identify the parents and their correct usage for achieving optimal results. A diallel cross without reciprocals was conducted with five modern durum wheat varieties at the Field Crops Institute - Chirpan. The inheritance of traits involves incomplete, complete and overdominance. Productivity tillering, spikelets number per spike and grain weight per spike are controlled by a simply additive-dominant genetic system with epistasis from complementary type. For the traits: plant height, spike length, and thousand kernel weight, the inheritance control is accomplished by a simply additive-dominant genetic system. All traits increased by accumulation of dominant genes, except productivity tillering. Complexly breeding valuable genotype with more dominant gene simultaneously several traits are the variety Progress. It can be successfully used to improve the traits related to productivity in durum wheat breeding programs.

Key words*: additive-dominance model, epistasis, traits rise, durum wheat.*

PECULIARITIES OF GROWTH AND DEVELOPMENT OF LEGUMINOUS FODDER GRASSES IN THE SOUTH OF UKRAINE

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Abstract

In recent decades, the intensity of chemical use in agriculture has increased significantly, which threatens food security, contributes to the accumulation of toxic chemicals in the environment, leading to the destruction of beneficial organisms (entomophages) and soil microflora, and thus disrupting the balance of the ecosystem. Agroecology and organic farming have become priority topics integrated into the scientific and technological approach to sustainable agriculture. The inclusion of legumes in crop rotation can contribute to the restoration of soil fertility and phyto-improvement of saline soils in the southern region of Ukraine, desalination being possible due to natural drainage and carbonic acid root secretion. In addition, the root system of these plant species enriches the soil with nitrogen and improves its structure. This article presents the results obtained in a field experiment with 3 species of perennial and biennial forage legumes, under different technological conditions with the aim of: i) evaluating the phenological evolution and biological characteristics of the growth and development of the studied plants; ii) investigating the impact of their cultivation on the ecological state of the soil and iii) determining the optimal parameters regarding the production obtained under different cultivation conditions.

Key words*: fodder leguminous grasses, soil fertility restoration, agroecology, crop rotation.*

EVALUATION OF NEW VIRGINIA TOBACCO GENOTYPES FOR YIELD, MORPHOLOGICAL AND CHEMICAL TRAITS

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Abstract

To evaluate the yield, morphological traits and chemical indicators of Virginia tobacco genotypes, under agroecological conditions of Plovdiv, a study was conducted during 2017-2019 in an experimental field at Tobacco and Tobacco Products Institute, Markovo. Three new genotypes of Virginia tobacco - L 36, H 126 F_1, H 135 F_1 and standard Virginia 0514 were planted in four replications and evaluated by the following traits: plant height; number of leaves; twelfth leaf length, twelfth leaf width; leaf area, cured leaf yield, chemical components - nicotine, sugars, total nitrogen, balance ratio total nitrogen/nicotine and sugars/nicotine. It was found that statistically significant differences existed among the studied Virginia tobacco genotypes only in the indicators cured leaf yield, twelfth leaf length and in the adaptability of plant height trait. Genotypes H 126 and L 36 are distinguished by a proven greater twelfth leave length (64; 62 cm.) and cured leaf yield (3.20; 3.14 t/ha). The presence of statistically significant differences between genotypes in terms of plant height trait proved H 126 to be the most resistant to environmental factors, followed by L 36. The standard V 0514 demonstrated superiority for the sugars/nicotine ratio, but for all genotypes the value was within the reference range. In L 36 the total nitrogen/nicotine ratio was below 1.

Key words*: Virginia tobacco, morphological traits, yield, ecological stability.*

THE QUALITATIVE POTENTIAL OF SOME GRASS-LEGUME MIXTURES FOR FEED. CASE OF STUDY.

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Abstract

The use of chemical fertilizers was one of the most common technological links for increasing feed production. The motivation for this measure was the need to increase the food requirement for the constantly growing population of humanity correlated with the consumption of animal products. One of the challenges of the last decade is to use chemical fertilizers in the smallest possible quantity, preserving the properties of the soil in order to obtain qualitative productions. One of the current trends of modern agriculture is to use mixtures (grasses and legumes) that are agro-economically efficient. In this sense, the purpose of this work is to test mixtures of annual grasses and legumes for fodder in order to evaluate their qualitative potential (CP%). Thus, mixtures of annual clover (T) and two oat varieties (O1, O2) were used. The proportions in which they were sown were: clover (T)/(O1, O2) 50%/50%, 33%/66%, 66%/33%. The mixtures were sown under the same conditions. From the statistically analyzed data, we can conclude that the best results in terms of CP% were T/O2 33%/66%, and fiber T/66%/33%.

Key words*: crud protein %, fiber %, mixture, qualitative potential.*

STUDY REGARDING THE MAIZE PRODUCTIVITY IN RESPONSE TO SHORT-TERM APPLICATION OF ORGANIC AND MINERAL FERTILIZERS IN A SOUTHEASTERN AREA OF ROMANIA

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Abstract

Maize (Zea mays L.) is the most widely produced food crop globally, providing essential nutrition for both humans and livestock, while also being an important raw material for industrial processes. However, factors such as climatic conditions and fertilization practices significantly affect maize yields. To address these challenges, this study explores the impact of short-term application of organic and mineral fertilizers on maize grain yield and its components. The field trial was conducted at the Moara Domnească Research and Development Station for Agronomy (RDSA) belonging to USAMV Bucharest, Romania, on a preluvosoil. Manure compost was applied in three doses (15 t/ha, 30 t/ha, and 60 t/ha), either alone or in combination with NPK complex fertilizers (20:20:0). Yield components and total production were evaluated prior to harvest, with results showing significant differences between treatments compared to the control (soil).

Key words*: maize yield, yield components, mineral fertilization, organic fertilization, sustainable production.*

COMPARATIVE TESTING OF SORGHUM, SUDANGRASS AND MAIZE SOWN AS A SECOND CROP AFTER WHEAT AND FALLOW PREDECESSORS

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Abstract

The research was carried out between 2021 and 2023 in the experimental fields of the Agricultural Institute - Shumen, Bulgaria. The aim of this study was to establish the yield structure and productivity of grain sorghum, Sudangrass and grain maize tested as a second crop after wheat and fallow predecessors. The results over three consecutive years indicate that fallow is a better predecessor and the plants sown on it develop much more intensively and accumulate more mass than the wheat predecessor, despite the shorter vegetation periods. The green mass yields of Sudangrass, sown on fallow significantly exceeded the yields obtained with the wheat predecessors. Similar results were obtained with sorghum and maize. In all three years, maize and sorghum with a fallow predecessor managed to form seeds and reach the milky-wax maturity stage, which is an important prerequisite for the production of green silage. Crops sown on fallow, despite their early sowing, lag behind in growth and form only short stems and foliage.

Key words*: sorghum, Sudangrass, maize, productivity, predecessors.*

EFFICACY OF BIOLOGICAL AND CHEMICAL SEED TREATMENTS FOR SUSTAINABLE MAIZE CROP PROTECTION

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Abstract

This study evaluates the efficacy of maize seed treatments to identify environmentally friendly crop protection solutions and reduce reliance on toxic chemical pesticides. Conventional products (Signal, Redigo Pro) and organic treatments (Bioseed, Biosem, Raiza Mix) were tested during 2024 at ARDS Turda (Transylvanian Plateau) and ARDS Brăila (Romanian Plain). Requiem Prime and Repel Aves, typically used as foliar repellents, were experimentally tested as seed treatments. The experiments were conducted on Turda 344 and Harmonium hybrids, respectively, analyzing seedling emergence dynamics, pest resistance, yield, hectoliter weight, and 1000-kernel weight. At ARDS Turda, Repel Aves (250 ppm) showed the highest emergence and yield increases (20-25%) under drought conditions, while higher concentrations (1000 ppm) caused phytotoxicity. At ARDS Brăila, Requiem Prime (250 ppm), Redigo Pro, and Signal achieved the best results, with high yields and superior quality. Organic treatments like Bioseed and Biosem showed intermediate performance, while untreated seeds had the weakest results. The study highlights biological seed treatments as effective and sustainable alternatives, enhancing yield and resilience to climatic stressors while supporting eco-friendly agriculture.

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

ON THE GROWTH AND DEVELOPMENT PROCESS OF GRASS MIXTURES AND LEGUMES FOR RIPARIAN GRASSLAND RENOVATION

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Abstract

The availability of solar radiation is a key environmental factor in the development of plant species, the intensity and regime of light being important for plant morphology and production, directly influencing the dominant species during a certain period of a season. To study the development of vegetation in riparian grasslands, 36 experimental plots were established. The experiment was located in Mogoșești village, Dragomirești commune, Dâmbovița county, approximately 1 km from the Dâmbovița river, where the environmental conditions are similar to the areas occupied with grasslands near the Dâmbovița River. Two variants were considered: fertilized and unfertilized. The plots were sown with various varieties, combined, of Medicago Sativa, Lotus Corniculatus, Lolium, Festuca, Poa, etc. Vegetative growth was good, including on some plots in the unfertilized lot; however, in the absence of fertilization and deficiencies in the microelements necessary for plant development, the vegetation in the unfertilized plots showed lower LAI values, and lower density, and lower quantities of dry matter.

Key words*: leaf area, quantitative analysis, crop growth, development stages, fertilization.*

HEREDITY OF MAIN EAR GRAIN WEIGHT IN F_1 OF SOFT WINTER WHEAT ACCORDING TO GENOTYPE OF INITIAL FORMS AND HYDROTHERMAL CONDITIONS OF THE YEAR

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Abstract

In 2020–2022, the types of inheritance of grain weight of the main ear in F_1 were studied during the hybridisation of short, medium, and tall varieties of soft winter wheat. The obtained hybrids formed a grain weight of the main ear ranging from 1.48 g to 3.01 g, while the parental forms ranged from 1.24 g to 2.05 g. The determined indices of the degree of phenotypic dominance (hp = -23.0 to 273.0) indicate significant differentiation. In most cases, the grain weight of the main spike was inherited with positive superdominance (hp = 1.3 to 273.0), accounting for 86.5% of hybrids. Negative dominance was observed in six hybrids (5.8%), partial positive dominance in four (3.8%), intermediate inheritance in three (2.9%), and partial negative inheritance in one hybrid. Over the three years, heredity by the type of positive superdominance was observed in 21 out of 36 crossing combinations, predominantly when the maternal form was one of the local varieties, Bilotserkivska semi-dwarf and Lisova Pisnya. The conducted studies indicate a significant influence of the parental components of hybridisation and the hydrothermal conditions of the year on the formation of grain weight of the main ear in F_1, as well as on the determined indices of the degree of phenotypic dominance.

Key words*: hybrids, varieties, grain weight of the main ear, degree of phenotypic dominance.*

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

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Abstract

The aim of our research was to evaluate the performance of a new active ingredient, fenpicoxamid, from picolinamide group, in control of wheat pathogens. Trials were carried out in experimental fields located in Buzău county, with foreign wheat genotype and in Neamț county with Romanian wheat genotype. In both experimental fields was detected attack by Septoria spp. that causes wheat septoria, Puccinia recondita, pathogen responsible for brown rust, and Blumeria graminis, powdery mildew pathogen. The control scheme included treatments with a.i. from SDHI, Strobilurins, Triazoles, Picolinamides and their mixtures. Treatment with 50 g/l fenpicoxamid + 100 g/l prothioconazole performed the best with the highest efficacy in control of pathogens monitored in the experimental fields. Efficacy in septoria control was over 90% in both locations. Efficacy in control of brown rust was 89.6% in Buzau experimental field and 90.1% in Neamț experimental field and control of powdery mildew was 78.8% in Buzău county while in Neamț county was 83.1%.

Key words*: wheat, agent pathogen, treatment, fenpicoxamid, efficacy.*

THE WESTERN CORN ROOTWORM (*Diabrotica virgifera virgifera* Le Conte) POPULATION IS INCREASING IN THE SOUTHEAST OF ROMANIA

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Abstract

The western corn rootworm (Diabrotica virgifera virgifera LeConte) was first detected in Romania in 1996 the western part of the country. Since then, the insects have spread to the east. This paper presents the results of this pest population monitoring in southeast Romania at the National Agricultural Research and Development Institute, Fundulea, Călărași County, maize field. The first detection of this pest in the pheromone traps at NARDI Fundulea was in 2017. This study has presented the results of western corn rootworm fly monitoring at NARDI Fundulea between 2020 and 2024. It has used pheromone traps, KLPfero+ type, from Csalomon®. The highest population of this pest was recorded in 2020, with a total number of 2192 captures, followed by 2023 (1645 captures), 2022 (1521 captures), and 2021 (1020 captures). In 2020, the flight peak was in the first 20 days of July, while in 2021, it was in the first 20 days of August. In 2023, the flight peak was in the last 10 days of July, while in 2024, it was in the last 20 days of July.

Key words*: maize, pest, rootworm, high pressure.*

MANAGEMENT PRACTICES INFLUENCE THE NATURAL ARBUSCULAR MYCORRHIZAE COMMUNITY OF MAIZE

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Abstract

The productivity of the agroecosystems is affected by the presence and the biodiversity of arbuscular mycorrhizal fungi communities. Understanding how mycorrhizal communities respond to various factors is crucial for promoting sustainable agriculture. This study examines how four cropping systems affect the natural arbuscular mycorrhizal community associated with maize. The trial involved three corn hybrids: DKC4949 (FAO 390), P8523 (FAO 260), and P9537 (FAO 390). The experiment was conducted using a randomized complete block design with three replications in a plot size of 25 m^2. For the tested period the highest number of spores (348 in 2022 and 370 in 2023) has been recorded by the hybrid P8523 when cultivated according to the no-till technology combined with mulching. Hybrid P9537, the highest yielding for the region, also exhibits the greatest rate of mycorrhizal colonization. Although no-till and its combination with mulching enhanced the colonization potential of mycorrhiza by all hybrids, the positive result has no quantitative manifestation and the yields remain the lowest by those variants.

Key words*: arbuscular mycorrhiza, colonization rate, cropping system, maize.*

THE INFLUENCE OF BIOTIC FACTORS ON THE PRODUCTION AND QUALITY OF SOME NEW WHEAT LINES IN THE 2023-2024 AGRICULTURAL YEAR

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Abstract

Cereals are the basis of nutrition. Wheat produces flour, from which bread and bread products are made, which is an important source of food for the entire population. Phytopathogenic agents and pests play an important role in the final determination of the quality of wheat grains, as the quality and quantity of gluten are very important in the baking process. They can either negatively or sometimes insignificantly influence productivity, depending on the intensity of the attack. The studied material was composed of the Trivale variety, which represents the control variant, and 4 new winter wheat genotypes, lines A4-10, A44-13, A95-13 and A57-14. Experimental factors: factor A-genotype, factor B-seed treatment, factor C-fertilization, studied through the parameters: production, protein content, gluten content.

Key words*: line, pathogens, pests, productivity, quality indices .*

RESEARCH ON MAIZE YIELD POTENTIAL BY MATURITY GROUP UNDER CONDITIONS AT ARDS BRAILA

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Abstract

In the current conditions of changing climatic conditions, especially in South-East Romania, it is necessary that the choice of maize hybrids is made correctly, depending on the maturity group, in order to obtain satisfactory yields and thus counteract the effect of climate change. The aim of this research was to study the yield and productive capacity of a set of maize hybrids of different maturity groups in the context of climate change. The field experiment was conducted in the 2023 and 2024 growing seasons on a vermic soil of chernozem with an average humus content of 2.4-3.1% in the upper horizons and only 1.6% in the transition horizon, total nitrogen content of 0.14-0.25% at the test site of the Agricultural Research and Development Station (ARDS) Brăila - Chiscani Experimental Center where a large number of maize hybrids from different maturity groups are tested annually.

Key words*: maize, FAO maturity groups, grain yields hybrids.*

GLUTEN AND PROTEIN CONTENT IN WHEAT GENOTYPES – COMPARATIVE ANALYSIS

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Abstract

Gluten and protein content were analyzed in 25 wheat genotypes (Wg5026 to Wg5050). The study was conducted at ARDS Lovrin, during the agricultural year 2023 – 2024. The comparative crops were organized in randomized replicates. The gluten content (Glt) varied between Glt = 46.00±0.48% (Wg5027, Wg5029) and Glt = 54.00±0.48% (Wg5042). The protein content (Pro, %) varied between Pro = 24.20±0.56% (Wg5041) and Pro = 35.90±0.56% (Wg5035). A comparative analysis was used to find out the differences between genotypes in relation to the quality indices studied. The gluten increase (ΔGlt) was between ΔGlt = 0.92% and ΔGlt = 3.92% (Wg5036, Wg5042), and eight genotypes showed statistical safety. The protein increase (ΔPro) ranged from ΔPro = 0.04% to ΔPro = 7.24% (Wg5035), and nine genotypes showed statistical safety. According to PCA, PC1 explained 53.466% of variance, and PC2 explained 46.534% of variance. Cluster analysis grouped the genotypes based on similarity, and genotypes ranking was done, based on the quality indices considered. The results are valuable for genotype selection in the wheat breeding program, as well as for agricultural practice.

Key words*: breeding program, genetic potential, gluten, protein, wheat genotypes.*

STUDY OF THE COTTON VARIETY IZABELL WITH NATURAL COLORED FIBER UNDER NITROGEN FERTILIZATION AND IRRIGATION

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Abstract

Optimizing nitrogen (N) fertilization in cotton is essential for balancing yield, fiber quality, and environmental sustainability. This study examines the response of the Bulgarian cotton cultivar Izabell to varying nitrogen rates (N0, N80, N160, and N240) under irrigated and non-irrigated conditions over a three-year period (2018-2020) in Central Southern Bulgaria. The results indicate that nitrogen application significantly affects plant height, boll number, and cotton yield, with the optimal rate determined at N160 level. Irrigation was the dominant factor influencing productivity, increasing cotton yield by 33.2% compared to non-irrigated conditions. Yield variation was strongly influenced by meteorological conditions, with drought stress during flowering leading to significant yield reductions. Excessive nitrogen fertilization (N240) resulted in delayed maturity and did not further improve yield. The findings highlight the importance of site-specific nitrogen management and irrigation practices in optimizing cotton production.

Key words*: cotton, fertilization, fiber, nitrogen, yield.*

INTEGRATION AND FUNCTIONALITY OF IPM STRATEGIES FOCUSING ON INSECT PESTS IN VARIOUS CROPS

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Abstract

Integrated Pest Management (IPM) is an increasingly used tool for sustainable pest management with the clear aim of reducing adverse environmental impacts and providing long-term economic and ecological benefits. Holistically, this approach aims to manage pest populations through combined and compatible techniques and methods. It is not focused on eradicating and eliminating pesticides but rather on keeping pest populations under control and reducing pesticide use. With this in mind, it is essential to bring to attention of both farmers and researchers in agriculture and plant protection the latest available tools, reflecting the advantages and disadvantages by exemplifying them on crop systems (cereals, vegetables). This review is by far an analysis of what is already used, tested and applicable and on the other hand highlighting the challenges in digital context through the scientific, economic and social potential. All of this helps to make decisions to organize pest management activities and encourage direction towards a safe path for human health and environmental protection by supporting precision agriculture.

Key words*: IPM, insect pests, monitoring, classic and modern tools.*

EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF *Origanum vulgare* L. ESSENTIAL OIL AND ITS POTENTIAL APPLICATIONS IN PLANT PROTECTION

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Abstract

In the current context of promoting sustainable agriculture, it is important to find alternative solutions to synthetic pesticides in the fight against phytopathogenic microorganisms. Volatile oils in general, and those of plants from the Lamiaceae family in particular, through their chemical profile, have proven their antifungal and bactericidal efficacy, offering an ecological solution for the protection of agricultural crops, without affecting the environment. The antimicrobial activity of oregano oil on plant pathogens is closely related to the oil concentration, chemotype, as well as the synergy of biologically active compounds. The scientific paper is a review and aims to present the comparative effectiveness of the essential oil obtained from species and subspecies of Origanum vulgare L. on the main pathogenic bacteria and fungi, in correlation with the chemical profile.

Key words*: antifungal effect, antibacterial effect, oregano.*

WHEAT FLAG LEAF MORPHOANATOMICAL CHARACTERISTICS AND GRAIN YIELD COMPONENTS UNDER FIELD CONDITIONS

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Abstract

Drought induces morphological changes in plants, and among these, certain characteristics can be identified as markers of drought tolerance or resistance. The identification of drought resistance morphostructural markers can facilitate the selection of tolerant genotypes with increased productivity. Our aim was to establish a reliable and reproducible set of drought adaptation markers for Izvor and F628 wheat varieties and their DH lines, A1-3, A1-20, A1-65, A1-66, A1- 72, A2-92, A2-255 and B1-16 under field conditions. For this purpose, different leaf morphoanatomical parameters were compared with field productivity parameters. Although other studies associate these characteristics with drought tolerance, in our research most of the studied flag leaf morphological and anatomical traits were not correlated with main spike productivity or the Drought Tolerance Index (DTI). Stomatal density was the only characteristic that showed a significant correlation with the DTI, thus being considered a reliable marker for drought tolerant genotypes with increased productivity.

Key words*: wheat flag leaf, morphoanatomic characteristic, grain yield, drought resistance markers.*

IMPACT OF WEATHER PARAMETERS AND THE FUNGICIDE SPRAYING PROGRAM ON THE LATE BLIGHT (*Phytophthora infestans*) OF POTATO IN BRASOV AREA

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Abstract

Diseases like potato late blight (Phytophthora infestans) are among the major constraints that limit potato production.Climate changes have a strong impact both on the destructive potential of diseases and on the environment. A field investigation was conducted during 2023-2024 to National Institute of Research and Development for Potato and Sugar Beet Brasov. Twelve potato Romanian varieties and a fungicidal program were used. Data on first disease symptom appearance, disease incidence, and disease progress rate were recorded. The impact on the obtained yield was also analyzed. Generally, late blight severity in 2024 was greater than it was in 2023 as several varieties (Darilena and Marvis) reached high severity in both years. Furthermore, to other varieties late blight was absent (Cosiana and Asinaria in 2023) or its severity was less than 1% for the entire duration of the epidemic (Sarmis in 2023 and Asinaria in 2024).

Key words*: assessment, climatic conditions, late blight, potato, yield.*

STUDY REGARDING THE INFLUENCE OF NITRIC, AMMONIACAL NITROGEN FERTILIZATION AND VARIETY ON WINTER WHEAT (*Triticum aestivum* L.) PROTEIN CONTENT

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Abstract

The aim of this study was to analyse e the effect of variety, nitrogen rate and type and their interaction on protein content and to determine the economic feasibility of varieties and fertilizer application for the highest values. The subject of the experiment consisted in testing during two wheat growing seasons 2021 - 2023, twenty-seven winter wheat varieties fertilized with nitric and ammoniacal nitrogen in three different rates - 120, 150 and 170 kg N ha^{-1}. The layout of the experimental plan was done using stratified randomization block method. Cultivars were factorially combined and arranged in completely randomized blocks. We concluded that compared with the mean of the experience of 14.75%, variety and nitrogen fertilization systems interaction had a significant effect on wheat protein content. The highest protein content was obtained by the Tika Taka variety – 15.78%. Regarding the fertilization system, with very significant differences the values above the average of the experience, 15.32%, 15.27% and 15.36% were obtained the levels of fertilization with nitric nitrogen and those with ammoniacal nitrogen had negative values of 14.04%, 14.20% and 14.32%.

Key words*: ammoniacal N, nitric N, fertilization rate, protein content, wheat genotype.*

ASSESSMENT OF WET GLUTEN CONTENT BASED ON THE INTERACTION BETWEEN NITROGEN LEVEL OF FERTILIZATION AND WINTER WHEAT VARIETY CULTIVATED AT DUDEȘTII NOI, AN IMPORTANT AGRICULTURAL AREA OF ROMANIA

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Abstract

The objective of this study was to analyse the effect of variety, nitric, amoniacal nitrogen and level of fertilization for values of wet gluten content on winter wheat. The research was carried out in 2021-2023 and the method of planting was carried out in subdivided randomized blocks with three repetitions. The subject of the experiment consisted in testing twenty-seven modern winter wheat varieties with the experimental variants: 120, 150, 170 kg ha^{-1} a.s. nitric and amammoniacal N. Compared with the mean of the experience of 32.83% the highest value was obtained of Ciprian variety – 35.64%. The application of treatments on a chernozem soil weakly acidic with nitric N positively influenced this index were the highest values of 34.54%, 33.86% and 34.73% were obtained. In those fertilizated with ammonium N, the values obtained were below the experience. The results were discussed in view of classical statistics using ANOVA and The Student`s t-tests.

Key words*: wheat quality, fertilization levels, nitrogen types, wet gluten content.*

Carthamus tinctorius L. – A SPECIES WITH POTENTIAL FOR EXPANDING CULTIVATED AREAS

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Abstract

Carthamus tinctorius L. – safflower - is a promising oilseed crop for drought-prone regions. Research conducted in the southwestern Banat region on eutric semicarbonatic alluvial soil involved two experiments: one focusing on fertilization and the other on plant density and row spacing. In the fertilization trial, the highest yield of 3335 kg/ha was achieved with an N150P100K60 treatment. This regimen also enhanced grain quality, as evidenced by an increase in the thousand seed weight from 30.4 g in the control to 37.2 g, and an improvement in hectoliter mass from 40.2 kg/hl to 46.2 kg/hl. In a separate experiment evaluating plant density and row spacing, the optimal configuration was found to be 250,000 harvestable plants per hectare with a row spacing of 70 cm, resulting in a yield of 3050 kg/ha. Furthermore, chemical analyses revealed that oil content increased from 30.8% in the control to 40.5% in the $N_{100}P_{100}K_{60}$ treatment, culminating in a maximum oil production of 1398 kg/ha. These results underscore the potential of safflower as a high-yield, high-quality oil crop when appropriate agronomic practices are applied.

Key words*: evolution, milk production, NW Region, Romania, trends.*

RESEARCH ON THE RESPONSE TO PROLONGED DROUGHT OF AN ASSORTMENT OF WHEAT VARIETIES, THROUGH THE RATE OF WATER LOSS FROM THE FLAG LEAF, ON THE CHERNOZEM OF CARACAL

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Abstract

A collection composed of 220 wheat varieties of various origins was studied in terms of the water loss rate at 4 h and 24 h from the initial weighing of 6 flag leaves and through the relationship between the determinations on 15 ears of each variant of the analyzed assortment (ear length, number of spikelets/ear, ear density, number of grains/ear, weight of grains/ear, mass of 1000 grains, ear harvest index) on the one hand and yield, on the other. The lowest water loss at 4 hours was manifested by the Pajura variety (0.019) and at 24 h by the Izvor variety (0.343). The correlations between yield and each of the studied elements suggested that it is strongly correlated with the ear harvest index (r=0.208) and correlated with the thousand weight grains (r=0.150) in a positive sense. There wasn't correlation between yield and the rate of water loss in 24 h, but the results obtained suggest possibilities to direct the behavior of wheat in drought conditions, if genes with a favorable effect are accumulated.

Key words*: wheat, drought, flag leaf, rate of water loss, yield.*

RESEARCH ON THE ADAPTATION OF TRITICALE VARIETIES TO DIFFERENT FERTILIZATION SYSTEMS IN THE CONTEXT OF CLIMATE CHANGE IN CENTRAL MOLDOVA

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Abstract

This paper presents the results obtained at A.R.D.S. Secuieni regarding the adaptability of the triticale species, under different fertilization systems, in the context of climate change and has as a main purpose to evaluate the efficiency of the cultivation of this species under increasingly variable pedoclimatic conditions. Ten triticale genotypes were studied in two systems under fertilized and unfertilized cropping regimes during 2020/2023. The average yields realized during the analyzed period ranged from 4224 kg/ha to 6503 kg/ha. The most productive variety was Zaraza, in the fertilized system. The fertilized system yielded a 2.3% higher protein content than the unfertilized system (average of 15.5% in the fertilized system and 13.2% in the unfertilized system), which shows the importance of fertilization in increasing the nutritive value of triticale. The Zaraza variety had a maximum protein content of 18%. The unfertilized system's thousand kernel weight is higher than the fertilized system's. Based on the results obtained, the non-fertilized variants had equal or even higher yields and thousand kernel weight than the fertilized variants, but the average protein percentage was higher in the fertilized variants.

Key words*: fertilization, production, protein, triticale, variety.*

VARIABILITY OF MORPHOLOGICAL TRAITS IN ROMANIAN WILD THYME POPULATIONS

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Abstract

The wild species of the genus Thymus reveal a great taxonomic diversity, indicating a natural evolution that has allowed the adaptation to different habitats and has created the premises of a divergent evolution based on a great genetic variability. The study aims at quantitative morphological characterization by quantifying the associative relationships between the morphological parameters studied, for thirteen thyme populations growing wild in western Romania. Five morphological parameters were used to evaluate the quantitative morphological characters to establish the degree of phenotypic similarity between the studied populations. Depending on the phenotypic similarity, the populations were hierarchically classified into three main clusters using the UPGMA multiparametric cluster analysis. Concerning the analysis of variance for the morphological traits studied in the thyme populations, high and significant values of variance were recorded in the case of leaf length which shows a high capacity for differentiation between the three groups. The lowest diversity between populations of different clusters was observed for leaf width. The overall results revealed high intraspecific and interspecific variability in wild populations of thyme and provided significant information for plant breeding.

Key words*: polymorphism, Thymus pannonicus, Th. dacicus, Th. glabrescens, Th. pulegioides.*

NEW ASPECTS WITH WEED COMPETITION AND CONTROL FROM THE SUNFLOWER CROP

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Abstract

Having a more developed leaf system, one might think that the sunflower can fight much better with weed species during the growing season. Young plants, however, are the most vulnerable, as in the case of other cultivated plants. Weed biomass currently exceeds 10- 12 t/ha, and their spectrum is diverse. On average, production losses due to weeding exceed 1.0-1.5 t/ha of seeds. As a structure, MA constituted on average 8.6 t/ha, DA 2.6 t/ha, and DP 1.0 t/ha. Weeding as often as needed has proven somewhat more effective than in the case of other cultivated plants. Herbicide with specific products contributed year after year to obtaining obvious increases in production. In the case of the application of single herbicides, the increases were below 1.0 t/ha, and in the case of the combined and associated ones, the increase in production was around 1.5 t/ha. Today, reducing herbicide doses still requires adequate research.

Key words: *competition, herbicides, hoeing, sunflower, weeds control.*

MONITORING OF *Rhagoletis cerasi* WITH THE HELP OF DECIS TRAP TRAPS AND MONILIOSIS IN THE CHERRY ORCHARD FROM USAMV of BUCHAREST

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Abstract

In the conditions of our country, the cherry fly (Rhagoletis cerasi L.) is the most important pest of cherry orchards. At the same time, species of the pathogen Monilinia laxa, which cause moniliosis and brown rot, produce severe damage with high economic relevance. In the present work, we aimed to present the moment of appearance of adults and their evolution in the crown of cherry trees, based on Decis Trap traps, and how the climatic conditions influenced the activity of the cherry fly. In order to establish the dynamics of cherry fly populations, Decis Trap traps were used, installed in the crown of the trees. It is known that the attack produced by this species significantly affects fruit, production, depreciating the quality of the fruit and can be a way of installing the Monilinia laxa pathogen in the fruit. The incidence of fruit attack was between 6.78% and 32.25%.

Key words*: Rhagoletis cersi, traps, dynamics, Monilinia laxa.*

RESULTS OF THE COMPARATIVE RESEARCH ON DISEASES ASSOCIATED WITH INVASIVE NEMATODES IN MAIZE PLANTATIONS UNDER THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

In the Republic of Moldova, maize, also known as corn, is one of the major field crops, possesses strong phenotypic plasticity, is profitable and productive, but every year it is frequently invaded by harmful organisms, which exert a severe parasitic impact. The results of the phytosanitary control realized each year in the corn plantations revealed a considerable diversity of 6 diseases caused by 15 species of phytopathogenic fungi. Besides, the frequency values and the progressive impact were assessed comparatively per phases of vegetation, attacked organs, crop rotation systems and monoculture. The above-mentioned pathogens were also associated with invasive nematode complexes-20 species included in 7 families, belonging to the Tylenchida order, distributed according to the investigated areas, classified into 5 groups of the trophic spectrum. It has been estimated that the highest values of frequency and abundance of the invasive impact are characteristic of the detected endo-ectoparasitic species belonging to the families: Pratylenchidae Hoplolaimidae, Paratylenchidae, Tylenchidae, Heteroderidae, which severely infest the seedlings in the early stages of vegetation.

Key words*: corn, pathogenic fungi, invasive nematodes, phytosanitary control, parasitic impact.*

PARASITIC NEMATOFAUNA IN PEA CROPS (*Pisum sativum* L.) UNDER THE IMPACT OF THE UNSTABLE ENVIRONMENTAL CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

The results of the present research estimated the efficiency of the phytosanitary helmintological control in peas grown in open field and elucidated the helmintological parasitic impact, establishing the range of the invasive nematofauna, the frequency and the abundance of the associations. As a result of the phytosanitary research and the analysis of the helmintological impact on pea plants, it was found that the parasitic nematode complexes consisted of 14 species included in 4 families: Aphelenchidae, Hoplolaimidae, Tylenchidae, Heteroderidae, of the order Tylenchida, class Nematoda, distributed according to the investigated areas and classified according to the spectrum of trophic specialization in 5 groups. A larger number of species was detected in the Center area (14 species), as compared to the North area (8 species). It was found that the values varied from 7 to 30%, the damage being caused mainly by invasive associations of parasite nematodes of the genera: Ditylenchus, Pratylenchus, Heterodera, Meloidogyne, Helicotylenchus, Aphelenchus. The results of the phytosanitary monitoring contributed to elucidating the degree of nematological damage and brought new evidence in favor of applying sustainable pest control measures suitable for fabaceae agrocenoses.

Key words*: nematodes, helmintological control, pea sectors, parasitic impact, trophic specialization.*

THE IMPACT OF NITROGEN FERTILIZATION ON THE PRODUCTIVITY OF SOYBEAN CROPS IN SOUTHERN AND CENTRAL ROMANIA IN THE CONTEXT OF CLIMATE CHANGE

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Abstract

This study investigates the effects of nitrogen fertilization on the productivity of soybean crops in Southern and Central Romania under changing climatic conditions. The research focuses on two soybean varieties, Amiata and Orakel, cultivated in the regions of Caracal and Crișcior, which differ in soil characteristics and environmental stressors. Field experiments were conducted using three nitrogen application rates, and key agronomic traits such as plant height, number of pods, grain yield, and seed quality parameters were measured. Although statistical analysis did not reveal significant differences across treatments, strong positive correlations between nitrogen levels and several performance indicators were observed. The findings underscore the importance of adaptive nitrogen management strategies for maintaining soybean productivity and resilience in climate-sensitive agricultural regions.

Key words*: climate, nitrogen, productivity, soybean, sustainability*.

BARLEY PRODUCTIVITY, MACRO AND MICROELEMENTS CONSUMPTION WITH BIOMASS IN ERODED ARABLE AND VIRGIN SOIL IN THE STEPPE ZONE OF UKRAINE

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Abstract

Two neighboring landscapes with arable and virgin soils were selected for field observations. These sites coordinates are: 48º30' E lat. and 35º15'N long. Barley was used as reliable biological indicator to determine the biologically effective fertility of slope lands in the pot experiments. Summarizing the data on the genetic horizons of the soil H, Phк, Pк, it was found that the productivity of barley, on average for four years, on the humus horizon (H) and slightly washed soil was close to 6.56 and 6.69 g/pot and a height of 45.4-45.0 cm. The barley productivity on virgin slope soils is significantly higher and even at a depth of 90-100 cm is 4.75-5.17 g/pot or 32-60% higher than on arable slopes. The level of consumption and uptake of nutrients by barley along the profile up to 100 cm was minimal on moderately washed arable soils. Comparing the content of trace elements in barley on arable and virgin soils of slopes, it should be noted that in the conditions of virgin soils of slopes, the content of zinc, manganese, copper was significantly lower than in arable soils.

Key words*: arable and virgin lands, soil genetic horizons, erosion, barley yield, elements consumption.*

EFFECT OF LEGUME-BARLEY INTERCROPPING ON POPULATION DYNAMICS OF CEREAL APHIDS IN DIFFERENT BARLEY VARIETIES

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Abstract

Intercropping increases plant diversity in the agroecosystem and thus supports regulatory mechanisms for pest populations. Aphids are economically important pests of barley and represent a significant threat to cereal grain production. The research was carried out in 2021 and 2023 under field conditions in Vrazhdebna, Sofia (42°70'76.1"N, 23°43'73.1"E). The intercropping system consisted of different varieties of winter feed and malting barley and legumes (chickpea and vetch) sown in rows of strips. This study was designed to investigate the effect of legume-barley intercropping on cereal aphid populations and barley production. The data obtained showed that the combination of barley and legumes resulted in a reduction in aphid numbers of up to 31.7%. The analysis revealed no statistically significant differences in aphid attack between different cultivars of winter feed and malting barley grown in mixtures with legumes. The LER values for economic yield indicate that this cropping system is conducive to barley production and effective in pest management within the agroecosystem.

Key words*: intercropping, cereal aphids, barley.*

MORPHOLOGICAL VARIATION IN *Hemileia vastatrix* CAUSING COFFEE LEAF RUST FROM COFFEE GROWING REGIONS IN SOUTHERN KARNATAKA, INDIA

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Abstract

Throughout the world, coffee is an important agricultural commodity and most consuming beverages. Over the last two decades, coffee production has been declined due to the outbreak of the most devastating disease called coffee leaf rust caused by Hemileia vastatrix. To achieve sustainability, soil biodiversity plays a key role in the agriculture system as the indicator of soil health. A total of 29 different localities were surveyed for coffee leaf rust disease in major coffee-growing regions such as Chikkamagaluru, Kodagu, and Hassan in Karnataka, India. The present study reveals the morphological variation of Hemileia vastatrix causing coffee leaf rust disease from different geographical regions, observed under a light microscope and scanning electron microscope

Key words*: coffee leaf rust, urediniospores, Scanning Electron Microscope, disease severity, morphological variation.*

RESEARCH ON THE IMPACT OF NITROGEN AND PHOSPHORUS FERTILIZERS ON WINTER WHEAT YIELD AND QUALITY UNDER THE PEDOCLIMATIC CONDITIONS OF CENTRAL MOLDOVA

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Abstract

Winter wheat is a key agricultural crop that responds positively to fertilizers under the soil and climatic conditions of our country. However, factors influencing fertilizer efficiency and dosing challenges necessitate the implementation of long-term studies to investigate the complex interactions among plant, soil, fertilizer, and climate, as well as their impact on crop yield. This paper presents findings from a long-term study on the use of chemical fertilizers (NP) in winter wheat, carried out at the Agricultural Research and Development Station Secuieni, Romania (26°5` E; 46°5` N) during the period 2020-2023. The yields obtained from applying chemical fertilizers varied depending on the applied dose. On average, the studied factors had a considerable influence on wheat yield, resulting in significant variability in yield, ranging from 4886 kg ha^{-1} (unfertilized, N_0P_0) to 7117 kg ha^{-1} ($N_{80}P_{160}$ active substance). The interaction between phosphorus and nitrogen on wheat seed yield demonstrated a significant impact, contributing to increases of up to 21.7% and 16.1%, respectively, compared to the control.

***Key words**: climate, nitrogen, phosphorus, plant, quality indicators, winter wheat, yield.*

DAMEANOR OF YIELD STRUCTURE OF DARMI VARIETY UNDER TWO SOIL TYPES AND THE SAME LEVELS OF MINERAL FERTILIZATION IN PERIOD 2012-2020

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Abstract

The considered demeanor of the yield structure development of Darmi cotton variety during long researches periods grown in two types of soil. The influence of nitrogen and phosphorus fertilization on cotton under conditions on pellic vertisoil and meadow-cinnamon experiment in cotton Darmi variety during the period 2012-2020 was studied. Treatments were: N_0; N_8; N_{16}; P_0; P_8. The numbers of 24 plot of land was design. With contents of mineral nitrogen in soil and phosphorus fertilization at rates $P_8 – P_{16}$ was obtained total. During the researches period were studied development phases budding, flowering and ripening, as well as the content of nitrogen and phopshor elements in cotton Darmi variety.

Key words*: phosphours, nitrogen, cotton, soil, yield.*

INFLUENCE OF TEMPERATURE ON COMMON WHEAT – *Fusarium culmorum* (W.G. Smith) SACCARDO INTERACTIONS

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Abstract

The paper presents data on the reaction of common wheat genotypes to Fusarium culmorum isolates. By treating the grains with culture filtrates, under controlled conditions, it was found that low temperature contributes to increasing the virulence of F. culmorum isolates and to changing the factorial weight of phytopathosystem components in the source of variation in growth organs. The lowest values of the heritability coefficient (h^2) were recorded in the case of the embryonic radicle length for both thermal variants under study (I – control: 18-19°C, II – 18-19 / 8-9 / 18-19°C). In contrast to the radicle, the stem recorded much higher h^2 values at both temperatures, which is evidence of its more pronounced genetic determinism and the weaker influence of fungal culture filtrates and temperature. The vigor index recorded relatively high values of heritability coefficient (0.65-0.70) and genetic progress (21.8-27.6%) for both thermal conditions, which denotes additive control of growth and development characters and, at the same time, opportunities to create wheat genotypes resistant to F. culmorum in short terms.

Key words*: wheat, Fusarium culmorum, temperature, character.*

EFFECT OF BIODEGRADABLE COMPOSITION FOR SEED COATING ON EARLY STAGE OF CORN GROWTH

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Abstract

The objective of this research was to evaluate the influence of biodegradable carboxymethylcellulose-based composition on the growth characteristics of coated corn seeds during storage. The seeds of four corn hybrids (P280, P300, P398, P402) were coated with a carboxymethylcellulose-based composition containing an extract of phenolic compounds from Juniperus sabina and natural dye obtained from Phytolacca americana berries. Early growth characteristics (germination, root/shoot lengths, root/shoot biomass, root/seedling vigour, metabolic efficiency) of coated seeds were studied before storage and during four months of storage. During storage, the overall germination of seeds remained at the level of 94-98%, while the length of the roots and seedlings of the germinated seeds increased by 1.2-1.9 and 1.4-1.8 times, respectively. After storage, the coated seeds also showed an increase in the vigour of roots and seedlings (by 1.5-2.1 times). Thus, the developed composition contributes to the improvement of the growth characteristics of corn seeds and, due to the original dye, allows for easy identification of coated seeds.

Key words*: corn, seed coating, biodegradable composition, growth characteristics.*

AGRONOMIC EVALUATION OF COMMON WHEAT VARIETIES FOR PRODUCTIVITY AND QUALITY CHARACTERISTICS

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Abstract

A field trial of five common winter wheat cultivars was conducted from 2021 to 2024 in SouthEastern Bulgaria. The experiment was carried out employing a block-plot method of design with four replications and a plot area of 15 m², following a coriander predecessor. The winter wheat varieties Asterion, Sofru, Lazuly, Avenu, and Pibrak were examined. The objective of the study was to determine and compare elements of productivity, grain yield, and some qualitative measurements of five common wheat types in southeastern Bulgaria. The results demonstrate that the assessed varieties displayed the highest values of productive structural elements in Avenu cultivar. The thousand kernel grain- and Test Weight of the Asterion variety were the highest. The grain of the Sofru cultivar had the greatest vitreousness. The Lazuly variety indicate better technological features of grain (wet gluten, dry gluten, and gluten extension), compared to the other examined common wheat varieties.

Key words*: common wheat, grain yield, thousand kernel weight, test weight, gluten content.*

RESEARCH ON MICROBIOTA ASSOCIATED WITH SUNFLOWER SEEDS

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Abstract

The aim of our research has been to detect and identify the microbiota associated with sunflower seeds. Biological material was represented by seeds samples from romanian hybrids Suria CL and Demetra and from foreign hybrids ES Belfis CLP, LG5077, QC Bravo, P64LE 99, P64LE 162 and P64LE 280. Pathogens from colonies developed after six days were identified, and their incidence was calculated for both untreated seeds and treated seeds with Lumisena 200 FS. In untreated seeds samples fungi from the genera Alternaria, Aspergillus, and Rhizopus were detected as well as bacterial colonies. Alternaria spp. recorded the highest incidence on ES Belfis CLP hybrid (50%), followed by Demetra (30%). Colonies of Aspergillus spp. were detected with an incidence of 33.3% for P64LE 162 hybrid. On treated seeds, Alternaria fungi recorded 20% incidence for Demetra hybrid, and 3.3% for P64LE99 hybrid, while Penicillium spp. showed an incidence of 3.3% for Demetra hybrid. Therefore, the antifungal effect of the tested product has been observed.

Key words*: sunflower, hybrid, seeds, microbiota.*

INFLUENCE OF ENVIRONMENTAL CONDITIONS ON RHEOLOGICAL PARAMETERS IN SEVERAL ROMANIAN WINTER WHEAT VARIETIES RELEASED BY NARDI FUNDULEA

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Abstract

Bread-making quality is a major objective in wheat breeding at NARDI Fundulea. For advancing towards this aim, we use the Reomixer, a device that provide parameters that describe rheological behavior of the dough. We analyzed Reomixer parameters of nine cultivars

*grown in twenty environments (locations*years) and found the largest variation for parameters "breakdown" and "enwidth" (describing the breakdown of the dough phase) and "peaktime" (describing the dough development phase). Smallest variation was found for "initslope" (describing the water absorption phase) and for grain protein concentration (GPC), while dough strength ("peakheight") and estimated bread volume had intermediate variability. Environments were the main source of variation for GPC, "peakheight" and bread volume, while cultivars had larger influence for "breakdown" and "peaktime". None of the weather parameters analyzed explained more than 10% of the variation in rheological parameters, but in combination produced the observed large variation. Cultivars Pitar, FDL Columna and Voinic had the best average values for GPC, dough strength and bread volume. Our results are useful for wheat breeding programs, opening prospects of breeding for stability of bread-making quality.*

***Key words**: wheat, environmental conditions, rheological parameters*.

PHENOTYPIC VARIABILITY OF COMPONENTS OF PRODUCTION IN WHEAT (*Triticum aestivum* L.), UNDER THE CONDITIONS OF THE SOUTH OF THE COUNTRY

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Abstract

The aim of this paper is to conduct an ecological study of the variability of productivity elements in native wheat varieties. The research was carried out under field conditions at the Teleorman Agricultural Development Research Station in the agricultural years 2019-2020, 2020-2021, 2021-2022 and 2022-2023 on a pseudoglazed cambic chernoziom soil. 10 wheat varieties created at INCDA Fundulea were analyzed both from the phenological point of view and the variation of productivity elements under the influence of climatic factors. The productivity elements, although they were influenced by the climatic conditions of the years of study, had a small and medium variation, proving/confirming the fact that the native breeding material has a high adaptability to the variations of the climatic factors. The varieties Abund (7755 kg/ha), Ursita (7295 kg/ha) and Otilia (7117 kg/ha) stood out, drought-resistant varieties with productivity and quality corresponding to market requirements and high adaptability to biotic and abiotic factors, in conditions of climate change that can be cultivated successfully in the southern part of the country.

Key words*: wheat varieties, climate change, productivity elements, variability, production.*

COMPETITIVE RELATIONSHIPS BETWEEN WEEDS AND *Sorghum bicolor* L. GROWN BY IGROWTH® TECHNOLOGY

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Abstract

In 2023-2024 in the experimental field of the Agricultural University-Plovdiv, weed associations in different BBCH stages of Sorghum bicolor L. were established. The crop was grown by igrowth® technology under non-irrigated conditions. The highest weed density from the late-spring group were Amaranthus retroflexus L., Chenopodium album L., Solanum nigrum L., Setaria viridis L., Portulaca oleracea L., and from perennial group - Sorghum halepense L. and Convolvulus arvensis L. In the control plot, during BBCH 14-15 stage of S. bicolor, the heights of the species Chenopodium album L. and Amaranthus retroflexus L. exceed the crop by 7.3 cm and 1.55 cm in 2023, but in 2024 the trend was the opposite. In BBCH 50, in both years, the two species were taller by 13.2 cm to 14.7 cm compare to S. bicolor. Sorghum halepense L. dominated with its height in both growing stages for the study period. The herbicide Pulsar 40 (imazamox), applied at rates of 1.20, 2.40 and 4.80 L ha-1, controlled the weeds up to BBCH 50 of the crop by 15% to 100%, depending on the species density

Key words*: Sorghum bicolor L., imazamox, igrowth® technology, weeds.*

RESEARCH ON THE BIOLOGY AND PRODUCTIVITY OF THE *Carthamus tinctorius* L. SPECIES IN THE CLIMATE CONDITIONS OF CENTRAL MOLDOVA

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Abstract

Safflower (Carthamus tinctorius) is an annual herbaceous plant in the Asteraceae family. Safflower was previously cultivated for its seeds and flowers, which were used to add colour and flavour to food, in dyes, and medicine. Recently, the plant has been cultivated mainly for the vegetable oil extracted from the seeds. Saffron flowers are sometimes used as a substitute for safflower. Safflower is one of mankind's oldest crops but remains a minor crop compared to other oilseeds. Today, safflower is mostly cultivated for the production of vegetable oil. The main objective of the present research was to study the biology and productivity of the species Carthamus tinctorius L. with the aim of understanding its adaptability to the climatic conditions in Central Moldova. Safflowers matures 110-150 days after sowing; the optimal harvest time is when the seeds are matte white. Under the conditions of S.C.D.A. Secuieni, the highest seed production was obtained in the variant sown in the first decade of April at a distance of 70 cm between plants/row.

Key words*: safflower, productivity, biology.*

TESTING OF SOME HYBRIDS OF SWEET SORGHUM AND SORGHUM X SUDAN GRASS AT BRĂILA AGRICULTURAL RESEARCH AND DEVELOPMENT STATION

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Abstract

The paper aimed to present the study with sweet sorghum varieties carried out in Great Brăila Island, Romania in the 2022-2023 agricultural year. This study was carried out by S.C. Eco-Sorghum Group S.R.L. in collaboration with the Agricultural Research and Development Station of Brăila within the research contract entitled "Testing of sweet sorghum hybrids (SAȘM 1 and SAȘM 2) and the sorghum x Sudan grass hybrid (SAȘM 4)" with the aim of highlighting the potential for total biomass production, technological strains, juice and bagasse and the cultivation technology. Following this experiment, it can be demonstrated that sweet sorghum has high potential in terms of biomass production, and also in terms of the production of juice with high sugar content. This is very important for the energy sector, by using sweet sorghum as a sustainable and affordable alternative in a context where the long-term use of fossil fuels presents quite a lot of uncertainties. Also the food industry can use sweet sorghum with very good results in the production of sugar.

Key words*: sweet sorghum, biomass production, sugar content.*

YIELD AND PROTEIN CONTENT OF WINTER PEA (*Pisum sativum*) VARIETIES IN AN ORGANIC FARMING SYSTEM

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Abstract

Pea (Pisum sativum) is one of the most important crops in the Fabaceae family, second only to soybean in significance. Its protein content, which ranges from 13% to 38%, is influenced by both environmental and genetic factors, making it a promising source of high-quality protein. A field experiment was conducted during the 2022–2024 years in an organic farming system in Satu Mare County, Romania, to evaluate the yield and protein content of winter pea. The study focused on three winter pea varieties: Andrada, Olguța, and Ghittia. The results indicated that the environmental conditions in the region were favourable for the growth, development, and yield formation of pea plants. The yield of the studied varieties exceeded 2500 kg ha^{-1}, with protein content surpassing 23%. These findings demonstrate that winter pea is a promising crop for Satu Mare County, offering a valuable source of protein. Additionally, the results provide practical insights for agricultural producers, enabling them to select pea varieties based on quality characteristics such as protein content.

Key words*: winter pea, protein content, yield, organic farming.*

ENHANCING BARLEY (*Hordeum vulgare* L.) PRODUCTIVITY THROUGH OPTIMAL IRRIGATION AND VARIETY SELECTION IN NORTHERN NIGERIA`S COLD HARMATTAN PERIOD

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Abstract

Barley (Hordeum vulgare L.) cultivation in Nigeria faces challenges due to water scarcity and variable climates, necessitating optimal irrigation and resilient varieties. This study, conducted during the 2023/2024 cold harmattan season at the Federal University of Kashere and Lake Chad Research Institute, evaluated the effects of three irrigation intervals (5, 10, and 15 days) on seven barley varieties (Explorer, Traveler, Focus, Brennus, Prunnella, Zhana, and Arupo) using a factorial design in a Randomized Complete Block setup. Key agronomic practices such as seed treatment, check basin irrigation, fertilization, and weed control were applied. Data on plant height, tiller count, leaf area index, and grain yield were analyzed using ANOVA and Duncan's test at 5% significance. Results revealed significant interactions ($p < 0.01$) between variety and irrigation. Explorer yielded highest (3.09 tonnes/ha) under a 5-day schedule at Kashere, while Arupo under a 15-day interval yielded only 0.50 tons/ha. The 5-day irrigation schedule achieved better average grain yields (1.95 tons/ha). Thus, a 5-day irrigation regime and resilient varieties like Explorer are recommended for optimal productivity in the study areas and similar environments.

Key words*: barley, cold harmattan, irrigation, varieties, yield.*

RESEARCH ON THE INFLUENCE OF SOWING TIME ON SUGAR BEET PRODUCTION IN THE CONTEXT OF CLIMATE CHANGE IN CENTRAL MOLDOVA

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Abstract

This paper presents the results obtained from research carried out at A.R.D.S. Secuieni, which aimed to identify solutions to increase the productivity of sugar beet, a crop strongly affected by drought in the specific conditions of the Center of Moldova. To this end, the influence of sowing time on production was analyzed in the experimental field. The growing period of sugar beet was characterized differently depending on the sowing epoch, being very dry for the first two epochs and normal for the third epoch, which benefited better from the large amounts of rainfall in September. The best plant density at harvest was recorded in the third sowing epoch (May 3th), which also achieved the highest root production (48.2 t/ha). Compared with the control variant (average of experience), the increase in production achieved by this variant was statistically assured and interpreted as highly significant. At the opposite pole was the variant sown in the first sowing period (April 01th), which achieved a difference from the control that was interpreted as a very significant negative difference.

Key words*: root yields, climate change, beetroot, cultivation technologies.*

RESEARCH ON THE INFLUENCE OF FOLIAR FERTILIZER TREATMENT ON THE YIELD OF DIFFERENT WINTER WHEAT VARIETIES DEPENDING ON WATER SUPPLY LEVELS, ON CHERNOZEM

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Abstract

In 2023 and 2024, on the chernozem of Caracal, a three-factorial experiment with wheat was located for study the influence of the variety, foliar fertilizer treatment, water supply level and their interaction on yield, test weight and protein content. The yield and test weight were influenced by the variety and the level of water supply. Protein content was influenced only by the variety. The lowest yield was recorded by the Glosa variety fertilized with Foliq Nitrogen (3 kg/ha) sown under non-irrigation conditions – 5233 kg/ha and the highest was 7289 kg/ha for the Gabrio variety fertilized with Foliq Nitrogen (5 kg/ha) sown under irrigation conditions with a norm of 50% of the active moisture interval (AMI). The thousand weight grains had the highest value in the Glosa variety fertilized with Foliq Cereale (1 l/ha). The protein content values ranged between 10.52% (Avenue variety fertilized with Foliq 36 N 3 l/ha and irrigated at the level of 50% of the AMI) and 12.36% (Glosa variety fertilized with Foliq Cereale 2 l/ha and irrigated at the level of 50% of the AMI).

Key words*: wheat, foliar fertilizer, water supply level, yield, protein.*

APPLICATION OF FOLIAR HERBICIDES FOR SOME DICOTYLEDONOUS WEEDS CONTROL IN *Triticum aestivum* L.

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Abstract

During the period 2023-2024, a field study with common wheat, Avenue variety was conducted. The experiment was set up in a production field in the village of Dobroplodno, Vetrino municipality, Bulgaria. The evaluated herbicidal products were Biathlon® 4 D (714 g/kg tritosulfuron + 54 g/kg florasulam), Ergon® WG (68 g/kg metsulfuron-methyl+ 682 g/kg tifensulfuron-methyl), Acurat Extra® WG (682 g/kg tifensulfuron-methyl + 70 g/kg metsulfuron-methyl), Aminopielic® 600 SL (600 g/l 2,4 amine salt), and Corida® 75 WDG (750 g/l tribenuron-methyl). The herbicidal products were applied as foliar treatments. The weed infestation of the experimental field was presented by Anthemis arvensis L., Lamium amplexicaule L., Consolida regalis S.F. Gray, Papaver rhoeas L., Sinapis arvensis L. and Convolvulus arvensis L. The infestation with these weeds resulted in a very low average grain yield for the untreated control (3,97 t ha-1). The highest biological yield of grain is obtained after using Biathlon 4 D (4,96 t/ha^{-1}) was found.

Key words*: Triticum aestivum, weedy plants, herbicidal products, efficient.*

INFLUENCE OF CLIMATIC CONDITIONS, VARIETY AND SOWING DENSITY ON WHEAT PRODUCTION AND QUALITY

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Abstract

The aim of the study was to highlight the reaction of the cultivated variety depending on the sowing density and climatic conditions on the level of production and quality indices. The wheat varieties tested were Biharia, Glosa and Anapurna, on three densities (530 b.g/m^2, 650 b.g/m^2 and 780 b.g/m^2). Fertilization was carried out using N150 kg s.a., P2O5 78 kg s.a. at sowing, and in spring an additional N 46 kg s.a. was applied. The highest production was obtained for the Anapurna variety of 8403 kg/ha, followed by the Biharia variety with 7790 kg/ha and Glosa with 7587 kg/ha. Depending on the sowing density, the highest harvest, 8009 kg/ha, was obtained at a density of 780 b.g/m^2. The crude protein content ranged from 13.10% for the Glosa variety (780 b.g/m^2) to 15.9% for the Anapurna variety (650 b.g/m^2). Wet gluten recorded values between 25% for the Glosa variety (530 b.g/m^2) and 36% for the Anapurna variety (780 b.g/m^2).

Key words*: crude protein, density, gluten, variety, wheat.*

THE EFFECTS OF WATER DEFICIT AND AIR TEMPERATURE ON SEED PRODUCTION OF ALFAALFA (*Medicago sativa* L.) UNDER THE CONDITIONS OF ARDS SECUIENI, NEAMȚ

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Abstract

Good quality of alfalfa seed variety is very important to meet the farmers` requirements for feed production. Testing of new alfalfa varieties is important for assessing their seed production potential, which also influences their commercial value. The purpose of our research was to test the seeds production potential of new alfalfa varieties, under the pedoclimaic conditions of ARDS Secuieni, Neamț, Romania. The experiment was organized between 2020 and 2022 o a chernozem-type soil and aimed to evaluate the quality of some new varieties of alfalfa. An important aspect pursued in this study referred to the effects of climate change on new alfalfa varieties, in the absence of irrigation. Within the study, 17 Romanian alfalfa varieties were analyzed regarding seed productiion potential, based on multi-annual testing, to recommend the best-adapted ones in culture, to make these results available to farmers, and to expand in culture. Of the 17 alfalfa genotypes tested in our study, five (F 2907-20, F 2910-20, F 2905-20, F 2906-20, Catinca) showed a high adaptability to the pedo-climatic conditions of ARDS Secuieni, Neamț, Romania.

Key words*: alfalfa, new varieties, seed production, climatic conditions.*

EVALUATION OF THE DOWNY MILDEW ATTACK (*Peronospora camelinae*) IN CAMELINA (*Camelina sativa* (L.) CRTZ.) DURING 2023-2024, DRACEA, TELEORMAN COUNTY

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Abstract

In recent years, Camelina sativa has emerged as a crop that can be considered an alternative to traditional oilseed plants. The primary objective of our research was to evaluate the downy mildew (Peronospora camelinae) attack. Observations were conducted during 2023 and 2024 under the conditions of the Dracea location in Teleorman County. The biological material consisted of two Romanian genotypes, Mădălina and Camelia, monitored in spring cultivation. In the conditions of 2023, the disease frequency in the Mădălina variety was 25%, while the Camelia variety showed a frequency of 34%. In the conditions of 2024, the frequency of the attack was 20% for the Mădălina variety and 22% for the Camelia variety. Throughout the research period, the Mădălina variety exhibited a lower disease frequency compared to the Camelia variety.

Key words*: Camelina sativa, downy mildew, frequency, row spacing.*

EVALUATION OF SOIL AND FOLIAR HERBICIDAL APPLICATIONS AT CAMELINA (*Camelina sativa* (L.) CRANTZ)

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Abstract

Camelina is one of the underestimated oil crops with high potential for low input production. Main constrain during the cultivation is the weed infestation. A field trial for evaluation of the efficacy and the selectivity of several herbicides applied on three genotypes (variety Czenstochowska, local landrace BGR 436, and introduced accession CAM 265) was performed at the Agricultural University of Plovdiv, Bulgaria in 2022 and 2023. The herbicides Stomp Aqua (455 g/l pendimethalin) – 4.00 L ha^{-1} and Butisan 400 SC (400 g/l metazachlor) – 2.50 L ha^{-1} were applied after sowing before germination. The studied foliar herbicides were Lontrel 300 SL (300 g/l clopiralid) – 0.40 L ha^{-1} and Galera Super (240 g/l clopyralid + 80 g/l picloram + 40 g/l aminopyralid) – 0.20 L ha^{-1}. The products were sprayed at the growth stage when a single true leaf on 5th to 8th node was developed on the crop. The Lontrel 300 SL and Galera Super treatments showed higher weed control compared to Stomp Aqua and Butisan 400 SC, but had higher phytotoxixity as well that resulted in growth retardation and yields decrease.

Key words*: Camelina, herbicides, weeds, plant development, yields.*

INVESTIGATING THE IMPACT OF SPECIFIC TECHNOLOGIES ON THE PRODUCTION AND QUALITY OF THE AUTUMN BARLEY CROP

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Abstract

The purpose of this work was to evaluate the impact of soil tillage, sowing period and mineral fertilization (NPK) on the quantity and quality of the seed harvest, in the specific climate and soil conditions of the Arad Plain, more precisely in the chernozem microzone of Nădlac, Arad County. The use of ploughing in association with disc harrow determined a small and insignificant increase in production compared to plots where only disc passes were applied. The results obtained demonstrate the superiority of the tillage variants without furrow turning, compared to the classic tillage system by ploughing. Sowing in the period 25 – 30.IX and staggered in 06 – 10.X, did not attract, on average over the two years, any particular differences between the variants. Mineral fertilization (NPK) of the soil plays an essential role in optimizing the plant`s nutrition requirements and achieving increased production. In addition, the tillage system and fertilization also influence soil fertility in the long term, a significant impact on other components of the environment. The variety of barley taken into cultivation was Melia.

Key words*: technological links, barley, production, quality indices.*

RESEARCH ON THE INFLUENCE OF FERTILIZATION ON *Lavandula angustifolia* Mill. SPECIES IN THE ORGANIC CULTURE OF THE BUFTEA AREA (ILFOV)

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Abstract

Lavandula angustifolia Mill., part of the Lamiaceae family, is a medicinal and aromatic plant used in various industries, such as the pharmaceutical and cosmetic ones. This paper discusses aspects concerning the growth and development of Lavandula angustifolia Mill. (the Emilia and George 90 varieties) when fertilization products approved for organic agriculture are applied. In terms of floral stem and inflorescence development, it is observed that the George 90 variety has larger dimensions than the Emilia variety. The George 90 variety had a floral stem length of 60.25 cm, whereas the Emilia variety measured 58.45 cm. From the perspective of the increase in length (cm) of the inflorescence, it was found that the George variety had a longer inflorescence (13.23 cm) compared to the Emilia variety (8.18 cm).

Key words*: fertilization, Lavandula, biometric parameters.*

INFLUENCE OF SOWING TIME ON THE PRODUCTION AND PRODUCTIVITY ELEMENTS OF WINTER WHEAT IN SOUTHERN ROMANIA

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Abstract

Wheat production is given by the possibilities of optimizing the interaction between ecological, technological and economic factors. The final production and quality of wheat is affected by pedoclimatic conditions and can be optimized and stabilized by respecting the sowing date associated with other important technological links. In general, the efficient strategy for obtaining maximum production is established by knowing the characteristics of the variety and the optimal time for applying technological highlights, and these must be adapted to the crop area. This article presents the results of research showing the effect of sowing time on the production and quality of winter wheat grains. Shifting the sowing time to an early date (September 25) or a late date (November 1) results in reduced yields. The results revealed that wheat planted on October-10 and October-25 produced higher spike length, 1000-grain weight, plant height and grain yield with a comparable number of tillers and number of grains per spike. It is recommended to plant wheat between October-10 to October-25 to attain higher grain yield.

Key words*: wheat, sowing times, variety, production.*

DENSITY-BASED ASSESSMENT OF *Adonis vernalis* ABUNDANCE IN NATIVE HABITATS

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Abstract

The study investigates the ecological distribution and abundance of Adonis vernalis in six natural habitats, identifying significant heterogeneity in species abundance. The analysis of Adonis vernalis habitats is an important step in the better understanding of this species place in the community assemblage related to their native environment: Plants of A. vernalis were counted in 25 m^2 small scale plots from six specific habitats. The data was analysed towards a proposal for the potential distribution of plants in relation to a gradual habitat type.: There were identified two distribution scenarios in relation to the potential distribution of the plants in the habitat. Most of the small-scale plots showed an average of 50 plants/25 m^2, while in three of the habitats were identified patches with more than 200 plants/25 m^2. The forecast for plant presence and distribution indicates two possible outcomes - the first one indicates a maximum pick value of 30-40 plants/25 m^2, and the second one shows two potential picks, at 30 plants/25 m^2 and 120 plants/25 m^2. The A. vernalis habitats present non-linear distribution patterns across the analysed small scale-plots, with the alternation of homogeneous with heterogeneous areas. Given its medicinal value and conservation status, we propose sustainable harvesting strategies that align with the ecological characteristics of the species.

Key words*: Grassland, heterogeneity, habitat dissimilarity, small-scale assessment.*

INFLUENCE OF NITROGEN FERTILIZATION ON TWO-ROWED WINTER BARLEY GENOTYPES UNDER 2023-2024 YEAR IN SOUTHEAST OF ROMANIA

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Abstract

This paper presents a one-year study (2023-2024) of 10 winter 2-rowed barley genotypes concerning the effectiveness of nitrogen fertilization on quality parameters that seeds need to accomplish for malting barley. The experiment was conducted at National Agricultural Research and Development Institute Fundulea, in Southeast Romania. The genotypes were sowed in the 2023 year in two technological sequences in 3 replications (T0 - 0 kg urea/ha and T1 - 100 kg urea/ha). It was revealed that were no significant differences in yield between the unfertilized (T0) and fertilized (T1) experience, the difference between the mean value of the experience was 635 kg/ha. The lowest value for protein content to be accepted by the malting industry was registered by the Gabriela variety (T0 - 11.47 %) meanwhile the highest value of the experiment was registered by the Ileana variety (T1 - 15%) which indicates a suitable variety for animal forage. Starch content ranged between 61.2% (T0) and 63.9% (T1). A significant difference was observed in grain plumpness between the technological sequences as follows: the mean of the dataset for (T1) was 94.04% compared with 69.51% (T0).

Key words*: barley, variety, quality indicest.*

THE PERFORMANCE OF SOME BARLEY GENOTYPES UNDER ORGANIC AND DIFFERENT PEDOCLIMATIC CONDITIONS

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Abstract

The choice of varieties is one of the most important decisions in the barley crop management because it greatly improves the production obtained in the ecological farming system and not only that. The aim of this study was to compare how some barley varieties differ in physiological traits and yield under organic farming conditions. This study was conducted in three different area from Romania throughout 2023-2024 winter wheat season. The results showed that in the three location, the chlorophyl content, the height of plants, plant density, leaf area index, normalized index of vegetation (NDVI) and dry matter were highly variable. Generally, the grain yields were positively correlated with leaf area index, normalized index of vegetation and the harvest index, at a significance level of 0.01. The high-yield barley varieties had higher photosynthetic rates in the grain-filling stages. Concernig the behaviour of barley genotypes to diseases our data showed that exist genetic variabiliy. Based on these results, high-yield barley varieties may be choise to be cultivated under organic agriculture under climate change conditions from Romania.

Key words*: barley, organic agriculture, NDVI, chlorophyll content, leaf area index, yield.*

EFFECT OF METEOROLOGICAL CONDITIONS ON THE PRODUCTIVITY OF MAIZE HYBRIDS OF DIFFERENT MATURITY GROUPS

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Abstract

The work aimed to study the productivity of maize hybrids from maturity groups FAO 300 to 600 under different conditions. A four-year experiment was carried out at Maize Research Institute – Knezha, Bulgaria. The hybrids Kneja 310, Kneja 461, Kneja 565 and Kneja 683 A were grown under non-irrigation conditions and with approval for the regional agricultural technology. Two-factor analysis of variance was used to find the effect of both hybrid and environment on the grain yield. In addition, Stability Yield Index (SYI) was calculated. The amount of rainfall per growing season varied from 199.8 to 316.1 mm/m^2, and grain yield averaged for the tested hybrids by years varied from 859.7 to 1040.7 kg/da. The highest average grain yield over the period was obtained from Kneja 565 (1003.9 kg/da) and the lowest - from Kneja 310 (900.3 kg/da), respectively. Kneja 683 A hybrid showed the low Stability Yield Indices, 0.685 followed by Kneja 565 0.729 values, respectively. Relatively high and stable yields were obtained from Kneja 310 (900.3 kg/da) and Kneja 461 (925.9 kg/da) with SYI 0.937 and 0.841, respectively.

Key words*: grain yield, maize, Stability Yield Index.*

STUDY ON THE ADAPTABILITY OF SOME TRITICALE GENOTYPES TO DIFFERENT CLIMATE AND SOIL CONDITIONS

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Abstract

The paper aims to evaluate the adaptability of 25 triticale genotypes in distinct agro-climatic and pedological conditions using three experimental locations in Romania: ARDS Secuieni, ARDS Turda, and ARDS Pitești. The study focused on determining the ability of genotypes to adapt to the variability of climatic and soil factors, emphasizing agronomic performance. The analyzed parameters included productivity, resistance to abiotic stress (drought, extreme temperatures), and the protein percentage of triticale grains. The results highlighted significant differences between genotypes in terms of adaptability to the specific conditions of each location, thus identifying genotypes with high potential for stability and productivity in variable environments. These data are relevant for selecting genotypes adapted to the agroecological diversity in Romania and contribute to developing sustainable triticale cultivation strategies.

Key words*: climatic condition, protein content, triticale, yield.*

SUGAR BEET PEST DYNAMICS IN THE CONDITIONS OF CENTRAL MOLDOVA (ROMANIA)

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Abstract

The plant's development near the soil characterizes the sugar beet agrosystem. Soil pests are important in crop evolution, and less so the foliar ones. Research carried out at the Agricultural Research and Development Station Secuieni Neamț consisted of inventorying the species that attacked sugar beet plants from the emergence period to the formation of the leaf rosette. The results showed that eight species attacked the sugar beet crop, belonging to the Coleoptera, Lepidoptera, and Homoptera orders. The highest densities of pests specific to sugar beet crops were recorded for the species Chaetocnema spp. (30 specimens), Bothynoderes punctiventris L. (26 specimens) and Opatrum sabulosum L. (18 specimens). In sugar beet crops, attacks by Agriotes larvae at seed germination were 30%, and during the vegetation period, the plants were attacked by B. punctiventris L. and Tanymecus spp. (30%), Chaetocnema spp. (15%), A. gamma L. (9%) and Aphis fabae (23%).

Key words*: sugar beet, attack, entomofauna, climatic conditions.*

ASSESSMENT OF THE THERAPEUTIC POTENTIAL APPLICATION OF THE EXTRACTS FROM DIOECIOUS HEMP (*Cannabis sativa* L.)

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Abstract

Dioecious hemp (Cannabis sativa L.) is an industrial crop utilised for various purposes, including fibre, seeds, and plant extracts. The seeds and plant extracts are used for food, pharmaceuticals, or cosmetic products. This study explores the therapeutic potential of dioecious hemp by analysing the antibacterial activity of hydroalcoholic extracts from four varieties of CS: CS 1 - Armanca, CS 2 - Lovrin 110, CS 3 - Silvana, and CS 4 - Teodora. The antibacterial properties of the examined extracts were evaluated against two clinically significant ATCC bacterial strains: Staphylococcus aureus (ATCC 25923) and Escherichia coli (ATCC 25922). The main parameters assessed included bacterial growth percentage (BGP%) and bacterial inhibition percentage (BIP%), and minimum inhibitory concentration (MIC). These were utilised to evaluate the effectiveness of the extracts. The findings indicated a positive correlation between the concentration of CS extract and its antibacterial activity. Specifically, higher extract concentrations resulted in stronger inhibitory effects on bacterial growth. However, further research is crucial to fully understand the potential of hemp hydroalcoholic extracts as components in antibacterial pharmaceutical products.

Key words: *dioecious hemp extracts, antibacterial activity, BGP, BIP, MIC, hydroalcoholic extracts.*

STUDY ON THE IMPACT OF PEDOCLIMATIC CONDITIONS ON MAIZE YIELD AND QUALITY

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Abstract

Global warming has increasingly impacted maize cultivation, with high temperatures and low precipitation posing significant challenges in many regions. This study investigates the production dynamics of three maize hybrids cultivated on typical chernozem soil in Seleuș, Serbia, over the 2022-2023 period. The interaction of pedoclimatic factors influenced maize yields, with 2022 recording an average yield of 5,400 kg/ha and 2023 achieving 9,500 kg/ha. Despite maize's rapid growth during its vegetative phase, climatic stressors markedly affect yield quality. To optimize maize production, the study emphasized quality assessment through physio-chemical and weight indices, including thousand-kernel weight (MMB, g), test weight (MH, kg/hl), and moisture content (U%). Laboratory analyses of microbiological, biological, and biochemical properties of maize kernels were conducted to evaluate quality. The findings provided insights into the influence of pedoclimatic factors on production quality, supporting strategies for efficient and profitable maize cultivation.

Key words: *maize yield, pedoclimatic factors, chernozem soil, climatic stress, quality assessment.*

THE INFLUENCE OF SOWING DEPTH AND OF PRECIPITATIONS ABOVE THE QUALITY AND THE YIELD OF AUTUMN WHEAT IN BOIANULUI'S MEADOW

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Abstract

Beside the yield gained of the autumn wheat's crop, the quality of it is the decisive factor of the seeding of a said kind or hybrid. The use of crop technology, but also of some recent innovations, lead to the improvement of the wheat crops. The cereal production is affected by the drought, one of the leading factors of abiotic stress, who is also affecting even tolerant crops. The constantly changing weather forces the farmers to adapt the crop technology specifically to the conditions of the local weather, the type of soil and the agricultural practices used to find the best strategy of seed distribution. This article presents the results of the effectuated studies with the purpose of determining the optimal depth of sowing in non-irrigable conditions and reduced precipitations in the southern part of the country. A year with water shortages is a different year when we can observe the influence of climate conditions over the growth of wheat crops at different depths.

Key words*: autumn wheat, precipitations, protein, soil, technology.*

TESTING THE EFFICACY OF ESSENTIAL OILS AGAINST *Drosophila suzukii* (Matsumura)

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Abstract

Drosophila suzukii (Matsumura) is an economically important pest of berry species. It is characterized by high reproductive potential and wide food specialization. For control of Drosophila suzukii, insecticides are mainly used, which lead to the development of resistance, therefore other alternatives are sought. In this regard, the efficacy of essential oils of lavender (Lavandula angustifolia Mill.), rosemary (Rosmarinus oficinalis L.) and peppermint (Mentha piperita L.) against adults of Drosophila suzukii was tested in two concentrations 0.1% and 0.2%. The study was carried out under laboratory conditions. The processing of the obtained data was carried out with a package of statistical programs Statistika 7 V. The highest efficacy was reported for rosemary, followed by mint and lavender. A gradual increase in efficacy was observed for all essential oils. Regression analysis of the results shows functional relationships between the concentration of the working solution and efficacy. As the concentration of the essential oil increases, efficacy increases and death occurs earlier.

Key words*: Drosophila suzukii (Matsumura), essential oils, Lavandula angustifolia, Rosmarinus oficinalis, Mentha piperita.*

ASSESSMENT OF THE EFFECTS OF SLOW-RELEASE FERTILIZERS APPLICATION OVER THE AMOUNT OF NITROGEN LEACHED AND OF THE DEVELOPMENT OF WINTER WHEAT PLANTS IN CONTROLLED CLIMATE CONDITIONS

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Abstract

Slow-release fertilizers provide a steady supply of plant nutrients over an extended period of time. The objective of these investigations was to study what was the amount of nitrogen leached after the administration of nitrogen fertilizers and how it influenced the development of plants during the vegetation period. The experiment was carried out in pots of vegetation with winter wheat. The experiment was conducted in the Green house with controlled climate conditions within ICAM Iasi - USV Iasi. This paper presents the results obtained regarding the influence of 5 nitrogen fertilizers, 2 classic fertilizers and 3 slow-release nitrogen fertilizers. The experiment was carried out in pots of vegetation with winter wheat. The amount of nitrogen leached after the administration of nitrogen fertilizers is influenced by the chemical forms of nitrogen included in the chemical composition of the fertilizers, but also by the structure, texture, chemistry of the soil and its fertility status. The amount of nitrogen leached is significantly lower for Sulfamo 25 and 30 variants compared to N2017TAR, Ammonium Nitrate, Ureea and the control, for both experiments.

Key words*: slow-release fertilizers, traditional fertilizer, nitrogen leached, soil chemistry.*

RESEARCH ON THE RELATIONSHIP BETWEEN THE VEGETATION PERIOD IN CEREAL SPECIES AND THE FLAG LEAF AREA THROUGH THE YIELD, ON THE CHERNOZEM OF CARACAL

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Abstract

In 2024, a bifactorial experiment was set up on the chernozem of Caracal, where A factor was the species: wheat, triticale, barley and B factor was the vegetation period: early, medium, late. The yield and flag leaf area were determined for each combination of factors in 3 repetitions. The highest yield was obtained for wheat – 61.92 q/ha. Compared to the control - yield of wheat species, only barley was significantly lower. There were no differences in yield between the vegetation periods, regardless of the species. The correlation coefficient between yield and flag leaf area recorded a value of 0.331, lower than the P5% limit for 27 studied cases, therefore insignificant. There were both varieties with small flag leaf area but with high yields (such as: medium-early triticale with flag leaf area of 1307.27 cm^2 and yield of 68.54 q/ha and late wheat with area of 1840.27 cm^2 and yield of 68.25 q/ha) but also varieties with large flag leaf area and high yields (such as: medium-early wheat with flag leaf area of 2951.07 cm^2 and yield of 66.08 q/ha).

Key words*: wheat, triticale, barley, flag leaf area, vegetation period.*

EFFICACY OF BIOSTIMULANTS AGAINST CABBAGE STEM FLEA BEETLES IN WINTER OILSEED RAPE UNDER FIELD CONDITIONS IN THE UK

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Abstract

This field study evaluated the efficacy of Yokosan and Converta biostimulants in mitigating cabbage stem flea beetle damage on winter oilseed rape (cv. Acacia). Treatments included control (no biostimulants) and varying doses of Yokosan (0.5, 1, and 2 L/ha) and Converta (1, 2, and 4 L/ha), applied at cotyledon, 6-leaf, and 8-leaf stages. The randomised complete block design included four replicates, with biostimulants applied at 300 L/ha per spray. Both biostimulants reduced beetle damage significantly compared to controls, which showed severe damage (60–70% of new growth affected). Yokosan was particularly effective at 1 L/ha, while Converta at 4 L/ha minimised leaf infestation (6.95 leaves/plant) and stem infestation (8%). Yokosan performed best at 0.5 L/ha for reducing stem larvae, though higher rates offered no further improvement. Conversely, Converta displayed dose-dependent efficacy for reducing beetle activity and infestation. Results suggest Yokosan and Converta can enhance plant health and resistance, with Converta at 4 L/ha emerging as the optimal treatment. These findings emphasise the importance of dose optimisation for integrated pest management strategies.

Key words*: biostimulants, Yokosan, Converta, cabbage stem flea beetles, winter oilseed rape, pest management, dose rates.*

DYNAMICS OF MORPHOPRODUCTIVE CHARACTERS IN *Phalaris arundinacea* UNDER THE CONDITIONS OF THE WESTERN PLAIN OF ROMANIA

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Abstract

Phalaris arundinacea, (reed canary grass), is suitable as an option for cultivating lands that are not ideal for other crops, numerous studies identify it in mild climates and humid environments but also drier areas, on various types of soil, with a pH between 4.0 and 7.5. The study aimed to identify the interdependence between morpho-productive characters in vegetation conditions in the Western plain of Romania, the biological material was represented by the Premier variety. Vegetative growth was investigated in 6 BBCH codes: 1.19; 2.21; 2.22; 2.29; 3.31; 3.37, and the measurements targeted the following characters: bush diameter, bush height, plant height, number of vegetative shoots, and the number of leaves of the main shoot. Statistical processing through descriptive statistics, Pearson correlation coefficient, and ANOVA analysis of variance illustrate a correct distribution of the experimental data and the existence of strong correlation relationships between the studied characters. This element is practically important because in the breeding process prioritizing positive and strong correlations can help to obtain faster results.

Key words*: reed canary grass, correlation, morpho-productive characters.*

MODELING BIOLOGICAL GROWTH OF *Lolium perenne* SPECIES UNDER CURRENT CLIMATE CHANGE CONDITIONS

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Abstract

The importance of knowing the impact of life factors is also supported by several specialized studies. Several measurements were made on 34 local biotopes collected from Almajului Mountains, Mehedinți Plateau and Blahniței Plain. During the vegetation period, recording was investigated: plant height, leaf dimensions, and leaf surface of the shoot, along five BBCH development codes. Depending on the bio-accumulations of essential life factors (sum of accumulated precipitation and temperatures), biological growth was estimated. The mathematical interpretation of the slopes of the lines represents the growth rate, which practically determines the influence of precipitation or temperatures on the studied characters. The results of the research in this work show that the determining factor in the dynamics of biological growth in perennial ryegrass is the amount of precipitation. Perennial ryegrass growth in the presence of precipitation is almost double that of the accumulation of an identical amount of temperature. Moreover, studies published in related research reveal that the major limiting factors are drought and high temperatures, factors that are accentuated by current climate change.

Key words*: perennial ryegrass, life factors, biological growth.*

THE IMPACT OF DIGESTATE ON THE CHEMICAL PROPERTIES OF MAIZE (*Zea mays* L.) GRAINS

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Abstract

Maize grains accumulate nitrogen (N), especially in the form of storage proteins, correlated to zeins and starch content. Digestate, a new bio-based fertilizer rich in essential nutrients, is an effective alternative for mineral fertilizers. The aim of this study was to examine the effect of digestate application on chemical properties and maize grain yield. Field experiment was established during year 2018 on eight different fertilization treatments: control treatment without fertilization, mineral fertilizer (MF), liquid cattle manure, solid fraction of digestate (SFD), liquid fraction of digestate (LFD), digestate, a mixture of MF+SFD, a mixture of MF+LFD. Nitrogen content in grains was positively correlated with proteins (99.93%) and zein (73.91%) content. In addition, the results showed that only the LFD and digestate treatments had a positive correlation between the N content in the grains and the starch content. Statistically higher grain yield was observed on MF (13.1 t ha^{-1}), MF+SFD (11.2 t ha^{-1}) and MF+LFD (12.2 t ha^{-1}) treatments compared to others. Digestate showed positive effect on chemical properties of the maize grain.

Key words*: chemical properties, crop, digestate fractions, grain, maize, nitrogen.*

THE CONTROL OF WEEDS IN MAIZE USING NEW HERBICIDES FORMULATIONS

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Abstract

Worldwide grain yield in maize may be severely impacted by competition with weeds. To evaluate the efficacy of novel herbicide formulations for weed control in maize, a randomized complete block design trial comprising three replications and seven treatments was carried out at the experimental field of the Agricultural and Research Station Caracal in 2023 year. All of the treatments, which were made up of separate and related herbicides, were considered to be selective in maize after emergence (POST). Their effectiveness was evaluated at 7, 14, 21, and 28 days after each treatment targeting the most common weeds, such as HIBTR, DIGSA, SOLNI, ATRPL, AMARE, CONAR, POROL, XANTIST, CIRAR. The findings indicated that of the herbicidal treatments, the best efficacy was recorded by Click Trio (2 L/ha) with efficacy between 80-100% even at 7 days after treatment for most of the targeted weeds. Also, a good control of targeted weeds from maize crop was done by Pyxides WG 562.5 g/kg + Adigor ADJ and the combination SAE 0.53 H/01+ Baracuda controlled weeds 100% especially at 14, 21 and 28 days after treatment, excepting Convolvulus arvensis (CONAR), Hibiscus trionum (HIBTR).

Key words*: weeds, new herbicides, Zea mays L, efficacy, control.*

STUDY OF THE EFFECT OF SOME FOLIAR HERBICIDES ON ALFALFA (*Medicago sativa* L.) IN CHANGING CLIMATE CONDITIONS

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Abstract

In a study, conducted during the period 2023-24, it was found that weed control in alfalfa is difficult to achieve with a single herbicide application. The efficacy varies depending on the species composition of the weeds. The highest efficacy against Eastern groundsel, Prickly lettuce and Shepherd`s purse was reported when Corum - 125 ml/da is applied, against Field pennycress and Flixweed with Pulsar Plus - 160 ml/da, against Milk thistle with Cleranda SC - 200 ml/da. The highest phytotoxicity was registrated at variant treated with Onix - 100 ml/da - score 4, and it is not completely overcome and remains visible until the first swath. At all other other variants, the phytotoxicity is weaker and is overcome by the plants. The highest chlorophyll index was recorded with untreated control, and the lowest with Onyx treatment – 100 ml/da at the first reporting, with the values of the indicator increasing at subsequent reading dates. Foliar herbicides treatments does not unidirectionally affect the plants height, as well as the yield of green and dry mass.

Key words*: alfalfa, weeds, weed control, yield.*

ADAPTATION OF SPRING FIELD CROP TECHNOLOGY TO CHANGING CLIMATE CONDITIONS

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Abstract

Trends of changing climatic conditions in recent years have created serious challenges for the cultivation of the region`s traditional spring crops. Analysis of agro-climatic conditions shows a shift towards prolonged rainless periods combined with extremely high temperatures leading to heat and water stress. This worsens the hydrothermal conditions during the vegetative and generative stages. The succession of warm winters and the resulting unhardened plants are stressed, and the significant temperature amplitudes after the resumption of vegetation further deteriorate the phytopathological environment. Conditions of permanent soil and atmospheric drought are observed during all phenological phases. All this creates unfavourable conditions for the development of spring crops. They are particularly dangerous at the generative stage of plant development, which, combined with water deficit conditions, results in the impossibility of growing high-yielding mid- to late-season hybrids under non-flooded conditions. The analysis of conditions in recent years shows that optimisation and balance of the standard technological regimes of crop cultivation should be sought on the one hand and a differentiated approach applied to the different soil types, rainfall and temperature zones on the other.

Key words*: climate change, agrometeorological conditions, spring crops, abiotic stress, drought.*

EFFECT OF PRE-SOWING ELECTROMAGNETIC TREATMENT OF TRITICALE (×*Triticosecale* Wittm.) SEEDS AND METEOROLOGICAL CONDITIONS ON GRAIN YIELDS

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Abstract

The study examined the effects of electromagnetic stimulation on seeds of two triticale varieties under different climatic conditions. A three-factor field trial was conducted in 2017–2018 and 2018–2019 at the Institute of Field Crops, Bulgaria. Before sowing, seeds were electromagnetically treated using controllable factors: voltage (U, kV), seed exposure time (τ, s), and stay period (T, days). The values for the electromagnetic options: E0-untreated seeds; E1 (U = 5.2 kV, τ = 24 s, T = 14 days); E2 (U = 5.0 kV, τ = 50 s, T = 7 days). During vegetation, organic and mineral fertilizers were incorporated. Agrometeorological conditions were assessed using Ivanov`s coefficient and De Martonne index. Grain yield was higher for the Boomerang variety in both years. The variety and fertilization had an average effect in both periods. Electromagnetic stimulation showed a greater effect during the semi-humid conditions of 2018. In 2019, based on the impact of the interaction of the electromagnetic stimulation and the variety, an increase in grain yield for the Boomerang variety for E2 was 6.0%. In 2018, for the E1 option, a higher yield of 23.7% was reported for the Boomerang variety.

Key words*: electromagnetic seed treatment, triticale, grain yields, mineral fertilization, organic fertilization.*

THE SOWING DENSITY INFLUENCE ON YIELD OF THE MAIZE HYBRID P0217

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Abstract

The study aims at determining the extent to which increasing plant density in maize crops is a means of increasing yield per unit area, and the objective is to determine the level of plant tolerance in terms of plant density per unit area with no consequences on the size of productivity elements. As a consequence of downsizing the nutrition area from 0.15 m² (for the 70 cm sown variant) to 0.076 m² (for the 35 cm sown variant), the vegetative growth was diminished with implications on the size of the intake area at the level of each plant, but with an increase in the leaf area index values due to the high density covering the soil surface much better. The yield obtained was 10.16 tonnes of grains/hectare in the case of the equally spaced row seeding scheme at 70 cm clearance and 7.33 tonnes of grains/hectare in the equidistant row seeding scheme at 35 cm spacing between rows.

Key words*: foliar surface, phenophase, productivity elements.*

STUDIES ON THE INFLUENCE OF GROWTH REGULATORS IN REDUCING THE EFFECTS OF CLIMATE CHANGE ON SOYBEAN CULTIVATION IN CENTRAL MOLDAVIA

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Abstract

Climatic stress, such as drought and extreme temperatures, represents a major threat to the growth and development of crops, including soybeans, which require a balanced water regime. Water is an essential component of plant life, and its absence is the most crucial abiotic factor negatively affecting the quality and quantity of agricultural production. According to the specialized literature, growth regulators positively influence the morphology, physiology, and quality of soybean production. Recent studies indicate that applying such products at optimal concentrations and growth stages can mitigate abiotic stress. Based on this premise, a study was conducted in the experimental field at ARDS Secuieni, aiming to determine the influence of growth regulators on the productive potential of soybeans. The experiment was bifactorial type, using two soybean varieties created by ARDS Turda and three growth regulators applied during the flowering period. The results highlighted that the tested regulators influenced the adaptability of the soybean varieties to drought.

Key words*: drought, growth regulators, soybean.*

33-YEAR OLD GRAIN YIELD FROM *Triticum durum* Desf. AFFECTED BY MINERAL FERTILIZATION WITH NITROGEN AND PHOSPHORUS

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Abstract

The long-term 33-year study was aimed at clarifying the impact of mineral fertilizers under the influence of different weather conditions. The experiment was conducted at the Field Crops Institute, Chirpan, Bulgaria. The data presented in this article are for the period 1990-2022 (33 consecutive years). The following nitrogen (N) and phosphorus (P) rates were applied: 40, 80, 120 and 160 kg ha^{-1}. Each fertilizer rate was introduced alone and in combinations (25 variants). All fertilization rates were compared to non-fertilized variant (N_0P_0). The results showed that the conditions of the year (47.87% of the total variation) and fertilization (33.40% of the total variation) have a significant influence on the productivity of durum wheat. Furthermore, we reported that nitrogen fertilization had a stronger effect than phosphorus, but combined fertilization at the $N_{120}P_{120}$ rate had the highest grain yield. The correlation coefficient ($R=0.897$) and the coefficient of determination ($R^2=0.805$) were proven. Through second-order polynomial equations, it was found that the optimum fertilization rate was in the range of 120-130 kg N ha^{-1}.

Key words*: grain yield, nitrogen, phosphorus, triticum durum.*

UNVEILING THE EFFECTS OF DROUGHT STRESS ON MAIZE HYBRIDS: CHANGES IN CHLOROPHYLL CONTENT, MORPHOLOGICAL TRAITS, AND SOIL-PLANT WATER DYNAMICS

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Abstract

This experiment aimed to assess chlorophyll content under drought conditions in two maize hybrids, KWS Inteligens and Kashmir, within microcosms. The parameters analyzed included chlorophyll content, soil moisture, morphological and growth characteristics based on the BBCH scale (Biologische Bundesanstalt, Bundessortenamt und CHemische Industrie), leaf area, final dry biomass and soil-plant water budget. Chlorophyll content and soil moisture were monitored twice weekly for normal hydric regime (RHN) and for drought or hydric stress (SH). Among the findings, Kashmir hybrid recorded the highest average chlorophyll content of 170 SPAD units after 20 days under RHN, while Inteligens hybrid showed the greatest increase in leaf area of about 2.24 dm². In case of dry biomass accumulated by Kashmir hybrid, a reduction of 63% was achieved under drought compared with RHN, while for Inger this percent was higher with 3%. The results highlight that both hybrids endured drought conditions for up to 23 days from emergence to wilting.

Key words*: BBCH scale, soil-plant water budget, KWS Inteligens, KWS Kashmir, water stress.*

EFFECT OF FOLIAR FERTILIZATION ON PROTEIN LEVELS AND NUTRITIONAL VALUE OF THREE HYBRID MAIZE BIOMASS

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Abstract

Foliar fertilization is a widely used practice for correcting nutrient deficiencies in plants. The object of the present study are three corn hybrids (DKC 4416, LG 31.390 and Premeo), with different genetic origins. Variants of the field experience are 1. Control without irrigation, with soil fertilization with N14 in the form of ammonium nitrate; 2. Soil fertilization with N14 in the form of ammonium nitrate; 3. Fertilization with N14 + foliar fertilization with Aminosol +Lebozol B + Lebosol Zn, Nutriplant 36; 4. Fertilization with nitrogen N14 + Kinsidro Grow, N-Lock. In variants 2, 3 and 4, irrigation was carried out, with a drip irrigation system. The parameters of yield of green mass and yield of dry matter were determined. The content of crude protein, KEM, KER and PSC in green mass was calculated. Linear regression equations were developed, which show that there is a strong positive correlation between green mass yield and crude protein content. The correlation coefficients for the three hybrids r = 0.99 (DKC 4416), r = 0.96 (LG 31.390) - r = 0.93 (Premeo) were established.

Key words*: corn, green mass, foliar fertilization, nutritional value.*

CORN RESPONSE TO FOLIAR FERTILIZER APPLICATION

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Abstract

A field experiment was conducted with five maize hybrids during the period 2022-2024. The parameters of the yield of green mass, of the additional yield formed under the influence of foliar fertilization, have been established. The application of the organic liquid fertilizer Aminosol, the single-component inorganic fertilizers Boron, Zinc and Nutriplant 36 contributed to an increase in biomass by 20608.4 to 26799.0 kg/ha, on average over the study period. After treatment with the organo-mineral fertilizer Kinsidro Grow and the nitrogen stabilizer N-Lock, an increase in the productivity of the hybrids was again established. The greatest increase was registered at LG 31,390, respectively with 26068.8 kg/ha. In total, for hybrids and variants for the period of the field study, an increase of 41.4% was recorded after foliar fertilization with the products of the first technology. A strong correlation was established between the indicators of plant height and green mass yield for Premeo (R^2 = 0.9284) and Pioneer P9889 (R^2 = 0.9043). A positive correlation dependence, with a coefficient of determination R^2 = 0.8998 for DKC 4416.

Key words*: corn, yield, biomass, foliar fertilization, regressions.*

STUDIES ON THE CULTIVATION OF WHITE MUSTARD (*Sinapis alba*) UNDER THE AGROECOLOGICAL CONDITIONS OF SOUTHERN DOBROGEA – DELENI IN A CONVENTIONAL SYSTEM

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Abstract

This study explores the behavior of white mustard (Sinapis alba) varieties under the specific agroecological conditions of southern Dobrogea. The experiments were conducted in the locality of Deleni, Constanța County, on two indigenous varieties, Bella and Cezara. The same agricultural technology was applied to both varieties, with the main objectives being to determine the optimal sowing density, analyze plant density at emergence and harvest, and assess the qualitative indicators of production. The results indicate that both varieties exhibit significant adaptive characteristics to the agroecological context of the region, yielding favorable average production levels in the cultivation years of 2022, 2023, and 2024. Additionally, the findings highlight the impact of environmental factors such as precipitation levels and soil conditions on plant development and productivity. The mean and standard deviation were calculated for each crop variant (Cezara and Bella, with and without fertilizer) both at emergence and at harvest, and an ANOVA test was applied to check whether the differences between variants were statistically significant. Additionally, a student's t-test was used to compare the means between the fertilized and control variants for each variety. The results showed that the differences between variants were statistically significant ($p < 0.05$), indicating a clear effect of fertilization on the increase in the number of siliques. To verify the normality of the data distribution, the Shapiro-Wilk test was used. p-values greater than 0.05 suggest that the distribution of the number of siliques per plant follows a normal distribution, validating the applicability of the parametric tests used. A regression analysis was conducted to assess the impact of plant density on yield. Linear regressions indicated a positive correlation between plant density at harvest and the obtained yield, with significant determination coefficients (R^2). These results contribute to a better understanding of the potential of Sinapis alba in conventional farming systems and offer insights into optimizing cultivation techniques for sustainable agricultural production in this region.

Key words: *mustard, climatic factors, cultivation, fertilizer, production, Southern Dobogea.*

MAXIMIZING RAPESEED YIELD AND QUALITY THROUGH ADJUSTMENTS IN SOWING DATE AND ROW SPACING

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Abstract

To explore optimal agronomic practices for maximizing rapeseed productivity and quality under specific environmental conditions, a field experiment was conducted during the 2022-2023 agricultural year in Jucu, Cluj County. The study aimed to evaluate the effects of two critical factors influencing crop performance (sowing date and row spacing) on the yield and quality of the rapeseed hybrid PT 275. Using a randomized split-plot design with three replications, the experiment tested three sowing dates (August 20, August 30, and September 10) and three row spacings (25 cm, 37.5 cm, and 50 cm). Yield data and quality indicators were assessed at the end of the growing season to determine the influence of the experimental variables, using standardized laboratory methods. The results revealed that sowing date significantly impacted yield, with August 30 emerging as the most favorable, achieving the highest yield of 3900 kg/ha, while narrower row spacings (25 cm and 37.5 cm) significantly outperformed wider spacing (50 cm). Delayed sowing (September 10) increased oil content but reduced yield, highlighting a trade-off between productivity and quality. While the genetic characteristics of the hybrid were the primary determinant of quality, the study highlighted significant variations in quality indicators associated with the technological factors examined. These findings provide actionable insights for optimizing rapeseed cultivation under temperate continental climates.

Key words*: rapeseed, row spacings, sowing date, seed quality, yield optimization.*

DETERMINATION OF THE DEPENDENCE OF ECONOMICALLY VALUABLE INDICATORS OF MOLDAVIAN DRAGONHEAD ON GROWING CONDITIONS

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Abstract

The study highlights the results of research into the phases of growth and development of the Moldavian dragonhead (Dracocephalum moldavica) depending on the timing of sowing and moisture conditions. The research was conducted in the agro-ecological conditions of the Central Forest-Steppe of Ukraine. The emergence of seedlings was noted on the 6th - 7th day, depending on the time of sowing. After 20 days from the beginning of the appearance of seedlings, the tillering phase was noted in plants of the first sowing period, and in the case of the second sowing period, after 28 days. In the phase of mass flowering, the height of plants reached 90-95 cm with indicators of above-ground mass of 200-240 g per plant. The mass fraction of essential oil in experiments in the phase of mass flowering varied from 0.08% to 0.16%. The yield of essential oil was the highest during the first sowing period with moderate moisture. Based on the results of the obtained values, a model of economically valuable indicators of the Moldavian dragonhead was built.

Key words*: dracocephalum moldavica; sowing time; aboveground mass; fraction of essential oil; model of economically valuable indicators.*

COMPARATIVE CHARACTERISTICS OF SELECTED SAMPLES OF *Hyssopus officinalis* L. BY BIOMORPHOLOGICAL INDICATORS IN THE CONDITIONS OF THE SOUTHERN STEPPE OF UKRAINE

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Abstract

Hyssopus officinalis L has recently attracted particular attention as a valuable raw material for pharmaceuticals. To identify the biomorphological features of Hyssopus officinalis L., a field experiment was initiated in 2020 in the Kherson region, Ukraine. Samples of Hyssopus officinalis L of the local ecotype No. 108 were selected for the research. It was noted that seedlings in the flowering phase differ in terms of the timing of the beginning of flowering and flower colour. Plants of Sample 1-20 (pink-flowered) bloom first. After 3-4 days, the beginning of flowering is noted in sample 3-20 (blue-flowered), and after another 2 days, Sample 2-20 (white-flowered) begins to bloom. The height of first year plants ranged from 50 to 60 cm. The diameter of the bushes varied from 20 to 35 cm. The central shoot consisted of 17 to 38 first-order shoots. The largest size of the inflorescence of the first and second order shoots is in sample 3-20. Sample 2-20 has slightly higher average values of the length of the inflorescence of the first order shoots than in Sample 1-20.

Key words*: Hyssopus officinalis L., essential oil plants, biomorphological indicators, introduction, medicinal plants.*

QUINOA (*Chenopodium quinoa* Willd.): A PROMISING NEW CROP FOR ROMANIA

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Abstract

This work was undertaken to evaluate the adaptability of quinoa under the South-Eastern Romania's climatic conditions. The trial was carried out in the experimental field of the University of Agronomic Sciences and Veterinary Medicine of Bucharest during the 2024 growing season. For this purpose, two quinoa cultivars sourced from Quinoa Quality ApS, Denmark, were analyzed for growth and seed yield parameters. The experiment was of a monofactorial type and was organized using a Randomized Block Design with four replications. Results showed that in the extremely dry year of 2024, seed yields ranged from 1.000 to 1.917 t/ha. Among the two cultivars, Vikinga yielded the least at 1.000 t/ha, which was 31.44% lower than the control, while the highest yield was recorded for the Puno at 1.917 t/ha, representing a significant increase of 31.43% compared to the control. Both varieties exhibited superior performance across all growth traits, including plant height, maturity, dry weight, and harvest index, all significantly correlated with seed yield. The promising agronomic performance of these cultivars under drought conditions suggests substantial potential for quinoa cultivation in Romania.

Key words*: Chenopodium quinoa, growth traits, seed yield, correlation.*

IMPROVING SOYBEAN QUALITY PARAMETERS BY SOWING ON DIFFERENT DATES IN VARIOUS CLIMATIC YEARS

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Abstract

Given the challenges posed by current climate change, which impacts food supply chain, alongside the growing global population, rising food demand, and continuous environmental degradation, it is essential to identify crop varieties that are stable in both productivity and quality. A field experiment was carried out at the Research and Development Station for Agriculture (RDSA) Turda over a period of four years (2021-2024), each representing different climatic conditions. The study included six soybean varieties of different maturity groups developed at RDSA Turda: Felix, Iris TD, Ziana TD, Raluca TD, Isa TD, Miruna TD. The soybean varieties were sown on two different soil temperatures (5°C and 7°C), based on readings taken at 8 a.m. The quality response of the soybean varieties sown at different soil temperatures was influenced by both genetic factors and the sowing date. These findings emphasize the potential of adjusting sowing dates to improve soybean quality, providing valuable guidance for farmers aiming to optimize performance in similar agroecological conditions.

Key words*: climatic conditions, sowing date, soil temperature, soybean, quality.*

ANALYSIS OF THE EFFICACY OF MCPA HERBICIDE IN THE CONTROL OF *Convolvulus arvensis* and *Chenopodium album* IN FLAX CROPS

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Abstract

Linum usitatissimum is a valuable crop with food and industrial significance, yet its production is often reduced by biotic and abiotic factors, particularly weed competition. This study focused on the chemical control of Convolvulus arvensis and Chenopodium album in flax crops, aiming to determine the optimal dose of MCPA 750%. Four doses (0.16, 0.21, 0.27, and 0.33 l/ha) were tested in Western Romania, with evaluations conducted 15, 28 and 42 days after application (DAT). The results of this study showed that the two species had similar responses to the action of the MCPA herbicide. The population reduction of the two species, from the flax agroecosystem, was influenced by the applied dose and the time interval. The MCPA herbicide had maximum efficacy at 28 DAT. Good effectiveness was registered in the variants treated with MCPA 0.27 l/ha and 0.33l/ha. As a result of the relatively small differences between the two doses, as well as the phytotoxicity observed in the plots treated with the 0.33 l/ha dose, it is recommended to use the 0.27 l/ha MCPA.

Key words*: Convolvulus arvensis, Chenopodium album, MCPA, Linum usitatissimum, chemical control.*

STUDY OF UNSTABLE PHENOTYPIC BEAN SEEDS

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Abstract

Since 2010, at the Vegetable Research and Development Station (V.R.D.S.) Buzău there was initiated a program in order to preserve and valorize local bean population (Phaseolus vulgaris L.) from Eastern and South – Eastern Romania. In 2020, the germplasm collection contained over 450 accessions. This paper presents the study of 3 climbing bean accessions seeds sown. For each accession sown, there were taken into study 9 new biotypes harvested. The seeds sown represented the control variant for the analysis of the harvested biotypes. The seeds were evaluated in what it concerns quantitative and qualitative characteristics. The main colors of the control seeds were brown (V_1 – medium, V_2 – light and V_3 – dark). The seeds harvested presented a lot of colors including white (on entire graine – 1.3.; 1.4.; 2.6.; 3.1 or as secondary color 1.5.; 1.7.; 1.8.; 2.7.; 3.3.). The mean weight of 100 seeds varied between 36.52 g (1.4.) and 70.95 g (1 Mt). The results obtained, corroborated by diversity of color and shape of the seeds harvested, show the presence of cross-pollination of climbing bean plants and increase the value of the bean germplasm collection.

Key words*: cross-pollination, germplasm collection, new biotypes, Phaseolus vulgaris L.*

STUDY ON OBTAINING POTATO MINITUBERS BY USING VARIOUS CULTURE SUBSTRATE

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Abstract

The modernization of the production of planting material for potato cultivation and especially the production of minitubers on industrial substrate represents a highly topical research direction worldwide, in line with the major objective of upgrading potato cultivation in Romania. The Research Laboratory for Plant Tissue Cultures, of the National Institute of Research and Development for Potatoes and Sugar Beet Brașov evaluated the minituberization process was on two culture substrates for four genotypes to observe whether the use of industrial substrate is more efficient than soil. The biological material used consisted of virus-free in vitro plants, starting from the culture of meristems. In vitro potato plants were planted on the two types of substrates. Determinations of number and weight of the minitubers were made. The industrial substrate favoured the production of a higher average number of minitubers (7.82 minitubers) with a distinctly significant positive difference, compared to the conventional substrate (6,94); also on industrial substrate the average weight of minitubers was higher than on peat

Key words*: potato, in vitro plants, variety, culture substrate, minitubers.*

STUDIES ON THE INFLUENCE OF INPUT APPLICATION ON THE PRODUCTIVITY OF ROMANIAN WHEAT VARIETIES, AT ARDS CARACAL

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Abstract

Nutrients play a vital role in wheat production, both macro- and micronutrients being necessary for plants. Each nutrient has its own character and is involved in various metabolic processes of the life of wheat plants, that is why the influence of each cannot be clearly delineated. The purpose of the research is to present the yield results obtained at ARDS Caracal in the 2023-2024 agricultural year, for three Romanian wheat varieties (Glosa, Otilia and Carom), cultivated after different preceding crops (rape, peas, sunflower), using four different fertilization schemes. The obtained yields highlight the fact that each of the links in the technological scheme influences, to some extent, the quantity and quality of wheat production. Amidst prolonged soil droughts both in the fall of 2023 and in the spring-summer of 2024, the application of gradual-release inputs, doubled by biostimulants, managed to provide production increases of up to 22%, compared to the control variants. The results confirm that inputs play an essential role in increasing soil fertility, in full correlation with the fertilizers type, but also with the timing of their application.

Key words*: wheat crop, inputs, macronutrients, micronutrients, yields.*

FUTURE VISIONS OF INTEGRATED PEST MANAGEMENT (IPM) FOR MAIZE CROPS IN ROMANIA

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Abstract

Integrated pest management (IPM) has the potential to help farmers minimize the use of crop protection chemicals, relying primarily on preventive measures, reducing costs, and contributing to the transition to sustainable food systems. Although IPM approaches have been developed for a wide variety of crops and contexts, their adoption by farmers remains low across Europe. Previous studies show that farmers prefer a certain agricultural system due to socio-economic dependencies or support and support policies, market or conditions related to equipment and infrastructure, farm machinery and equipment, or insufficient professional training. This suggests that many farmers cannot simply adopt IPM and that changes and clarifications are needed along the entire chain from production, distribution, processing, market, and consumption to agricultural policy levels. This paper presents some of the results obtained to contribute to a greater extent to the co-creation of policies and actions together with the actors involved, regarding consumer health, plant and animal welfare, conservation and protection of the environment and biodiversity, adaptation of plant cultivation technologies to the effects of climate change.

Key words*: Integrated Pest Management, IPM, future visions, maize crops.*

EVALUATION OF TALL FESCUE (*Festuca arundinacea*) GENETIC RESOURCES FOR BREEDING ACTIVITY

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Abstract

The breeding program involves new objectives and approaches for adapting to changing climatic conditions by creating productive varieties with increased tolerance to drought. The aim of research is the evaluation of the germplasm through observations and measurements to choose valuable resources of initial breeding material. Were analyzed 20 accessions. The studied genotypes can be grouped into three categories from precocity point of view, difference between the earliest variety, Kerestelny (28.04) and the latest, Luna (25.05) was 27 days. The abundance of vegetative shoots was combined with the abundance of generative shoots, to break the existing negative correlations between seed production and DM production. Regarding plant height a large inter-varietal and intra-varietal variability was found, with average values above 100 cm in the varieties: Krasnodarska 115.2 cm and with values below 50 cm in the Luna variety 48.5 cm. The most resistant genotypes to Puccinia.sp. with the frequency of over 80% resistant plants are: Luna: 90%, Bronson: 89.5%, Prolate 86.7% and the most sensitive are Szarkad 5: 20% and Bull 20.5% unattached.

Key words*: disease resistance, genotype, generative shoots, plant height, tall fescue, vegetative shoot.*

RELATIONSHIPS OF NDVI AND CHLOROPHYLL CONTENT WITH YIELD COMPONENTS OF DIFFERENT ACCESSIONS OF *Phaseolus vulgaris* L. AND VIGNA (*Vigna unguiculata* L. Walp.)

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Abstract

The aim of this study was to investigate the relationship between NDVI, Chlorophyll and Nitrogen content in leaves with yield components of different Phaseolus vulgaris L. and Vigna (Vigna unguiculata L. Walp.) genotypes. Field experiment was conducted in 2024 year in the experimental field in Institute of Plant Genetic Resources, Sadovo, Bulgaria. The normalized difference vegetation index (NDVI), leaf chlorophyll content (Multy pigmentometer MPM – 100) and Nitrogen content (N-Pen) were measured on leaves directly in the field. The various plant characteristics in addition were measured such as plant height, plant weight, plant weight without pods, pod length, number of pods per plant, number of beans per pod, weight of beans per plant of cowpea (Vigna unguiculata L. Walp.) and common beans (Phaseolus vulgaris L). It was found that NDVI index has positive significant correlation with Chlorophyll (r = 0.69) and higher between N and chlorophyll (r = 0.75). It was also found the morphological traits studied characteristics as days to flowering, plant weight, number of seeds in pod showed higher correlation with chlorophyll index in compare to NDVI and N content.

Key words*: NDVI, chlorophyll, cowpea, yield.*

THE EVALUATION OF FERTILIZATION SCHEMES OPTIMISATION AT TWO ROW BARLEY CROP IN ORDER TO INCREASE THE HARVEST PROCESSING VALUE

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Abstract

As the cultivation of barley as a raw material for brewing beer is on an upward trend in Romania, to identifying an optimal fertilization scheme that enhances the quality of the grains is still a real challenge for producers and processors alike. In this context, the researches focused on the behavior of the Salamandre two row barley genotype in terms of grain yield achieved per unit area and the technical value of the harvest, against the background of the practice of differentiated fertilization schemes. The results of the research highlighted the positive impact of the administration of foliar fertilizers based on macro and microelements, in the phenophases considered critical for the supply of nutrients to plants. The highest values of the physical and chemical indicators that define the quality of grains in barley for brewing were obtained under the conditions of application of three foliar treatments with Poly Feed GG fertilizer applied in well-defined vegetation phases, against the background of administration at the time of establishment of the crop of 200 kg/ha of Complex fertilizers 20-20-0+13% Sulphur.

Key words*: two row barley, foliar fertilization, grain yield.*

ASSESSING POTATO MORPHOLOGICAL AND PHYSIOLOGICAL TRAITS UNDER FERTILIZATION DURING THE FIRST YEAR OF FIELD ADAPTATION

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Abstract

*Potato, Solanum tuberosum L. represent one of the most important crop worldwide and from Romania. The general aim of the study was represented by the overall assessment of potato growth and development under specific field condition respectively Râșca county. Therefore, were chosen six potato germplasm (Red Fantasy, Bella Rosa, Dutch Red, Mauve, Captiva and Elfe), free of pest and diseased and the morpho-physiological features were evaluated. Different vegetative phenophases were assessed according to BBCH scale (**B**iologische **B**undesanstalt, Bundessortenamt und **CH**emische Industrie) with and without fertilization, productivity, chlorophyll content and chemical distribution of the most important chemical elements from potatoes. The results were differentiated between different principal growth stages pointed and also depending on potato variety. Râșca still remains one of the main location for obtaining high potato productivity.*

***Key words**: BBCH scale, chemical distribution, chlorophyll content, Energy dispersive X-ray spectroscopy, Scanning electron microscopy, Solanum tuberosum L.*

CRITICAL SALINITY THRESHOLDS IMPACTING WHEAT GERMINATION: DETERMINING DOSE-DEPENDENT RESPONSES ACROSS VARIETIES

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Abstract

*The study aimed to establish the critical salinity dose that can be tolerated by 16 wheat varieties from Romania under controlled conditions. The tested varieties were Alex, Andrada, Bezostaia, Boema, Arieșan, Ciprian, Esențial, Faur, Glosa, Granny, Fundulea, Miranda, Otilia, Pădureni, Taisa and Transilvania. Critical salinity levels (mM NaCl) were tested respectively D1-100, D2-125, D3-150; D4-175; D5-200; D6-225; D7-250; and control (C) with distilled water. The assessment was made according to first and second principal growth stage on BBCH scale (**B**iologische Bundesanstalt, **B**undessortenamt und **CH**emische Industrie) and the following parameters were calculated: germination percentage (GP), germination index (GI), total germinated seeds (TGS) and relative salt injury rate (RSIR). After 7 days, at 250 mM NaCl, the wheat varieties reached overall the maximum developmental stage of BBCH 07. Lower RSIR was obtained by Andrada variety a result of an increased salinity resistance, while Taisa, Transilvania, and Pădureni proved lower resistance to stress, marked by increased RSIR coefficient. Germination standard parameters highlighted the critical salinity thresholds between 225-250 mM NaCl with different resistance threshold between varieties.*

***Key words**: abiotic stress, early growth stages, relative salt injury rate, wheat tolerance.*

EFFICIENCY OF SUNFLOWER SEEDS INOCULATION WITH DIFFERENT MICROORGANISMS

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Abstract

The aim of the study was to determine the effectiveness of sunflower seeds inoculation with various microorganisms and their impact on enhancing plant resistance to negative environmental factors. The study on the reaction of sunflower hybrids to different growing conditions was conducted at two locations: 'Location 1', which imposed limiting conditions, and 'Location 2', which imposed optimal conditions. The study was conducted over the period 2023-2024. In the optimal conditions, the highest weight of 1000 seeds (70.44 g) was observed in the variant with $N_{40}P_{60}$, while the highest oil content of 50.3% and the actual yield of 2763 kg/ha were achieved in the variant with $N_{20}P_{30}$ and multicomponent inoculation. In the context of limiting conditions, the variant with $N_{40}P_{60}$ demonstrated the highest oil content (42.3%) and actual yield (1167 kg/ha). Conversely, the variant with $N_{20}P_{30}$ and multicomponent inoculation exhibited the highest weight of 1000 seeds (47.01 g).

Key words*: sunflower, fertilizer, inoculation, yield, oil content.*

EVALUATION OF BIOCHEMICAL COMPOSITION AND NUTRITIONAL VALUE OF FODDERS FROM *Lablab purpureus* L.

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Abstract

The identification of alternative forage crops that need less water and produce high yields of proteins is important for animal husbandry and agricultural durability. The aim of this paper was to evaluate the biochemical composition and nutritional value of fodders from Lablab purpureus introduced and grown in monoculture in the experimental plot of the NBGI Chişinău. The results of our research revealed that the dry matter of harvested whole plants contained 176 g/kg CP, 90 g/kg ash, 281 g/kg ADF, 453 g/kg NDF, 44 g/kg ADL, 196 g/kg TSS, 237 g/kg Cel, 171 g/kg HC with 742 g/kg DMD, 709 g/kg DOM, RFV=138, 10.78 MJ/kg ME and 6.80 MJ/kg NEl. The prepared silage was characterized by agreeable olive colour with pleasant smell and the dry matter contained 186g/kg CP, 120 g/kg ash, 307g/kg ADF, 510 g/kg NDF, 37g/kg ADL, 270 g/kg Cel, 203 g/kg HC with 748 g/kg DMD, 686 g/kg DOM, RFV=119, 10.48 MJ/kg ME and 6.50 MJ/kg NEl. It has been found that the prepared hay had 167 g/kg CP, 94 g/kg ash, 45 g/kg ADL, 158 g/kg TSS, 260 g/kg Cel and 198 g/kg HC, 720 g/kg DMD, 664 g/kg DOM, RFV=120, 10.48 MJ/kg ME and 6.22-6.52 MJ/kg NEl. Lablab purpureus contains many nutrients, which make it suitable to be used as fodders for farm animals.

Key words**:** *biochemical composition, green mass, hay, Lablab purpureus, nutritional value, silage.*

STATUS OF THE MEDICINAL AND AROMATIC PLANTS COLLECTION IN THE NATIONAL GENEBANK OF BULGARIA

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Abstract

Bulgaria is known for its wealth of medicinal plants. The diversity that exists ecologically is a prerequisite for the collection and cultivation of various species and forms with a high content of biologically active substances. The country therefore has centuries-old traditions relating to the collection, cultivation, processing and marketing of medicinal plants. More than 250 species are used in official medicine and are very well accepted in both the domestic and foreign markets. The collection of medicinal and aromatic plants in the National Genebank in IPGR-Sadovo, Bulgaria is represented totally by of 484 specimens of which 210 are annuals, 66 perennials, 26 bulbous flowers and 182 medicinal specimens, mainly wild.

Key words*: medicinal and aromatic plants, conservation, collection, PGR, National Genebank.*

GRAINS YIELD IN SOME CORN HYBRIDS: COMPARATIVE ANALYSIS

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Abstract

The present research tested, in comparative crops, 15 corn hybrids (F8021 to F8025), created within NIARD Fundulea. The field experiments were conducted under the conditions of ARDS Lovrin during the agricultural year 2023-2024. The comparative corn crop was grown in an unfertilized and unirrigated system, to test the genetic potential of the hybrids. The yield recorded values Y = 3387.80±174.57 kg ha^{-1} (hybrid F8035) and Y = 5994.47±174.57 kg ha^{-1} (hybrid F8021). Compared to the mean calculated at the experiment level (Y_m = 4804.61±174.57 kg ha^{-1}), nine hybrids recorded yield above the mean value, with statistical safety the hybrids F8021 and F8023 at the p<0.001 level (***), hybrid F8030 at the p<0.05 level (**) and hybrid F8025 at the p<0.05 level (*).Yield values below the experimental mean were recorded for hybrids F8031 and F8035 at the p<0.001 level (ooo), and for hybrid F8027 at the p<0.01 level (oo). In the case of the other hybrids, the differences did not present statistical certainty. The positive yield increase (ΔY) was between ΔY = 125.71 kg ha^{-1} (hybrid F8033) and ΔY = 1189.86 kg ha^{-1} (hybrid F8021).

Key words*: comparative analysis, genetic potential, maize, positive yield increase, unfertilized comparative crops, yield.*

DIVA-GIS APPROACH TO DIVERSITY ANALYSIS OF *Aegilops cylindrica* GERMPLASM

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Abstract

The object of the study was 152 specimens of Aegilops cylindrica Host. collected in 2024 from 17 districts in Bulgaria. DIVA-GIS approach was used to analyze the diversity. The descriptive analysis of the studied quantitative characteristics showed a wide range of variability among accessions. The Shannon diversity index exhibited a high level of diversity, with a maximum range of 1.109-2.0, 1.109-2.0, and 0.879-2.0, respectively, for the traits of plant height, spike length, and number of spikelets per spike. These findings indicate a notable responsiveness of these traits to the ecosystem. The grid maps generated for the diversity analysis of these characters indicated the occurrence of diverse accessions for plant height and for spike length from the municipality of Elin Pelin (district Sofia), and for number of spikelets per spike from the Kyustendil (district Kyustendil), Belitca and Bansko (district Blagoevgrad), Sevlievo (district Gabrovo), Karlovo (district Plovdiv), Mineralni bani (district Haskovo) and Elin Pelin (district Sofia) municipalities. The study would facilitate more effective management and utilization of Aegilops cilindrica Host. in the country.

Key words: *Aegilops cylindrica Host., diversity, expedition, Diva-Gis.*

INFLUENCE OF SOWING DENSITY ON GROWTH PROCESSES OF AMARANTHUS PLANTS IN THE CONDITIONS OF SOUTHERN UKRAINE

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Abstract

Recently, the population of Ukraine has been paying more attention to a balanced diet and preferring products that contain the necessary complex of proteins, fats, carbohydrates, vitamins and micro- and macro elements. To meet such needs, manufacturers are constantly replenishing the range of products by adding non-traditional types of food raw materials to the recipes. One of these is a fairly new agricultural crop for our country - Amaranth. The extremely wide possibilities of using Amaranth are gradually increasing the demand for its production. This encourages agro-producers to improve cultivation technology, to obtain stable high yields of grain of this crop. One of the ways to increase the yield of agricultural crops is to regulate the sowing density. This measure allows plants to develop well and accumulate above-ground mass for the formation of a subsequent harvest. The article presents the results of a study of the Amaranth plants growth and development peculiarities depending on the post-emergence plant density. The highest values of amaranth plant height were recorded at the highest post-emergence plant density (180·10^3 plants/ha). In the phase of full grain ripeness, amaranth plants of the Kharkivs`kyi 1 variety were 164.0 cm high, plants of the Liera variety were 170 cm high. The greatest stem thickness was at a post-emergence plant density of 90 10$^3$ plants/ha. The stem thickness of plants of the Kharkivs`kyi 1 variety was 3.0 cm, the stem thickness of plants of the Liera variety was 3.2 cm. The greatest values of (Leaf mass ratio) LMR were at a post-emergence plant density of 150 10^3 plants/ha. For the Kharkivs`kyi 1 variety, this indicator was 0.197 g/g, and for the Liera variety it was 0.232 g/g. To ensure the best conditions for plant growth and development, the optimal post-emergence plant density was 150 10^3 plants/ha. The obtained results will help agricultural producers to optimize the sowing parameters when growing Amaranth.

Key words*: Amaranth, plant growth and development, phenological observations, post-emergence plant density, sowing parameters*

GENETIC CONTROL AND COMBINING ABILITY IN LINE BY TESTER CROSSES OF COTTON

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Abstract

The aim of this study was to evaluate the nature of gene action, combinnig ability of parents and F_1 hybrids in line × tester cotton crosses. An approach was applied to identify the parents having as high as possible GCA for all studied traits and to select the most reliable F_1 crosses by their ranking based on the total effects using the squared Euclidean distance. Crosses with relatively short Euclidean distances to the "ideal" population in which desirable segregats are expected to occur were identified. The crosses 572 × Chirpan-539, Melani × Chirpan-539 and 641 × Chirpan-539 had the highest positive GCA for the three studed traits and appeared to be the most valuable for breeding programs. Heterosis manifestations were found for the three traits in individual croses, the heterobeltiosis for productivity per plant ranged from 103.7% to 141.9%, for lint percentage was from 101.3% to 107.2% and for fiber length - from 102.2% to 106.8%. Good general combiners were identified and high GCA of some was mainly due to additive genes, making them very suitable for the synthetic selection.

Key words*: cotton, G. hirsutum, genetic variance, heterosis, Euclidean distance.*

EXPLORING SPRING BARLEY GENOTYPE X ENVIRONMENT INTERACTION IN THE SOUTH EAST REGION OF ROMANIA

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Abstract

The main objective of this study was to evaluate the genotype x environment interaction on a spring barley germplasm panel with different geographic provenance and to identify useful germplasm that can be exploited in the barley breeding program. Spring barley genotypes usually show wide variation under climatic conditions in the south-east of Romania and these negatively affect agronomical traits. During the 2021-2023 period, at National Agricultural Research and Development Institute Fundulea, a spring barley panel was tested under three different environments, and data of heading (DH), data of flowering (DF), plant height (PLH), yield (Y), one thousand kernels weight (TKW), protein (P) and starch (S) content were determined. The significant effect of genotype × environment interaction on the traits showed different responses of the genotypes across the testing environments, offering the possibility of identifying some genotypes of interest to be used in future crosses and to describe the genetic resources for stakeholders.

Key words*: spring barley, germplasm, traits, environment.*

RESPONSE OF MAIZE BREEDING TO CLIMATE CHANGE

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Abstract

Maize is the species with highest world production and the most widely planted agricultural crop. Breeders and the agricultural community around the world will have to expand the capacity of current breeding programs to increase yield potentials in the conditions of climate changes. In the paper the effect of key factors such warmer temperatures, changes in rainfall and higher concentrations of CO2 on the productivity of maize were reviewed based on the literature. The most sensitive stages to drought were shown. Breeding tools to mitigate unfavorable effect of climate changes on grain yield of maize were reviewed. Breeding program achievements of the Maize Research Institute Knezha, Bulgaria was shown. New hybrids Kneja 461 and Kneja 561 due to their drought tolerance were found as more productive comparing to the standards Kneja 435 and Kneja 509 in new conditions. Future prospects of the breeding of maize were shown as development of maize varieties resistant to high temperatures; selection and improvement of maize varieties capable of maintaining growth and productivity under changed environment, ect.

Key words*: climate change, drought, maize.*

CHLOROPHYLL CONTENT IN MAIZE HYBRIDS

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Abstract

One of the most important factors determining productivity is the photosynthesis process. The work aimed at to find the chlorophyll content in leaves of maize hybrids from two vegetation groups. Maize hybrids FAO 500-599 (Kneja 560, Kneja 564, Kneja 570A, Kneja 572 and KWS Camillo), and FAO 600-699 (Kneja 648, Kneja 649, Kneja 650A, Kneja 650 and Kneja 683) were tested in field conditions and no irrigation. Chlorophyll 'a' and chlorophyll 'b' were determined in green leaf samples 60 DAS. The total chlorophyll a+b and chlorophyll 'a' to chlorophyll 'b' ratio was calculated. Generally, the values for chlorophyll concentration were found higher for the maize hybrids FAO 600-699 group. The exceeding compared to FAO 500-599 group was for chlorophyll 'a' by 12.53%, for chlorophyll 'b' by 9.38% and for total chlorophyll by 11.47%, respectively. The chlorophyll 'a' to chlorophyll 'b' ratio was relatively similar for the hybrids from two groups. It was concluded the highest total chlorophyll concentration in maize hybrids was found in Kneja 648 (5.39 mg/g) and Kneja 560 (4.49 mg/g).

Key words*: chlorophyll 'a', chlorophyll 'b', maize, total chlorophyll.*

THE ROLE OF METHYLOBACTERIUM SYMBIOTICUM IN AGRICULTURE

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Abstract

The current scientific work presents a review of the role of Methylobacterium symbioticum not only as a tool for increasing agricultural yields but also as a strategic ally in transitioning to a greener and more sustainable agricultural model. Methylobacterium symbioticum is a symbiotic bacterium known for its ability to utilize single-carbon compounds, especially methanol, as a source of carbon and energy. In the context of modern agriculture, the use of beneficial microorganisms has become an essential component for enhancing sustainability and productivity. Among these, Methylobacterium symbioticum stands out as a symbiotic bacterium with significant potential for improving plant health and their adaptation to environmental stress. This bacterium has the capability to colonize plants and form symbiotic relationships, thereby contributing to increased nutrient use efficiency, stimulating growth and development, and enhancing plant tolerance to adverse conditions. It stimulates the physiological processes of the host plant by synthesizing phytohormones, such as auxins, and by producing enzymes that contribute to increased stress resistance.

Key words*: methylobacterium symbioticum, biofertilizer, phytohormones, biostimulant.*

EVALUATION OF FOLIAR HERBICIDES FOR WEED CONTROL IN MAIZE (*Zea mays* L.).

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Abstract

In 2022 and 2023 a field experiment with the maize hybrid P 9610 was conducted. The trial was performed on the experimental field of the Agricultural University – Plovdiv, Bulgaria. The variants of the experiment were: 1. Untreated control; 2. Economic control; 3. Aminopielik 600 SL (1.20 l ha^{-1}); 4. Arigo WG (0.33 kg ha^{-1}); 5. Callam (0.40 kg ha^{-1}) 6. Starane Gold (1.20 l ha^{-1}). The herbicides were applied in the crop growth stage 3rd-5th leaf (BBCH 13-15). The weed infestation was represented by Chenopodium album L.; Amaranthus retroflexus L.; Xanthium strumarium L.; Abutilon theophrasti Medik., and Solanum nigrum L. The highest weed control against Ch. album, A. retroflexus, and A. theophrasti after the application of Callam was recorded, and against X. strumarium and S. nigrum after the application of Starane Gold. For the Economic control as well as for the variants treated with herbicides, the parameters ear diameter, ear length, number of seeds per ear cob, absolute seed mass, hectoliter seed mass and grain yield were higher and mathematically proven compared to the untreated control's results for these parameters.

Key words*: maize, weeds, herbicides, efficacy, biometry.*

RELATIONSHIPS BETWEEN MORPHOMETRIC AND QUALITY PARAMETERS IN WHEAT GRAINS

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Abstract

Wheat is a staple food grain that plays a vital role in daily diets worldwide. Therefore, even minor changes in wheat production and quality hold significant importance globally, particularly in today`s context, where food crises are a pressing concern. While the effects of various environmental factors on wheat yield and quality have been extensively studied, research on the variation in quality traits of seeds from wheat plants exposed to the same environmental conditions remains limited. In this study, the quality traits and amino acid contents of wheat seeds grown under identical conditions were comparatively analyzed based on their size. The results showed that protein content, sedimentation value, and gluten levels were highest in medium-sized seeds, whereas starch content was found to be higher in large seeds. Moreover, essential amino acids crucial for human health were observed at the highest levels in smaller seeds of the same variety.

Key words*: wheat, morphometric traits, quality parameters, seed size.*

AGROCLIMATIC ASSESSMENT OF THE PROSPECTS FOR GROWING WINTER PEAS IN THE ODESA REGION

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Abstract

Peas are a key leguminous crop in Ukraine due to their valuable properties, which are beneficial for both agriculture and ecology. Pea grain is widely used in the food industry, serves as an important component of animal feed, and acts as a natural nitrogen fixer, improving soil fertility. These characteristics ensure its important role in enhancing the productivity of agricultural systems and supporting agroecological stability. Climate change, particularly warming and uneven rainfall distribution, presents challenges for growing traditional crops, including spring peas. As a result, the development of winter pea varieties becomes a promising solution. These varieties better utilize moisture during the late autumn and early spring periods, provide more stable yields, and protect the soil from erosion. This is especially important for regions at risk of soil degradation, such as the southern regions of Ukraine. The article presents the results of numerical calculations of the productivity of winter peas under the agrometeorological conditions that prevailed in 2023, compared to the agroclimatic conditions expected for 2031-2050. The obtained results confirm the potential of growing winter pea varieties as a strategy for adapting Ukrainian agriculture to climate change, as it increases yield, preserves soil, and ensures the stability of agroecosystems.

Key words*: winter peas, productivity, yield, climate change, scenario, modelling, moisture availability of crops.*

STUDY ON THE DEVELOPMENT AND YIELD OF SAFFRON CROCUS (*Crocus sativus* L.) IN ORGANIC FARMING CONDITIONS IN CENTRAL SOUTHERN BULGARIA

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Abstract

The study was conducted in the period 2022-2024 in the experimental field for organic farming of the Agroecological Center at the Agricultural University, Bulgaria. The yield of fresh and dry mass of saffron crocus (Crocus sativus L.) grown under organic farming conditions was studied. To achieve the goal, a field experiment was set up, with a two-row planting scheme in three repetitions and a rate of 32 plants /m^2. Italpollina organic fertilizer was used for soil fertilization before planting. The harvesting and processing of saffron flowers was carried out manually, and the drying of the fresh mass was under controlled conditions with a temperature of 40°C for 3 hours. Meteorological conditions, including the amount of precipitation, influence the beginning of the vegetation of plants, the onset and duration of the flowering phase. The indicators of the beginning of flowering, number of flowers, yield and percentage ratio of fresh and dry mass (saffron) under organic cultivation conditions in Central Southern Bulgaria were studied.

Key words*: organic farming, Crocus sativus L, yield, saffron.*

MISCELLANEOUS

THE EVALUATION OF THE QUALITY INDICES OF PHYTOMASS FROM ENERGY GROPS AND AGRICULTURAL RESIDUES

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Abstract

The objective of this research was to evaluate the quality indices of the solid dry phytomass from energy crops Miscanthus giganteus 'Titan', Silphium perfoliatum 'Vital', Sorghum bicolor, var. saccharatum 'SAŞM1' and agricultural residues – stems of Brassica napus oleifera and Pisum sativum collected in the experimental plot of the NBGI Chişinău. It has been found that elemental composition the collected dry phytomass was 41.36-50.00% carbon, 4.32-6.14% hydrogen, 0.22-1.37% nitrogen, 0.03-0.10% sulphur, 2.18-5.66% ash and gross calorific value varied from 18.2 to 19.6 MJ/kg phytomass. The solid dry phytomass contained 361-520 g/kg cellulose, 191-320 g/kg hemicellulose, 83-122 g/kg acid detergent fibre and the estimated theoretical ethanol yield averaged 410-592 L/t organic dry matter. The studied energy crops were characterized by optimal quality indices of phytomass and can serve as feedstock for the production of pellets and cellulosic bioethanol. The agricultural residues have higher content of ash, nitrogen, sulphur and lower concentration of structural carbohydrates and energy value, which make them suitable to be used as a part of a diverse mix with biomass from woody species.

Key words*: agricultural residues, energy crops, Brassica napus oleifera, Miscanthus giganteus, Pisum sativum*.

SURVEY ON SUSTAINABLE PROMOTION OF NUTRITIONAL STATUS OF CROPS

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Abstract

Sustainable plant nutrition is essential for maintaining soil fertility and minimizing environmental impacts. This study evaluates farmers' perceptions, challenges, and adoption of sustainable fertilization practices through a structured questionnaire. Results indicate that crop rotation is the most preferred method, while a combination of chemical and organic fertilizers is widely used. Despite moderate effectiveness, concerns about environmental impact are high, yet adoption of mitigation measures remains limited. Financial constraints, particularly the high cost of organic fertilizers, are the main barriers to sustainability. Most respondents rely on fertilizer manufacturers for information, with lower engagement in scientific research. Strong interest in training exists, though accessibility issues persist. Spearman correlation analysis highlights links between fertilization practices, awareness, and sustainability actions. Principal Component Analysis identifies key factors influencing farmers' decisions, including financial support and knowledge accessibility. The findings emphasize the need for subsidies, expert collaboration, and improved information dissemination to promote sustainable fertilization.

Key words*: environmental impact, soil fertility, principal components analysis, trends.*

A COMPARATIVE STUDY ON THE EVOLUTION OF PLANTED BLACK PINE SAPLINGS ON THE STERILE DUMPS FROM RECEA ȘUNCUIUȘ QUARRY, BIHOR COUNTY

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Abstract

This study analyses the performance of black pine (Pinus nigra Arn.) seedlings planted in 2008-2009, of local origin, and those planted in 2023, with Austrian origins, on the waste dumps of the Recea Șuncuiuș Quarry in Bihor County. The survival rate of the seedlings was assessed, and their diameters and heights were measured across different slope categories. Preliminary results show that the seedlings planted in 2023 exhibit strong growth in both height and diameter, particularly on medium slopes. The overall survival rate of the seedlings planted in 2008-2009 was around 84%. The study also examines the impact of pests on the black pine stand on the Recea Quarry waste dump. Lastly, the health of the trees planted in 2008-2009 was assessed.

Key words*: afforestation, health status, pine, Pinus, survival rate.*

RESEARCH ON PRODUCTIVITY INDICES IN SOME DEMONSTRATION BATCHES OF AUTUMN WHEAT, AT SCDA BRAILA, IN THE LAST TWO AGRICULTURAL YEARS

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Abstract

At SCDA Braila, demonstration batches of autumn wheat are organized every year, with Romanian and foreign varieties, to formulate recommendations on cultivation technologies and the choice of the best performing varieties for farmers. This paper presents the productivity elements of 25 varieties of autumn wheat cultivated in the pedoclimatic conditions of the Braila Plain, in the last two agricultural years. A classification was made regarding the productivity of the 25 wheat varieties tested in the last agricultural years and recommendations were formulated for the farmers in this area. It is essential to explore solutions to reduce operational costs, diversify crops to have a market for the products obtained and invest in advanced technologies that can increase the efficiency and sustainability of agriculture.

Key words*: wheat, productivity, technology, climatic conditions, wheat varieties.*

A CASE STUDY ON GRAIN LEGUMES GENETIC RESOURCES AVAILABLE FOR USE IN BREEDING FOR SUSTAINABLE AGRICULTURE

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Abstract

Plant genetic resources are essential for sustainable agriculture and for securing the global food supply. Sustainable agriculture and global food security depend on the availability of well-described plant genetic resources. The work presents challenges related to the availability of grain legumes genetic resources for use in breeding for sustainable agriculture, germplasm held in gene banks, and approaches to enhance the use and access to conserved resources. A better understanding of the stability and potential of investigated traits can be achieved by considering data from different experiments, thereby improving the prospects of using genetic resources in novel breeding programs. Consequently, genetic resource collections can become more utilized through enhanced cooperation and sharing not only of seeds, but also the accumulated knowledge gained over many years of resource regeneration and/or research. Legumes are a vital group of crops that include beans, lentils, chickpeas, lupins, and many others, contributing significantly to global food security, nutrition, and sustainable agriculture. The genetic resources of legumes are essential for breeding programs aimed at improving yield, disease resistance, and adaptability to changing climates. However, these genetic resources face several safeguarding challenges.

Key words*: sustainable agriculture, germplasm, crops, genetic variation.*

Passiflora incarnata L. – CULTIVATION IN OPEN FIELD

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Abstract

The article presents the synthesis of the results of the investigations conducted over several years, regarding the acclimatization and cultivation of the species Passiflora incarnata L. in open field, under the conditions of the Republic of Moldova, the plant being native to subtropical and tropical areas. P. incarnata is commonly used as an herbal medicine, possessing sedative, spasmolytic, hypertensive, cardiotonic properties etc. The dry raw material productivity from field cultivation reached 3.6 t/ha from 2 cuts. About 2.7 t/ha pharmaceutical raw material and edible, delicious, fragrant fruits can be harvested at a single cut. After several years of testing, a high-performance form of the aforementioned species, with stable characteristics in terms of raw material, fruit and seed productivity, has been selected and after the DUS and VCU testing, we came to the conclusion that it can be proposed as a new cultivar, with high value for medicinal plant growers and pharmaceutical companies.

Key words: *species, sedative, production, raw material.*

ENHANCING AGROECOLOGICAL TRANSITIONS THROUGH LIVING LABS IN EASTERN EUROPE

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Abstract

Agroecological transitions are essential for sustainable farming in the face of climate change and biodiversity loss. Living Labs (LLs) serve as innovative, participatory platforms for co-developing, testing, and implementing agroecological solutions. This study explores the role of LLs in fostering agroecology through multi-stakeholder collaboration, knowledge exchange, and biodiversity-based farm practices. At the European level, initiatives like the ALL-Ready Project and the European R&I Partnership on Agroecology Living Labs emphasize LLs as tools for enhancing ecological resilience. In Romania, few case studies of organic farms and Core Organic initiative projects demonstrate LL potential in biodiversity conservation. Similarly, in Bulgaria, the ReForest Project in the Strandzha region and Integrated Pest Management (IPM) strategies illustrate LL contributions to sustainable farming. This study highlights the effectiveness of LLs as innovation ecosystems supporting agroecological transitions. The findings offer insights for policymakers, researchers, and practitioners aiming to scale agroecological practices through site-specific, real-life experimentation.

Key words*: agroecology, Living Labs, Integrated Pest Management, sustainable agriculture, Eastern Europe, biodiversity, agroforestry.*

HALOPHYTE BIOACTIVE COMPOUNDS: A REVIEW OF THEIR CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES

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Abstract

Halophyte plants, which thrive in saline environments (non-competitive agriculture areas), have garnered significant attention in recent years due to their potential as a rich source of bioactive compounds. These plants have evolved unique mechanisms to tolerate high salt concentrations, and in the process, they have accumulated a diverse array of secondary metabolites that are chemically and economically significant. Researchers have identified a wide range of bioactive compounds from halophytes, including phenolic compounds, terpenoids, alkaloids, and polysaccharides, each with their own distinct biological activities. These specialized metabolites often serve as osmoprotectants, antioxidants, and signalling molecules in the plants, conferring their characteristic resilience to high-salinity environments. This review synthesizes and examines the academic literature on secondary metabolites generated by halophyte plants.

Key words*: bioactive compounds, biological activities, halophytes, saline environments, secondary metabolites.*

THE ASSESSMENT OF HEAVY METAL BIOACCUMULATION IN PEPPER PLANTS (*Capsicum annuum*) CULTIVATED IN GREEN-HOUSE CONDITIONS, USING CONTAMINATED SOILS FROM THE INDUSTRIAL AREA OF COPȘA MICĂ

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Abstract

The study investigated the effects of cadmium, lead, zinc, and copper contamination on the bioaccumulation of heavy metals in pepper plants (Capsicum annuum L.). The experiment was conducted using soil materials contaminated with heavy metals, collected from 24 individual households in the Copșa Mică area, selected to ensure a large range of soil reactions and total heavy metal content. To evaluate the mobility and bioaccessibility of the metals, pepper seedlings (Capsicum annuum L.) were cultivated in green-house conditions. The mobility of metals were assessed by using two extraction methods:extraction with solution NH_4NO_3 (1M) for the easily exchangeable forms and DTPA-$CaCl_2$-TEA, for the bioavailable forms. Experimental data indicated a significant correlation between the cadmium and lead content in soil, in their bioavailable forms, and their content in edible parts of pepper plants. Cadmium demonstrated higher mobility and bioaccumulation compared to lead. The results showed that pepper plants have a relatively low capacity to bioaccumulate zinc and copper but can accumulate cadmium and lead under highly soil contamination conditions.

Key words*: bioaccumulation, heavy metals, soil contamination pepper.*

THE INTERESTING CASE OF PHOSPHORUS IN FOREST SOILS: A BIBLIOMETRIC REVIEW

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Abstract

Phosphorus is an essential element in soils. By using VOSviewer and Web of Science tools, we conducted a bibliometric analysis considering titles, and abstracts to identify the types of publications, the scientific fields they belong to, the years, the authors distributed by country, the publishing journals, and the keywords used. The results revealed the existence of 613 publications, of which 595 are articles in the priority fields of Environmental Sciences, Ecology, Forestry, and Soil Science, with an exponential increase in the number of articles published on this topic, especially in the last 10 years. A total of 201 authors were inventoried, with the top two countries being China and the USA. Journals where articles on this topic were published belong to the fields of soil science and forestry, but also include general journals; most articles were published in Forest Ecology and Management, Science of the Total Environment, and Forests. The most frequently used keywords were nitrogen, phosphorus, carbon, soil, and diversity, with an increased emphasis in the last 5 years on the implications of phosphorus in forest soils.

Key words*: publications, keywords, topic, journals, phosphorus.*

FROM FIELD TO FIELD: SUCCESSFUL USE IN PEST MANAGEMENT OF INDIGENOUS ENTOMOPATHOGENIC FUNGAL STRAINS FORMULATED AS EXPERIMENTAL BIOINSECTICIDES

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Abstract

Biological control using entomopathogens is a common practice in many Integrated Pest Management (IPM) programs. A strain of an entomopathogenic fungus, genetically identified as Beauveria bassiana, was isolated from a Colorado potato beetle adult (Leptinotarsa decemlineata) collected from a natural outbreak in a potato field. The fungal strain was formulated into a spore-based bioinsecticide and applied to the soil for the biological control of Colorado potato beetle larvae. The results highlight the potential of locally isolated entomopathogenic fungi for developing effective and sustainable pest management strategies in potato crops. This study emphasizes the importance of using beneficial microorganisms from local sources and demonstrates the insecticidal activity of the experimental product against the target pest, L. decemlineata.

Key words*: entomopathogenic fungi, biological control, Solanum, Beauveria.*

RECYCLING OF WASTEWATER FROM THE CULTIVATION OF *Spirulina platensis* THROUGH ITS USE AS A BIOSTIMULANT FOR THE GERMINATION OF *Phacelia tanacetifolia* Benth. (Melifera) SEEDS MAINTAINED IN COLLECTIONS

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Abstract

This article presents the experimental results obtained from the application of a biostimulant based on wastewater derived from the cultivation of the cyanobacterium Spirulina platensis in various concentrations, on the germination of Phacelia tanacetifolia (Melifera) seeds, maintained under collection conditions for 1 and 4 years. The results show that the seeds treated with biostimulants have a higher germination capacity compared to those in the control group, where germination ranged from 28-40%. The highest germination rates were obtained for the 1-year-old seeds (56%) treated for 1 hour with a biostimulant at a 2% concentration, while for the 4-year-old seeds (54%), the best results were recorded at a 1% concentration with a 1-hour treatment period. The application of the biostimulant contributed to the relative elongation of the root system of the studied culture. Based on the conducted research, we can conclude that the application of the investigated biostimulant has the effect of stimulating seed germination and root elongation in seedlings, which provides grounds to consider that it demonstrates a positive effect and could be practically applied.

Key words*: wastewater, biostimulator, Spirulina platensis, Phacelia tanacetifolia (Melifera).*

DYNAMICS OF THE MOTOR MECHANISM OF INTERNAL COMBUSTION ENGINES

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Abstract

Engines that equip self-propelled tractors and combines are diesel engines. These engines have a construction adapted to working over a wide range of speeds and powers. This ensures the operation of all agricultural machines. However, the areas of economic use are more restricted, which is why agricultural aggregates should be properly made up and exploited to fit into them. The tractor engine is used at maximum speed regime when it has maximum power requests or when operating machines is also necessary from the independent power source. The studies in this work were carried out on a D-110 Diesel engine, an engine that equips the U-650M tractor. Studies refer to the dynamics of the motor mechanism. The parts of the engine mechanism studied were: the cylinder, the piston, the piston bolt, the connecting rod, the crankshaft, and the steering wheel. In each of these parts, the size and weight were measured. For the calculation of the operating indices of the D-110 engine, measurements were made on a stand to try and roll internal combustion engines.

Key words*: diesel engine, agricultural machines, tractor, cylinder, bolt, piston.*

FIELD PEA AND ITS IMPORTANCE FOR A SUSTAINABLE AGRICULTURE AND BETTER FOOD SYSTEMS

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Abstract

The cultivation of peas (Pisum sativum) presents a promising opportunity for promoting sustainable agriculture and ensuring food security in the face of contemporary challenges. This leguminous plant (Fabaceae family), plays a crucial role in the process of nitrogen fixation in the soil, significantly enhancing its fertility while simultaneously reducing dependence on synthetic fertilizers. Within a global context characterized by food insecurity, driven by climate change and market fluctuations, there is an urgent need to promote less conventional crops that possess significant agronomic potential. This article aims to consolidate the numerous advantages offered by pea cultivation, including its origins, relevance, and adaptability to various agro-climatic conditions. Moreover, it will highlight the high nutritional value of peas, alongside their potential to address increasingly urgent global challenges, such as the need to produce sustainable and healthy food for a constantly growing population. In this regard, peas are not only emerging as an important agricultural crop but also as a key pillar in the sustainable food strategy.

Key words*: pea, sustainable, agriculture, food security.*

SURVIVAL RATE OF OAK (*Quercus* L.) SEEDLINGS IN AN AGROFORESTRY SYSTEM ESTABLISH IN HORTINOVA NURSERY (CÂRCEA, DOLJ COUNTY)

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Abstract

Agroforestry systems play a crucial role in mitigating the impacts of climate change, particularly in vulnerable regions like southeastern Romania, where drought poses a significant challenge to young forest stands. In 2023, twenty 24 m x 24 m plots were established, incorporating a mix of forest species and agricultural crops. Of these, 9 plots included four oak species, namely pedunculate oak (Quercus robur L.), red oak (Q. rubra L.), Turkey oak (Q. cerris L.), and sessile oak [Q. petraea (Matt.) Liebl.], as key tree species in an agroforestry experiment located in Cârcea, near Craiova, Dolj County. This study aimed to evaluate the survival rate of the planted oak seedlings. Additionally, climatic data (temperature, relative humidity and precipitation) were gathered using six HoBo sensors (Onset Computer Corporation) and one iMETOS 3.3 data logger. Soil analyses were done at Dolj Office of Pedological and Agrochemical Studies. The findings further highlight the significance of integrating oak species into agroforestry systems in southeastern Romania.

Key words*: agroforestry systems, Craiova, Dolj, oak, Quercus.*

THE MELLIFEROUS POTENTIAL AND PROSPECT OF VALORIZATION OF WASTE BIOMASS OF *Coriandrum sativum, Salvia hispanica and Lavandula angustifolia* FOR RENEWABLE ENERGY

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Abstract

We investigated some biological peculiarities of Coriandrum sativum, Salvia hispanica and Lavandula angustifolia. It was established the studied plant species is characterized by an extended flowering period, providing food for bees from June to mid-August, with a honey potential of 60-330 kg/ha. The analysis of lignocellulose composition of collected waste biomass - dry stalks suggested that dry matter contained 357-504 g/kg cellulose, 197-248 g/kg hemicellulose, 72-135 g/kg acid detergent lignin and estimated theoretical ethanol yield from cell wall carbohydrates varied from 398 to 533 L/t. The physical and mechanical properties of dry stalks biomass from studied plant species was 3.36-4.48% ash, 73.17-79.39% volatile matter, 17.19-19.83 MJ/kg HHV, 15.86-18.46 MJ/kg LHV and can serve as feedstock for production solid densified fuel-pellets for renewable energy production.

Key words*: biomass, Coriandrum sativum, Lavandula angustifolia, melliferous potential, Salvia hispanica, solid densified fuel-pellets, theoretical ethanol yield.*

CARABID BEETLES AS ENTOMOPATHOGENIC VECTORS: A REVIEW OF THEIR ECOLOGICAL ROLE AND POTENTIAL APPLICATIONS

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Abstract

As predators of phytophagous insects and potential vectors of pathogens, ground beetles (Carabidae) are vital in agroecosystems. In this work, their interaction with entomopathogenic fungi and bacteria is presented to highlight the dual role of ground beetles as biocontrol agents and pathogen vectors. This includes understanding how disease propagation and dispersion in multitrophic complexes interact with parasitism, predation, and competition. Integrated pest management (IPM) strategies that consider the potential of ground beetles are evaluated in terms of their ability to enhance biological control methods. The current state of knowledge regarding the long-term ecological consequences and the function of these strategies as vectors of organisms, however, limits their scope. This work underscores the necessity of understanding multitrophic interactions to inform the integration of ground beetles into pest control strategies.

Key words*: Carabidae, biological control, entomopathogens, multitrophic, IPM.*

TRACKING THE PERCENTAGE OF SEED GERMINATION WHEN THE BASIS FOR THE SPROUTS IS PURE COMPOST AND COMPOST WITH ADDITIVES

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Abstract

The present study aimed to monitor the germination percentage of radishes and spinach in compost mass in pure form and with additives. Six variants and one control (V0) were prepared: V1- lavender extract, V2- thyme extract, V3- basil extract, V4-mix, V5-microbial fertilizer, V6-mineral fertilizer, V7-Min. + microbial fertilizer for each of the studied crops - a total of 14 samples. An initial reading of the microbial community was carried out after the introduction of the additives and immediately before planting the seeds and then at day 5, day 10 and day 15. The temperature, humidity and pH of the samples were measured. The two considered crops give different germination percentages of the different variants. Spinach seeds generally had difficulty germinating and produced fewer sprouts than radishes. The best results for germination and survival of the sprouts were obtained for the spinach in the control and in the variant with mineral fertilizer and the variant with basil. For the radishes, the best germination was shown by the control and by the variants with microbial fertilizer, the variant with microbial and mineral fertilizer.

Key words*: microorganisms, compost, germination.*

HARMFUL AND BENEFICIAL FAUNA ASSOCIATED WITH MEDICINAL AND AROMATIC PLANTS

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Abstract

Our country has a wide variety of wild medicinal and aromatic plants and very good conditions for their cultivation. Due to the diversity of active principles they contain, they represent an impressive source of plant material for medicinal, food and other uses, being a significant natural resource and an important part of our cultural and scientific heritage. Most medicinal and aromatic plants are entomophilous, their reproduction depending on pollinating insects. This paper presents the harmful and beneficial species associated with medicinal and aromatic plants, present in the didactic collection of USAMV Bucharest, in the period 2023-2024. Species belonging to the classes Arachnida, Insecta, Gastropoda, Amphibia and Reptilia were identified. Species such as Rhopalapion longirostre Olivier, Nezara viridula L., Chrysolina coerulans Scriba, Agapanthia cynarae Germar, Pegomya terebrans Rondani and Aphis spp. showed a significant attack on host plants. Beneficial fauna was also identified and evaluated.

Key words*: medicinal plants, aromatic plants, host plants, harmful fauna, beneficial fauna.*

THE EVALUATION OF THE BIOMASS QUALITY OF *Lolium perenne* 'MĂGURA'AND *Phleum pratense* 'TIROM' GROWN UNDER THE CONDITIONS OF MOLDOVA

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Abstract

The main goal of this research was to evaluate the quality indices of the harvested green mass from the perennial grasses Lolium perenne 'Măgura' and Phleum pratense 'Tirom' maintained in monoculture in the experimental plot of the NBGI MSU Chişinău. It was established that the biochemical composition and the nutritional value of the dry matter of the harvested green mass from the investigated perennial grasses were characterized by the following indices: 86-95 g/kg CP, 97-111 g/kg ash, 336-391 g/kg CF, 35.5-41.7 g/kg ADF, 633-734 g/kg NDF, 22-26 g/kg ADL, 65-181g/kg TSS, 9.22-9.92 MJ/kg metabolizable energy and 5.24-5.95 MJ/kg net energy for lactation. The studied green mass substrates for biogas production contained 33.3-39.1% Cel, 27.8-31.7% HC, carbon nitrogen ratio C/N= 32-36 and the estimated biochemical biomethane potential lwere 324-339 L/kg DM. *The Romanian cultivars of perennial grasses: Lolium perenne 'Măgura' and Phleum pratense 'Tirom' are multi-purpose crops, which may be used as natural forage for farm animals and as substrates for biogas production facilities in Moldova.*

Key words: *biochemical biomethane potential, biochemical composition, green mass, Lolium perenne 'Măgura', nutritional value, Phleum pretense 'Tirom'.*

EFFECTIVE INSECTICIDE APPLICATION TO PREVENT ECONOMIC LOSSES FOR UKRAINE CAUSED BY WESTERN CORN ROOTWORM (*Diabrotica virgifera virgifera* Le Conte) SPREADING

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Abstract

The first individuals of western corn rootworms (Diabrotica virgifera virgifera Le Conte) were noticed in the border zone of Transcarpathia region in 2001. These insect pests had inhabited only two regions of the country for a long period of time. However, the gradual spread of Diabrotica species from the places of the first detection to the South and West of Ukraine has been noticed recently. The main aim of the research is to study the spreading tendency of the western corn rootworms (WCR) in the Ukrainian forest-steppe zone and to create the preventative system for identifying insect pest localization and extermination. According to the research results, it has been determined that the population of insect pests is increasing every year. There is a plant-feeding insect adaptation due to corn cultivation increase, poor crop rotation and climate change. The research priority and relevance has been done on the basis of the interest in insect pest identification, studying of their biological spread peculiarities under the consideration of modern conditions and improving of the insect pest control preventative methods.

Key words*: Diabrotica, crop rotation, insect, effective insecticide.*

ROMANIAN FARMERS PERCEPTION ABOUT POLLINATORS IMPORTANCE

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Abstract

To analyses the perception of Romanian farmers about the importance of pollinators, a study based on personal interviews was conducted in the year 2024. The survey contained two sections with various questions. A total of 100 farmers (small and big) specialized in technical rapeseed and sunflower crops were selected from various counties of Romania. The farmers showed interest in pollinators; over 90% of respondents considered pollinating insects to be essential for their crops. Over 40% of respondents believed that the yield of rapeseed and sunflower crops depends not only on the cultivation technology used, but also on pollinators. Almost 40% of respondents believed that pollinators are in decline. They perceive the impact of the biodiversity decline on pollinators from their farms, having a positive attitude towards the idea of pollinator conservation, but these perceptions do not necessarily imply conservation actions on their part. Among big farmers, it was observed that majority of the farmers perceive the honey bees to be the principal insects for the pollination activity. They rated intensification of agriculture as the major driving force behind farmland pollinators declines. The good perception of big farmers on importance of pollination could change the view of small farmers through the example power, considered to be the safest form of education.

Key words*: farmer, pollinators, biodiversity, oil crops.*

BIOACTIVE POTENTIAL OF SPENT *Rosa damascena* Mill. PETALS EXTRACT: ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES

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Abstract

The rose petal from Rosa damascena Mill. are often associated as a source of compounds with antioxidant activity and antimicrobial properties. The rose oil-bearing industry is generating enormous quantities of by-products with a potential to become part of the circular economy. Therefore, we aimed to produce an extract from the spent rose petals (SRPE) by-water: ethanol (70:30) extraction, followed by concentration and freeze drying. The phenolic profile evaluated by HPLC showed a presence of Gallic, Protocatechuic, p-Coumaric acids and Rutin. Also, the organic acid such as Ascorbic, Malic, Tartaric and Oxalic were found. The obtained extract exhibited a strong antioxidant activity evaluated by the radical scavenging activity against DPPH and ABTS radicals, metal chelating capacity against transition metal and oxygen and hydroxyl radical absorbance capacity (ORAC and HORAC). In addition to antioxidant activity, the extract manifested an antimicrobial activity against most of the pathogens responsible for food poisoning. The minimum inhibitory concentrations of rose extract for yoghurt and probiotic starter cultures were evaluated.

Key words*: by-product, rose extract, antioxidant activity, MIC yoghurt starter culture, MIC probiotic starter culture.*

EVALUATION OF THE INHIBITORY EFFECT OF ESSENTIAL OILS AGAINST *Fusarium sporotrichioides* ISOLATED FOR THE FIRST TIME FROM STRAWBERRY PLANTS IN ROMANIA

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Abstract

This study evaluated the in vitro inhibitory effects of essential oils (EO) on Fusarium sporotrichioides isolated for the first time from strawberry plants in Romania. Oregano and cinnamon EO exhibited strong and consistent inhibitory activity, achieving complete fungal inhibition at both high (500 and 1000 µl/l) and moderate (125 µl/l for oregano and 250 µl/l for cinnamon) dosed. Clove EO revealed to be effective only in higher doses (500 and 1000 µl/l) and showed reduced efficacy at lower dosage (35-125 µl/l) compared to oregano and cinnamon EO. In contrast, lemon, mint, and tea tree EO demonstrated limited and inconsistent fungal inhibition. Lemon EO intensified mycelial pigmentation without affecting the growth. Mint EO reduced the mycelial density but did not hinder radial expansion, while tea tree oil had minimal inhibitory impact, with only 17.96% inhibition at 1000 µl/l after 6 days of incubation. These findings highlight the potential use of some specific EO to control F. sporotrichioides, as oregano and cinnamon EO showed high fungal inhibitory efficacy, even at lower doses.

Key words*: biocontrol, essential oils, fungal inhibition, Fusarium sporotrichioides, strawberry.*

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

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Abstract

Depending on pedoclimatic and operational conditions, different situations may arise regarding the coverage of soils occupied by grasslands with mounds, stones, low-value vegetation, manure, etc. Based on the degree of coverage with mounds, low-value herbaceous and woody vegetation, manure, etc. and the size of these elements, different technological variants are selected for mechanizing the operations of clearing mounds, removing manure, leveling micro-relief, aerating, and fertilizing the soils occupied by grasslands. This paper presents the results of experimental research conducted under operational conditions of technical equipment designed for clearing mounds and fertilizing grassland soils. The experimental results obtained in this study are used to optimize the working process, aiming to surpass the performance of existing equipment in the same category. The goal is to provide farmers with access to technical equipment that meets the requirements for adapting techniques and technologies for the rational utilization of grasslands in the context of global and regional climate change.

Key words*: clearing weeds, fertilizing soils, grasslands.*

EXPERIMENTAL RESEARCH FOR PROMOTING A TECHNICAL EQUIPMENT FOR NARROW STRIP TILLAGE AND DIRECT SEEDING IN THE GRASS COVER OF A GRASS MIXTURE

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Abstract

Considering the imperative of improving the quality of life in the long term and under the pressure of increasing consumer demands for plant and animal agricultural products, there are scientific concerns in Western Europe and developed countries on other continents regarding rational grassland utilization technology. This paper presents the results of experimental research conducted under operational conditions on grassland quality restoration technology in the context of climate change, through narrow strip tillage and direct seeding into the grass cover of a grass mixture or even a single species, while preserving the existing vegetation entirely or to a certain extent.

Key words*: tillage, direct seeding, meadows.*

METHODS FOR DETERMINING PROTEINS AND AMINO ACIDS AND THE IMPORTANCE OF THEIR USE FOR IDENTIFYING SUSTAINABLE SOURCES OF DIETARY PROTEINS. A REVIEW

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Abstract

The aimed of this review is to highlight the importance of sustainable vegetarian protein sources in a world with a growing population in which dietary principles have also changed. This involves using sustainable non-animal protein sources. Nevertheless, the quantification of the nutritional quality of food sources also involves the normalization of the essential amino acid content with the protein content. For this, new methods for the determination and analysis of proteins individually or simultaneously with amino acids are needed, with possible advantages such as being simple, inexpensive, fast and accurate, etc. In this review, we try to summarize the benefits of a sustainable vegetarian diet (rich source of proteins), but also the importance of the continued development of simpler and faster methods to determine protein quality and content. The use of spectrophotometric methods for the measurement and analysis of proteins is of major interest, as they are generally simple, fast and with high sensitivity, as well as the adaptation of traditional methods such as the traditional biuret reagent.

Key words*: protein, amino acids, sustainable sources, vegetarian diet.*

PARTICULARITIES REGARDING THE TENDING OPERATIONS IN FOREST SHELTERBELTS

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Abstract

In order to optimize the ecological and economic functions that forest shelterbelts perform, it is necessary to carry out appropriate maintenance work, through which certain trees are extracted and their density is reduced. In this regard, tending operations were carried out in forest shelterbelts with different compositions and ages to ensure sufficient and as uniform space as possible for the growth of the remaining trees. This spacing of the trees has an influence on the growth and quality of the trees but also on the resistance to disruptive climatic factors and implicitly on the protective functions they perform. The gradual and periodic reduction of the number of trees corresponding to the age and stage of development of the shelterbelts is carried out according to the principles adopted in forestry, mainly applying negative selective thinning, namely the extraction of small, poorly formed, injured, diseased, and dry trees. However, unlike stands, care will be taken to ensure that the extractions carried out do not affect the semi-penetrability of the forest shelterbelts, which must perform specific functions. By experimenting with different degrees of thinning, the aim is to establish an optimal density, through which the forest shelterbelts can exercise their protective functions, and the equilibrium state of this agroforestry system is not affected.

Key words*: forest shelterbelts, tending operations, cleaning, thinning, agroforestry system.*

METHODOLOGY AND EVALUATION CRITERIA OF THE CONSERVATION STATUS OF GRASSLAND HABITATS OF COMMUNITY INTEREST IN ROMANIA

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Abstract

For Romanian natural or semi-natural grassland habitat of Community interest assessed in all five terrestrial bioregions, the conservation status assessment activities were carried out based on the objectives of the EU Biodiversity Strategy for 2030, which is part of the European Green Deal. In our study we developed methods and used multicriteria analysis for all 2114 plots installed in 15 types of grassland habitats from the Natura 2000 sites of Community interests from Romania. In the studies conducted in the last five years, we evaluated the specific intensity of the pressures, followed by the estimation of the intensity of threats, affecting both the target habitats and their characteristic species. In order to compare the general trend of the conservation status in a biogeographic region, we established the trends within the Natura 2000 network. We realized the assessment matrix that uses information about the magnitude of short-term trends to assess the conservation status. Only stable or increasing trends can lead to a general conclusion regarding the favourable conservation status of the analysed habitat. Romania needs to effectively implement conservation measures for grasslands habitats.

Key words*: methodology, conservations status, grasslands habitats, community interest, Romania.*

CONTRIBUTIONS TO THE STUDY OF *Arrhenatherum elatius* (L.) P. Beauv. ex J. Presl & C. Presl GRASSLANDS FROM THE ORHEI NATIONAL PARK (REPUBLIC OF MOLDOVA)

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Abstract

The present paper makes new contributions to the geobotanical and agroproductive knowledge of grasslands in Orhei National Park (Republic of Moldova). The research was carried out during 2021-2023 on a grassland of Arrhenatherum elatius identified in the village of Neculaeuca, Orhei district. The floristic and phytocenotic composition was determined on the basis of the research, the pastoral value, hay production and quality were determined. About 80 species of vascular plants were identified in the floristic composition of the grassland, and the described phytocenoses fall into the association Pastinaco - Arrhenatheretum elatioris Passarge 1964. The plant cover consists of good forage plant species, which makes the grassland profitable. The average hay yield is 4.85 t/ha. In addition to fodder species, the vegetation cover contains species of medicinal, honey and culinary value, which further enhances the importance of this grassland. The presence of decorative plant species provides important landscape and aesthetic functions. At European level, Arrhenhenatherum elatius grasslands are of conservation interest, being included in Annex I of the Habitats Directive 92/43 EEC.

Key words*: grasslands, Arrhenatherum elatius, Orhei National Park.*

POTENTIAL HABITAT PREDICTION FOR THE CURRENT DISTRIBUTION OF *Tozzia alpina* subsp. *carpathica* IN THE ROMANIAN CARPATHIANS

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Abstract

Tozzia alpina subsp. carpathica is a rare semiparasitic plant that faces significant conservation concerns within its native range in the Carpathian Mountains of Romania. Currently classified as data deficient on the IUCN Red List, this species requires accurate habitat prediction to guide effective conservation strategies and deepen our understanding of the factors shaping its distribution. The conservation status assessment, conducted under Article 17 of the Habitats Directive, relies on presence points within 10x10 km squares. However, current estimates require a robust distribution model to assess habitat extent accurately. This plant is typically found in small patches within wet meadows and tall hydrophilous vegetation along springs and rivers in the alpine bioregion, making it vulnerable to land use and resource exploitation. Therefore, developing models to predict the habitat distribution is a priority. We employed the Maximum Entropy modeling approach to address this need and predict suitable habitats, utilizing species occurrence data in conjunction with environmental variables. This modeling method provides valuable insights for identifying areas to evaluate in the upcoming reporting period under the Habitats Directive, significantly enhancing conservation efforts.

Key words*: Carpathians, conservation, distribution, Maximum Entropy modelling, Tozzia alpina subsp. Carpathica.*

STRUCTURAL AND FLORISTIC DIVERSITY OF THE SHRUBLANDS VEGETATION IN THE CĂPĂȚÂNII MOUNTAINS, ROMANIAN CARPATHIANS

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Abstract

The surveys have been carried out in the Căpățânii Mountains, part of the Southern Carpathians, in Romania. In the last 3 decades, the issues of species diversity in shrub vegetation in relation to the evolution, stability and maturity of natural ecosystems have been a priority from an ecological, phytocoenotic and conservation point of view. These shrublands plant communities have some of the greatest plant diversity, characterized by their floristic richness, but which has recently been significantly reduced as a result of a relatively rapid evolution, being under stress from drought, fire, grazing and cutting. In the lower mountain sub-zone, some shrublands plant communities occur, such as: Spiraeo chamaedrifolii-Coryletum avellanae Ujv. 1944. Pinus mugo develops here scrubs between 1,700 and 2,100 m. We found such types of shrublands in the subalpine area, the upper limit of spruces on gentle slopes but also on steep slopes. Alongside these, other shrubby plant communities are also found, which settle on rocky substrates, at the edge of forests or meadows, all of which have an ecological, pedological and conservative role.

Key words*: Căpățânii Mountains, structural diversity, plant communities, habitats, scrublands.*

REGENERATION DYNAMICS OF THE BEECH FOREST IN THE UPPER BASIN OF THE NAIBA VALLEY, GODEANU MOUNTAINS

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Abstract

The imbalances produced by climate change, wind blows, excessive drought, increasingly high temperatures, excessive drought, the lack of precipitation or their decreasing amount can greatly affect the synchrony of regeneration and, therefore, the stability of beech forests in Romania and around the world. Studies on the dynamics of regeneration of beech stands are based research regarding: the structure of the stand, the dynamics of the tree population, the characteristics of gap formation, the distribution and characteristics of the shrub layer the vitality of the individuals within the analyzed beech populations, the distribution and characteristics of the seed. In order for natural regeneration to take place in the seedbed, it is necessary to have enough mature trees, able to bear fruit abundantly and seed the entire surface. Following the research carried out in Naiba Valley, it was found that there are favorable conditions for the natural regeneration of the beech groves and the dynamics of the regeneration is good in relation to the current eco-pedo-climatic conditions due to appropriate and adapted conservation measures in this area.

Key words*: beech forest, Naiba Valley, regeneration, dynamics, plant community.*

STUDIES REGARDING THE POTENTIAL APPLICATIONS OF BIOPRODUCTS DERIVED FROM *Origanum majorana* IN AGRICULTURE

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Abstract

Marjoram (Origanum majorana) is a versatile plant widely recognised for its use as a spice in the food industry and its significance in traditional medicine. However, its potential for agricultural applications remains underexplored. This study aims to detail methods for obtaining such bioproducts and to evaluate their biological activities. The findings underscore the potential of marjoram as a raw material for developing ecological pesticides. These bioproducts could play a significant role in organic farming by effectively targeting phytopathogenic fungi (Verticillium dahliae, Fusarium verticilliodies, Fusarium graminearum, Botrytis cinerea, Rhizoctonia solani), weeds (Thlaspi arvense, Amaranthus retroflexus), and insects (Spodoptera littoralis; Aphis fabae).

Key words*: Origanum majorana bioproducts, phytopathogens, insecticidal properties, weeds.*

EVALUATION OF VIRUS DIVERSITY IN TRADITIONAL BOSNIAN-HERZEGOVINIAN APPLE CULTIVARS

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Abstract

Apples (Malus domestica L.), although second in production to plums, represent a commercially important fruit crop in Bosnia and Herzegovina. The geographical location and therefore diverse environment, combined with the complex historical background of the country, most likely influenced the great diversity of apple germplasm in the country. Due to an extensive effort from scientists ex-situ collections were established and the traditional apple germplasm of Bosnia and Herzegovina is now well agronomically and genetically characterized. Since the establishment of the collections, no assessment of the phytosanitary status of the trees have been conducted. In this study, we aimed at assessing the viral diversity of traditional apple cultivars from two ex situ orchards and present in this paper the first findings. In total, 41 traditional apple cultivars were analysed using high-throughput sequencing technology combined with conformation testing using standardised PCR protocols for the identified viruses. The obtained virus sequences were subjected to phylogenetic analysis.

Key words*: high-troughput sequencing, phylogenetic analysis, apples, viruses.*

THE INHIBITORY EFFECT OF LAVENDER COMPOST EXTRACTS ON VARIOUS PATHOGENS

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Abstract

Different types of composts have gained attention for their potential applications in sustainable agriculture and for their inhibitory effects against various plant pathogens. This study investigates the suppressive effects of lavender compost extracts on common plant and soil pathogens and evaluates the composts' microbial composition. Pathogenic fungi, including Sclerotinia sclerotiorum, Fusarium oxysporum, Botrytis cinerea, and Alternaria alternata, were subjected to in vitro assays with varying concentrations of the extracts. The results revealed inhibitory effects due to compost microbiota; several fungal genera (Aspergillus, Penicillium, Trichoderma) and bacteria were detected. Microbial analysis of the compost extracts indicated the presence of beneficial microorganisms, such as Trichoderma spp., which may contribute to plant pathogen suppression. These findings suggest that lavender compost extracts can be a natural, eco-friendly alternative for managing plant pathogens and promoting sustainable agricultural practices. Further studies regarding the mechanisms underlying their biocontrol properties are recommended.

Key words*: lavender compost, plant pathogen suppression.*

ROLE ON THE PRODUCTIVITY AND NUTRACEUTICAL PROPERTIES OF CORN BY NITROGEN-FIXING AND PHOSPHORUS-SOLUBILIZING COMPONENT OF THE SOIL MICROBIOME

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Abstract

This study evaluates the impact of nitrogen-fixing and phosphorus-solubilizing bacteria (Azotobacter vinelandii, Azotobacter chrococcum, Bacillus megaterium) and biostimulants on the productivity and nutraceutical properties of waxy corn (Zea mays). Conducted in 2024 at the University of Life Sciences `King Michael I of Romania` in Timişoara, the field experiment involved sowing corn on May 15, with bacterial treatments applied on June 6 and July 4. The results showed that microbial treatments significantly improved germination, yield, and nutraceutical properties. Among the treatments, Azotobacter vinelandii had the greatest impact, enhancing germination rates, yield, and antioxidant activity, vitamin E levels and magnesium content compared to the control group. Biostimulant applications, particularly at higher doses, resulted in moderate improvements, though microbial treatments were more effective. Compared to a similar study conducted in 2023, Azotobacter vinelandii outperformed its prior results, achieving higher productivity and better crop quality under optimized conditions. These findings underscore the potential of microbial inoculants and biostimulants to enhance crop performance while promoting sustainable agriculture. Their integration into farming practices can reduce reliance on chemical inputs and support environmentally friendly approaches.

Key words*: Waxy corn, nutraceutical properties, nitrogen-fixing bacteria, phosphorus-solubilizing bacteria, antioxidants, vitamins, sustainable agriculture, biostimulants.*

EVALUATION OF THE PRODUCTIVITY OF PERMANENT MESOPHILIC GRASSLANDS FROM CODRU-MOMA MOUNTAINS (NW ROMANIA)

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Abstract

The paper presents a case study for evaluating the productivity of permanent grasslands of Festuco rubrae-Agrostetum capillaris Horvat 1951, Trifolio-Lolietum perennis Krippelová 1967, Anthoxantho-Agrostetum capillaris Sillinger 1933 and Nardo-Festucetum rubrae fallax Puşcaru et al. 1959, from Codru-Moma Mountains, based on floristic relevées. Following the floristic study and the assessment of the participation weight of the component species in each type of grassland, the production of green mass and animal load was determined for each type of grassland studied. Among the studied plant associations, the highest productivity was found in Trifolio-Lolietum perennis Krippelová 1967, with productions of 18.15 t/ha of green mass and a capacity of 1.59 livestock/ha, Festuco rubrae-Agrostetum capillaris Horvat 1951 with productions of 11.64 t/ha of green mass and a capacity of 1.02 livestock/ha loading with animals. The lowest productions were evaluated in the grasslands of Nardo-Festucetum rubrae fallax Puşcaru et al. 1959, with productions of 3.86 t/ha of green mass and a capacity of 0.37 livestock/ha. The data provided by the present study are useful in characterizing the pastoral quality of these grasslands in the context of the improvement and rational use of the pastoral fund.

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

RESULTS REGARDING THE CONTROL OF THE PATHOGEN *Erisiphe pisi* (de Candolle) IN THE PEA CROP UNDER THE CONDITIONS AT ARDS PITEȘTI-ALBOTA

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Abstract

Erisiphe pisi (de Candolle) is the pathogen that causes powdery mildew in peas, one of the most important fungal diseases. The objective of the research was to estimate the level of the powdery mildew attack in the Alvesta and Nicoleta pea genotypes, under the experimental conditions at ARDS Pitesti-Albota, in the period 2023-2024. The effect of azoxystrobin and azoxystrobin + difenoconazole molecules in controlling the pathogen was determined. The frequency (F %), intensity (I %), degree of attack (G.A %) of the disease and effectiveness (E %) of the treatments were calculated. The results showed that the azoxystrobin + difenoconazole variant had the lowest attack degree 1.47%, followed by the azoxystrobin variant with 2.26% in the Alvesta genotype. In the Nicoleta variety, higher values of the degree of attack were recorded compared to the Alvesta variety. The effectiveness had the highest value, of 82.92%, when applying the azoxystrobin + difenoconazole treatment, for the Alvesta genotype.

Key words*. Erisiphe pisi, pea, attack degree, variety, disease, effectiveness.*

PERFORMANCE AND QUALITY OF HEMP MICROGREENS UNDER SUBSTRATE AND WATERING CONDITIONS

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Abstract

Microgreens are a sustainable and innovative food source, highly valued for their nutritional content, short cultivation time, and potential to address global food security challenges. The experiment was conducted in 2024 in a controlled environment growth chamber using monoecious hemp seeds. It evaluated the effects of three substrates (perlite, peat and vermicompost) and two types of watering (distilled water and water from a recirculating aquaculture system – RAS water) on the biometric traits, yield, and nutritional quality of hemp microgreens. The results showed that the Peat x RAS water variant produced the highest fresh matter yield (12.75 g/100 cm²) and the largest leaf area index (LAI – 332.25 cm²/100 cm²), as well as the highest protein content (23.72%). The Vermicompost x distilled water combination resulted in the highest total fiber content (18.62%), while the Perlite x distilled water variant had the highest content of total soluble solids (7.2°BX). These findings highlight the essential role of substrate and watering in optimizing biometry, yield, and nutritional properties, further establishing hemp microgreens as a sustainable and innovative choice for modern diets.

Key words*: hemp microgreens, biometric traits, matter yield, nutritional quality.*

ASSESSMENT OF ANTIFUNGAL AND ANTIBACTERIAL ACTIVITY OF CINNAMON AND CLOVE ESSENTIAL OILS

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Abstract

The present research paper aims to evaluate the antifungal and antibacterial activity of two essential oils, cinnamon essential oil (Cinnamomum zeylanicum) and clove essential oil (Eugenia caryophyllata) on three fungal strains (Aspergillus brasiliensis, Botrytis cinerea, Penicillium expansum) and one bacteria strain (Bacillus subtilis). The studied essential oils (EOs) are used in the food industry as bioactive compounds and are known to have antimicrobial activity on the growth of some bacteria strains as well as several fungal strains. The trend worldwide is to develop novel and healthy methods used to prologue the shelf-life of food products that are naturally spoiled by different types of microorganismsn thus EOs are a perfect solution in potentially solving this problem. The major problem that occurs with the use of EOs as natural preservatives used to prolong the shelf life of different food products is that in high concentrations they affect the sensory qualities. Also, the EOs have several limitations like variability in efficacy, stability issues, low water solubility and regulatory challenges. The results showed that the minimum inhibitory concentration (MIC) values ranged between 10µl and 50µl. The results suggest that both EOs could be used as potential natural alternatives that may lead to the growth inhibition of some microorganism's strains, thus prolonging the shelf life of food.

Key words*: antimicrobial activity, bioactive compounds, food safety, shelf life.*

RESEARCH ON THE MANAGEMENT OF CARBON DIOXIDE EMISSIONS AND SEQUESTRATION BY DIFFERENT CROPS, DEPENDING ON THE AGRICULTURAL TECHNOLOGIES APPLIED

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Abstract

The carbon footprint calculation was carried out based on the technological data of each crop sown 2023 and 2024 in 3 farms: Terra Nostra Farm Băileşti – organic technology, Trăistaru Farm Băileşti – conventional technology and Sonnenhof Farm Wolpertshausen – Germany – Demeter organic technology. At Terra Nostra Farm, the calculation was carried out for corn, wheat, soybean and alfalfa crops. At Trăistaru Farm, corn, wheat and sunflower crops were analyzed. Lentil + camelina, spelt wheat, mustard, coriander, alfalfa crops were studied at the Farm in Germany. The carbon emitted through works and inputs from the crops at the Farm in Germany were grouped as follows: lentils + camelina, eco mustard, coriander – values around 500 kg CO_2/ha and eco spelt and eco alfalfa – values around 1000 kg CO_2/ha. There were no differences in the carbon sequestered by corn depending on the technology applied. In wheat, a yield of 3000 kg/ha obtained at the Terra Nostra Farm sequestered a much smaller amount of carbon than the 5500-6000 kg/ha yields from the German Farm.

Key words*: carbon footprint; conventional technology; organic technology Demeter; carbon dioxide emissions; carbon sequestered.*

WASTE FROM THE WINE AND ETHYL ALCOHOL PRODUCTION INDUSTRY - AN IMPORTANT SOURCE FOR INCREASING SOIL FERTILITY AND CROP PRODUCTIVITY

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Abstract

The Republic of Moldova generate approximately 100 thousand tons of wastes each year. These contains 28 thousand tons of organic matter, 180 tons of nitrogen, 82 tons of phosphorus and 257 tons of potassium. Fertilization with waste from the production of alcoholic beverages led to a significant increase in the content of organic matter by 0.17-0.41%, nitric nitrogen - 0.45-5.80 mg/kg, mobile phosphorus - 0.22-0.68 mg/100 g and exchangeable potassium by 7-16 mg/100 g of soil. The application of solid wine yeasts ensures a significant increase in grape (Sauvignon) production on average over eight years of 1.4-2.4 t/ha. The average harvest increase when incorporating vinasse over eight years was 1.0-1.1 t/ha. The cereal mash applied to the soil determined the achievement of average increases in plant production over ten years of 1.100-1.700 kg/ha cereal units or 50-65% compared to the unfertilized variant. Based on the research, innovative technologies for the valorisation of waste from the production of alcoholic beverages as local organic fertilizers are developed.

Key words*: grapevine, field crops, solid wine lees, vinasse, grain mash.*

GLIMPSES INTO THE BIODIVERSITY OF SFÂNTU GHEORGHE, TULCEA COUNTY

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Abstract

A field trip carried out in July 2023 reveales some aspects of natural biodiversity in Sfântu Gheorghe, a locality from Tulcea County placed in the Danube Delta Biosphere Reserve. During the observation period, the following fish species were noticed at the shore of the Black Sea: Abramis brama, Callionymus risso, Cyprinus carpio, Esox lucius, Engraulis encrasicolus, Gymnammodytes cicerelus, Ophidion rochei, Pomatoschistus minutus and Trachurus mediterraneus. Of them, only for four species were given data upon the total length (cm) and total weight (grams), taking into account the number of specimens and the quality of preservation. Among the invertebrates gathered from the vegetation, were registered: gastropods (Cepaea hortensis, Helicella sp., Planorbarius corneus), spiders (Agelena sp., Araneus diadematus, Argiope bruennichi, Cheiracanthium sp., Tetragnatha sp.) and insects, mainly from Orthoptera order. In addition, the preliminary study of the coastal flora of the Sfântu Gheorghe indicated a total of 74 plant species, belonging to a number of 37 families. Some of the species are included in the categories of rare species.

Key words*: Black Sea, Danube Delta, Sfântu Gheorghe, species, vegetation.*

SOME AGROBIOLOGICAL FEATURES AND QUALITY INDICES OF THE BIOMASS OF *Panicum virgatum* and *Panicum miliaceum* GROWN UNDER THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

This research was conducted to determine the productivity of switchgrass - Panicum virgatum and common millet - Panicum miliaceum, grown in monoculture in the experimental plot of the NBGI Chişinău. It was determined that the dry matter yield and its biochemical composition varied among the Panicum species: 8.2-14.1 kg/m^2 with 61-132/kg CP, 352- 419 g/kg CF, 82-101 g/kg ash, 372-433 g/kg ADF, 608-692 g/kg NDF, 39-59 g/kg ADL, 124-127 g/kg TSS, 333-381 g/kg Cel, 236-259 g/kg HC and the nutritive and energy values of the fresh mass fodder reached 55.2-59.9 % DDM, 9.04-9.73 MJ/kg ME and 5.05-5.75 MJ/kg NEl. The hay prepared from the studied Panicum species contained 56-132 g/kg CP, 79-104 g/kg ash, 348-384 g/kg Cel, 243-272 g/kg HC with 54.5-58.8 % DDM, 8.94-9.57 MJ/kg ME and 4.96-5.59 MJ/kg NEl. The prepared silages had pH index = 4.06-4.14, 30.6-32.5 g/kg organic acids with 88.0-93.5% lactic acid. We found that the biochemical methane potential of the studied substrates varied from 302 to 364 l/kg ODM. Panicum virgatum and Panicum miliaceum may be used as forages for livestock and as feedstock for renewable energy production in Moldova.

Key words*: agrobiological features, biomass, biochemical composition, forages, methane potential, Panicum miliaceum, Panicum virgatum.*

NUTRITIONAL AND MINERAL COMPOSITION OF WILD *Salicornia europaea* L. AND CHARACTERISTICS OF THE SOILS IN BULGARIA WHERE IT GROWS

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Abstract

The aim of our study is focused on the nutritional and mineral composition of wild-growing Salicornia europaea L. and the soil properties under which it thrives. In Bulgaria, it is found along the Black Sea coast. Soil and plant samples were collected in July and August 2024 from various locations, including Atanasovsko Lake, Pomorie Lake, and Balchishka Tuzla. The soil samples were analyzed for mechanical composition, organic matter content, soil reaction, and concentrations of macro- and microelements. The plant samples were analyzed for their nutritional and mineral composition. The soils were found to have high sodium cation concentrations (500 ppm), which explains the strongly alkaline reaction, reaching pH values of up to 9.8 in some samples. Chemical analyses of the plant samples revealed a high ash content of up to 50%, indicating a rich mineral composition. Protein content ranged between 10.33% and 15.11%, fiber content between 4.77% and 7.98%, while the fat content remained low at around 1%. These characteristics highlight Salicornia europaea L. as a valuable source of minerals and proteins, suitable for use in gastronomy, cosmetics, industry, and as a forage crop.

Key words*: functional foods, halophytic plants, mineral composed, nutritional value, Salicornia europaea L., saline soils.*

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