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and Veterinary Medicine of Bucharest

Faculty of Agriculture

International Conference

"Agriculture for Life, Life for Agriculture"

BOOK OF ABSTRACTS

Section 1

AGRONOMY

2024
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SUMMARY

SOIL SCIENCES

CROP SCIENCES

MISCELLANEOUS

SOIL SCIENCES

RESEARCH ON EARTHWORM COMMUNITY IN MAIZE CROP IN BORCEA, CALARASI

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Abstract

Earthworms play a variety of important roles in ecosystems. Their feeding and burrowing activities incorporate organic residues and amendments into the soil, enhancing decomposition, humus formation, nutrient cycling, and soil structural. Earthworms feed on plant debris (dead roots, leaves, grasses, manure) and soil.The purpose of this study was to assess the presence of earthworm species in maize crops in Borcea commune in Calarasi Country over the years 2020-2022. The sampling consisted of 15 pits of 25 x 25 x 40 cm. Five earthworm species belonging to three genera Aporrectodea, Allolobophora, Eisenia fetida and Dendrobaena were identified. he most abundant species was Aporrectodea caliginosa. This study reports the first data on earthworm fauna for the Borcea, Calarasi.

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

UTILIZATION OF GEOPHYSICAL METHODS IN PRECISION AGRICULTURE AND ARCHAEOLOGICAL PROSPECTION

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Abstract

Connecting stakeholders in heritage, archaeology, and precision agriculture can help us to understand the impacts of and shape positive outcomes for this transformation by developing common ground and shared agendas. Technologies such as satellite imaging, drone-based imaging, and geophysical survey are used in the practice of precision agriculture to support farmers and land managers to make data-driven management decisions. Archaeologists use many of these same technologies to investigate the buried evidence for past human activities and make this evidence for the heritage of agricultural landscapes visible. Fundamentally, practitioners and researchers in both precision agriculture and archaeology are invested in developing a better understanding of soils, plants, topography, water, insects, current farming practices and anything else that shapes agricultural landscapes. Drone-based geophysical survey, still in development, has the potential to facilitate increased field access and improve survey timings, if the signal-to-noise ratio of the measurement is good and the depth of investigation sufficient. In agricultural geophysics, the relationship between measurements and the physical/chemical parameters of the soil under investigation needs to be identified and their spatial variation understood.

Key words*: soil, geophysics, agriculture, archaeology.*

THE EVOLUTION OF SOIL AGROCHEMICAL PROPERTIES, UNDER THE INFLUENCE OF MINERAL FERTILISATION AND WATER EROSION, ON A NATURAL GRASSLAND LOCATED AT THE PREAJBA EXPERIMENTAL CENTRE IN THE GORJ COUNTY

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Abstract

The research was carried out at the Experimental Centre for Grassland Culture, located in Preajba in the Gorj County, on a Stagnic Luvisol on a relief with a 10-12% slope, on parent material represented by fluvial terrace deposits, where the depth of groundwater is 5-10 m with a natural vegetation represented by grassland with acidophilus species which is characterised by a profile of type Aț, Ao, El(w), ElBt, Bt1(w), Bt2(w). These consisted in setting up an experiment on natural grassland with 3 versions and 3 repetitions, following the method of isolated blocks, in order to highlight the evolution of soil agrochemical properties under the influence of erosion and mineral fertilisation. Research has shown that mineral fertilisation had beneficial effects both on yields and indirect effects on soil protection against loss of humus and fertilising elements. Thus, the evolution of the agrochemical properties of the soil in the experimental versions is influenced by the amount and intensity of rainfall, the mass of eroded soil, the degree of vegetation cover and the doses of fertilisers applied.

Key words*: water erosion, natural grassland, slope, Stagnic Luvisol, chemical indicators, mineral fertilization.*

LAND USE IMPACT ON SELECTED CHEMICAL PROPERTIES OF HUMOFLUVISOLS IN PERI-URBAN AREA IN ZAGREB (CROATIA)

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Abstract

The objective of the study was to assess the effects of different long-term land uses on the basic chemical properties and contamination of Humofluvisols by potentially toxic elements (PTE). A total of 20 top soil samples (0-30 cm) were collected in the peri-urban area of Zagreb within cropland (CROP), orchard (ORCH), vegetable garden (VEGA), and urban park (UP). A significantly lower pH value was determined in ORCH compared to the other land use types. The UP had a significantly higher soil organic carbon (SOC) content than agricultural soils. The P_2O_5 and K_2O concentrations were significantly lower in UP compared to agricultural soils. The As, Cu, Pb, and Zn concentrations were the lowest in UP. Significantly higher Cu concentrations were determined in ORCH compared to other agricultural soils. The soils of UP, CROP, and VEGA had PTE concentrations below the maximum permissible concentrations. Only three soil samples from ORCH were contaminated by As and Zn. Tillage, fertilization, and the application of pesticides were presumably the reasons for altered soil chemical properties and reduced soil quality of agricultural soils.

***Key words**: agriculture, available nutrients, pH, potentially toxic elements, soil organic carbon.*

THE EVOLUTION OF THE COMPACTNESS OF ARABLE CHERNOZEMS IN CONDITIONS OF THE INTERCALATED IMPACT OF AGROGENESIS AND CLIMATE CHANGES

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Abstract

The degree of compaction is the basic parameter that characterizes the physical state of soils under conditions of intercalated impact of agrogenesis and climate changes and represents an integrative index of the spatial organization of soil phases. The compaction and overcompaction of arable chernozems involves mechanisms that change the ratio between them in the sense of the one-way reduction of the volume of the liquid and gaseous phases to below critical values with the involvement of slithogenesis processes and the irreversibility of the settlement state. Within it, the intensity of self-reproduction processes of chernozem pedogenesis is far below the intensity of degradative processes. As a result, none of the practiced agricultural systems provide the necessary conditions for reproducing the agro-ecosystem functions and services of arable chernozems, and their sustainability procedures (mineral and organic fertilization) are ineffective. This implies the conclusion that the compaction phenomenon is to be managed in the early stages when the bulk density values are < 1.40 g/cm^3 (humus content 4-6%) or < 1.35 g/cm^3 (humus content 3-4%). At humus contents < 3%, complex remedial measures are required.

Key words*: compactness, arable chernozems, agrogenesis, climate change, slitogenesis.*

PGPR AS AN AVAILABILITY IMPROVER OF NATURAL IRON AND MANGANESE SOURCES

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Abstract

Natural minerals are essential plant nutrient resources that can be used as natural fertilizers for cultivated plants. Bacterial inoculation improves plant-available elements in these materials. This pot experiment investigated the effects of Fe or Mn-containing natural minerals incorporation into the soils, either alone or with PGPR, on biomass development and some microelement concentrations. Fe and Mn doses were selected as 0, 100, and 200 kg ha^{-1}. The results revealed that Fe treatments promoted the biomass development of the maize plant. Bacteria inoculation increased biomass; however, the effect was statistically insignificant. In terms of mean values, increasing iron doses increased the iron concentration in the plant steadily. Bacteria inoculation increased iron uptake by 29%. Similarly, manganese-containing substrate treatments increased the biomass yield of the plant. Plant root weight and plant height were not statistically affected by manganese treatments. Dual application of manganese-containing material and bacteria inoculation increased the manganese concentration by 28%. The results clearly showed that natural minerals can be used to increase the nutrient concentration of the plant, while bacteria application further improves the uptake by about one-third. It is recommended to apply natural minerals together with the respective bacteria.

Key words*: PGPR, natural minerals, micronutrients, plant nutrition, nutrient bioavailability.*

APPLICATION OF AMENDMENTS OBTAINED THROUGH PROCESSING LIMESTONES FOR THE IMMOBILIZATION OF HEAVY METALS IN CONTAMINATED SOILS

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Abstract

This study presents the results of testing various amendments for use in the immobilisation of metals in contaminated soils. The incubation tests were carried out for five indigenous amendments from different sources, and the results showed significant changes in the pH value of the contaminated soil following their application. At the same time, the effects of the application of these limestone amendments on the mobility of metals in the soil were estimated by specific extractions of different forms of metals existing in the soil. The results obtained allowed the ranking of the tested amendments according to their immobilization ability. Thus, for cadmium, lead and zinc, the calcium carbonate from Murfatlar and the calcium carbonate from Fieni showed the highest immobilization efficiency. The ground limestone from Baita had the lowest efficiency compared to the other amendments studied. The results obtained showed that the use of indigenous limestone amendments had significant effects on the decrease in the mobility of heavy metals in contaminated soil, providing promising prospects for their use in the restoration of these soils.

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

THE INFLUENCE OF THE CONSERVATIVE TILLAGE SYSTEM ON THE PEA CROP IN THE PEDOCLIMATIC CONDITIONS OF A.R.D.S. PITESTI

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Abstract

The study presents experimental results obtained in 2023 regarding the effect of pedoameliorative and basic soil works - classical and conservative system (direct sowing) – on the pea crop. The research was carried out in the experimental field in the SCDA Pitești - Albota area on the typical soil-luvosol type. In addition to the factors (scarified, nonscarified, and working depth of basic soil works) that were studied, the research period's climate also had an impact on the yields. In 2023, the scarified soil version produced an average yield of 2715 kg/ha, while the nonscarified soil version produced an average yield of 2476 kg/ha. This represents a 239 kg/ha difference in favor of the scarified soil variants. The conventional deep ploughed scarified system is the most effective tillage method for pea crops in the SCDA Pitesti - Albota area. It guaranteed a superior yield when compared to the conservative direct sowing method.

Key words: *conservative system, direct sowing, peas, yield.*

THE EFFECT OF THE CULTURE SUBSTRATE ON THE CONTENT OF BIOACTIVE COMPOUNDS IN SOME BLACKBERRY GENOTYPES

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Abstract

Blackberries are shrubs that belong to the genus Rubus, family Rosaceae. It is a perennial plant, to have believed originated in Armenia, fast growing, cultivated mainly in Europe, Asia and North America, but its worldwide popularity is steadily increasing. Since blackberries grow naturally in extensive regions of Romania. They are cultivated only on small areas of land. The fruits of the genus Rubus are among those rich in bioactive compounds (anthocyanins, dietary fiber, vitamins, minerals and carbohydrates, so beneficial for human and animal health. The objective of the paper was to evaluate the bioactive compounds with antioxidant properties from blackberry fruits obtained from plants grown on different culture substrates, such as: manure, garden soil, forest compost, semi-fermented compost and spent mushroom substrate (SMS) applied to the soil. The studied plantation was established in the spring of 2020, and the presented results refer to the fruits harvested in 2022. The experiments were set up in the field within SCDP Băneasa - the Moara Domnească Afumați experimental farm.

Key words*: blackberry cultivation, nutritive substrates, bioactive compounds.*

DETERMINATION OF PHYSICAL AND CHEMICAL PROPERTIES OF SOME SOILS FOR AGRICULTURAL USE IN FIER DISTRICT OF ALBANIA

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Abstract

This study aims to determine the effects of different land management systems on the physical and chemical properties of soil. Soil samples were collected at a depth of 0-30 and 30-60 cm from the greenhouses area and were analyzed in the laboratory using standard protocols. The physical properties) and chemical properties of the soil samples were examined. pH values recorded in the control site ranges from 7.9 to 9.7 indicating that all the soils studied were moderate to strong alkaline. The conductivity values range from 230 µS/cm-8.6 dS/m which indicated that all the soils vary from non-saline to moderately saline. Organic matter ranges from 0.3-1.6%, which indicates that its content is classified from very low to low. Available phosphorus also varies from 0.2-1.3 mg/kg, which indicates a low content of this element. From the study it was concluded that soil properties change through soil management based on the physical and chemical properties of soils through their classification for soil quality and environmental protection.

Key words*: soil composition, physic-chemical parameters, soil pollution*.

ECOPEDOLOGICAL CONDITIONS THAT DEFINE THE LANDS FAVORABILITY FROM TIMIŞ LOW PLAIN FOR THE MAIN CROPS

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Abstract

The purpose of the studies and researches undertaken, over many years, finds its origin in the current increasingly assiduous scientific and practical pursuits, regarding the accumulation of knowledge in the characteristics of the natural environment and its zonal peculiarities, as eco-pedological elements, which define the structure of the edaphic cover and its quality, respectively its favorability for the main cultivated plants, in order to develop sustainable management systems of soil and land resources . The topic covers an area of 39215 ha, located in the Timiş Low Plain, in the western part of Romania. The area taken into account and its zonal peculiarities, determining a great diversity of ecological conditions, generated by the variability of the factors that compete to create the environment in which plants grow and achieve production. It is presented in more detail, the composition of the soil cover, some restrictive characteristics of the quality and suitability of land for certain agricultural uses, with requirements and specific improvement measures and the favorability of arable land for the main cultivated plants.

Key words*: soil, evolution, factor, resource, soil, land, plants.*

REGARDING THE LEVEL OF SOIL POLLUTION WITH HEAVY METALS (I)

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Abstract

As regards the research methodology, this paper used the comparative method between the current legislation in force in the Member States of the European Union on the regulated standards for the content of heavy metals in soil. As we can see, the legislative regulations vary from country to country, and in Romania, the legislation is the most stringent in terms of one heavy metal, in special, Pb content in soil, compared to the other EU Member States. Finland imposes even higher restrictions for heavy metals such as Cd and Zn content. Dutch legislation is more permissive for essential metals than other EU Member States.

Key words*: heavy metals, human health, soil pollution.*

DYNAMICS OF SOIL BACTERIAL COMMUNITIES UNDER WINTER WHEAT IN THE NORTH-EAST PART OF ROMANIA

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Abstract

Agricultural soil microbial communities are influenced by a multitude of factors, including seasonality and local environmental conditions, management practices and their interaction, and cultivated species. Seasonality can result in variations in temperature, precipitation, soil moisture, and solar radiation, all of which drive rates of soil microbial metabolism and respiration, as well as taxonomic composition. Agricultural crop species can significantly impact the soil microbial population through the release of root exudates. Root exudates are a diverse array of organic compounds that are actively secreted by plant roots into the surrounding soil. These compounds include sugars, organic acids, amino acids, vitamins, enzymes, and other secondary metabolites. Root exudates serve various functions, including providing a carbon source for soil microorganisms, facilitating nutrient uptake by plants, and mediating plant-microbe interactions. This study investigates the dynamics in bacterial communities within the rhizosphere of winter wheat across different growth stages and geographical regions in north-eastern Romania. Soil samples were collected from two locations in Iasi County, one location in Botosani County, one location in Vaslui County, and one location in Galati County. Soil sampling occurred three times during the winter wheat growing season: in the fall of 2022, in April 2023, and in May 2023, covering three phenological stages (emergence, stem elongation, and flowering). The results obtained indicated differences between the wheat crop's phenophase and between locations; however, statistical analysis of the data demonstrated that these differences were not statistically significant.

Key words*: soil microbiome, soil microbial community, winter wheat.*

KINETICS OF THE MICROBIAL FUNCTIONAL PROFILE INVOLVED IN DECOMPOSITION SHAPPED BY LONG-TERM APPLICATION OF INPUTES

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Abstract

Fertilization methods have the capacity to modify both soil fertility and biological characteristics, consequently affecting the ecological functions of the soil. Straws are a hard crop residue to decompose, and stimulate the appearance of a specific functional microbiome. The microbial functional profile is correlated with the application of calcium carbonate (CaCO3) and fertilizers containing nitrogen, phosphorus, potassium (NPK). The present study aims to analyze the effect of long-term application of inorganic fertilizers and liming on the functional soil microbial communities. A modified EcoPlate method was used to incorporates the utilization of straw subjected to a 30-day incubation period in the soil at the Livada Agricultural Research and Development Station. In the aftermath of the Ecoplate experiment, discernible alterations in substrate solubilization rates have been noted across diverse soil compositions, spanning from untreated soil to those enriched with nitrogen, phosphorus, and an NPK complex. The results provide information on important functional soil microbial assemblages influenced by fertilizer application and the detection of the most active functional gropus associated with straw decomposition process.

Key words*: EcoPlate, microbial communities, fertilization, long-term field experiment.*

SOIL ACIDITY AND EXCHANGEABLE ALUMINIUM IN SOIL OF THE HIGH PITEȘTI PLAIN, ARGEȘ COUNTY, ROMANIA

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Abstract

In Romania 49.5% of the total soil surface have pH below 5.8 which represents a risk for aluminum toxicity and plants growth. Research carried out in the High Pitești Plain aimed to study exchangeable aluminum presence in cultivated soils in order to issue recommendations for acid soils liming. Soil samples collected from the first soil layer, down to 25 cm depth, were analysed in the laboratory and the reaction, humus and available phosphorus and potassium contents, and cation exchange properties were determined. Out of 120 analysed samples 38 showed contents below the method's detection limit. Relationships were drawn for the rest 82 of them between humus and available phosphorus and potassium on one hand and soil reaction and aluminum contents on the other to assess aluminum variability and its possible toxicity for plants. Low, very low, and extremely low aluminum quantities were found which means there is no immediate risk of soil acidification in the studied area from this point of view. Researches must be carried on though in other Romania agricultural land on acid soils.

Key words*: exchangeable aluminum, soil analysis, slightly acid soils, CS Region, Romania.*

MICROBIAL COMMUNITY DYNAMICS OF COMPOST MIXTURES AFTER APPLICATION OF MICROBIOLOGICAL ADDITIVE

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Abstract

The present study aimed to analyze the dynamics of the microbial community of compost mixtures after application of a microbiological additive. Three series of compost mixtures are available with two variants each: one control and one with a microbiological additive. Quadruple sampling was performed. Main groups of aerobic microorganisms were analyzed: non-spore-forming and spore-forming bacteria, actinomycetes and molds. The total microflora of aerobic and anaerobic microorganisms was determined, and a predominance of aerobes was reported. Temperature, pH and humidity were analyzed. All variants showed an initial slight increase in microbial abundance on day 8 and a subsequent smooth steady decline as the composting process progressed. Non-sporing bacteria predominated in all mixtures. Spore-forming bacteria are least involved. Only one variant with the supplement had higher biogenicity than the control. There is no evidence that the applied supplement has a major positive effect on the microbial biota. Microbial community structures were not affected by the introduction of the microbiological additive. We consider the influence of input material and the optimal C:N ratio as the main determinant of microbial abundance.

Key words*: compost mixtures, microorganisms, microbiological additive.*

USING THE BULK DENSITY AND PARTICLE SIZE COMPOSITION OF SOIL AS SUSTAINABILITY INDICATORS TO CHARACTERIZE A SILVOARABLE ECOSYSTEM OF ROMANIA

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Abstract

The aim of the study was to identify the values of several soil parameters (particle size composition and bulk density) in a silvoarable ecosystem combining two types of plant cultures: a plantation of no-tilled hybrid poplar (Populus spp.*) trees and a conventional 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, but in particular to characterize a rare type of agricultural ecosystems in Romania, the agroforestry ecosystems, and in this case a silvoarable ecosystem, because these are poorly studied and described in this country. The results have shown in the 0-10 cm topsoil of the poplar plantation negative Pearson's correlations between soil bulk density and respectively silt, colloidal clay and physical clay, and positive Pearson's correlations between soil bulk density and respectively coarse sand and fine sand, and inverse correlations between the same factors in the 20-30 cm poplar soil. The coarse sand and the fine sand have negatively correlated with other textural fractions of the soil (silt, colloidal clay, physical clay) in both plant types, excepting the depth 20-30 cm in the poplar soil. The silt fraction was positively correlated with the clay fractions (colloidal and physical, respectively) in both plant types, excepting the depth 20-30 cm in the poplar soil, and a positive correlation has been found between the colloidal clay and the physical clay fractions in both plant types and for all soil depths. In this study, for the topsoil (0-10 cm) of the two components (poplar plantation and rapeseed crop) there were not found statistical significant differences between the proportions of the fractions coarse sand, colloidal clay and physical clay, but there were found for fine sand and silt fractions.*

Key words*: agroforestry, particle size distribution, texture, Populus, poplar, rapeseed.*

THE AGRO-ECOSYSTEM APPROACH TO THE HEALTH AND FERTILITY MANAGEMENT OF ARABLE CHERNOZEMS WITHIN THE ACTUAL AGRICULTURAL SYSTEMS

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Abstract

In the agroecosystem approach, soil health and fertility are integral agroecosystem functions of soils and their management involves the activation of their reproduction processes by soil biota and crop plants through the greening of agricultural systems based on the adaptation, rotation and diversification of all agroecosystem components. A special place in the ecologically-oriented management of soil health and fertility belongs to `biological intermediaries` - improving crops that contribute to the reduction of energy consumption. The specified agrosystemic measures are aimed at activating the self-organization potential of the components of the agroecosystem, especially of soils. Important elements of soil health and fertility management are the assessment of limiting factors and the identification of `intermediaries` - biological intensifiers through the action of which soil properties can be managed under conditions of limited human inputs. The main biological intensifiers are: optimization of the structure of the agroecosystem through landscape adaptation and the `soil-plant-pedocenosis-soil` ecological system.

Key words*: soil health, soil fertility, agroecosystems, biological intermediaries, self-organization.*

THEORETICAL AND APPLICABLE FRAMEWORK OF ECOLOGIZATION OF THE AGROPHYSICAL PROPERTIES OF ARABLE CERNOZEMS IN THE FRAMEWORK OF ACTUAL AGRICULTURAL SYSTEMS

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Abstract

Within the anthropo-natural pedogenesis, the main factors that limit the effective realization of the health and bioproductive potential are the unfavorable physical properties that cause the reduction of the biogeochemical circuits of nutrients, the intensity of the transformation processes of substances and energy, the degree of mobility and accessibility of water and nutrients. The agricultural systems practiced do not ensure their improvement. As a result, agro-ecosystem measures are needed for their current rehabilitation within the production process. The theoretical framework of the greening measures of the agrophysical properties of arable chernozems is ensured by the concept of their priority role in the establishment of health and the ecosystem determinism of the reproduction processes of the agrophysical state of agroecosystems, according to which the ecological essence of the agrophysical properties of soils is determined by the production process and the amount of plant debris and organic matter in the soil. Achieving the objective of greening the agrophysical state of arable chernozems within the current agricultural systems requires the greening of all agroecosystem modules: bioenergetic, biophysical, hydrophysical, agrotechnological, biocenotic, pedocenotic.

Key words*: agroecosystems, modules, greening, agrophysical properties.*

INFLUENCE OF MICROFLORA IN IRRIGATION WATER ON THE SOIL AND SOIL-COMPOST MICROBIOME

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Abstract

Sanitary-microbiological control of water for irrigation of soils and composts with agricultural crops was carried out. The analyzed water meets the regulatory requirements for indicators of pathogenic microorganisms. The main groups of microorganisms before and after irrigation were studied: non-spore-forming bacteria, bacilli, actinomycetes, micromycetes, bacteria assimilating mineral nitrogen, as well as their mineralization and enzyme activities (catalase, cellulase). The quantity and activity of the studied soil aerobic microorganisms decreased immediately after irrigation, increased up to 12 hours after irrigation, and then decreased again. This tendency is not expressed for the molds. A major share in the composition of the total microflora is occupied by bacteria. Immediately after irrigation, the number of anaerobes increases but remains lower than that of aerobes. The quantity, composition, and activity of the soil microflora depend on the humidity of the soils and soil-compost mixtures, as well as on the microflora introduced with the irrigation water and vary with different agricultural crops. The activity of microorganisms highly depends on their quantity, but it is not an independent factor for their activity.

Key words*: water microflora, soil-compost microflora, irrigation, catalase, cellulase.*

SOIL CARBON SEQUESTRATION AND STOCKS FOLLOWING LAND-USE TYPES CHANGE

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Abstract

The influence of agricultural activities on virgin soils leads to the loss of organic carbon, which leads to degradation processes in the soil ecosystem. This paper on the example of a Typical Chernozem, the content and stock of organic carbon in virgin soils (fallow, mottled virgin soil, absolute virgin soil) and arable soil was studied. Study was conducted in long-term field experiments with the cultivation of vegetable and grain agricultural crops and on the territory of the «Mykhailivska Tsilyna» conservation in Forest-Steppe zone of Ukraine. We was discuss the main factors influencing soil carbon sequestration following land-use change. It has been established that there is a stabilization level of carbon content for each type of land use, and approximate levels of absorption by the soil, which are possible under management, have been calculated.

Key words*: soil organic carbon, land use types, application of fertilizers, stocks of soil carbon.*

NITROGEN BALANCE IN THE LONG-TERM EXPERIMENTS ON THE LEACHED CHERNOZEM FROM CENTRAL ZONE OF THE REPUBLIC OF MOLDOVA

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Abstract

The article presents the results of nitrogen balance evaluation in long-term experiments on leached chernozem during the 1991-2020 years at the level of agricultural plants, crop rotation and fertilizer doses. It was established that the nitrogen balance in the control variant (without fertilizers) is profoundly negative, on average constituting 81 kg/ha. Manure in dose of 60 t/ha associated with vegetable residues applied in autumn 1990 led to the reduction of the negative balance by approximate 33 kg/ha. The administration of organo-mineral fertilizers led on average for 30 years to the reduction of the negative nitrogen balance compared to the control variant by 5-57 kg/ha annually. The organic fertilizers role in maintaining an equilibrated balance was essential in the fertilization system of agricultural crops. The nitrogen fertilizers application in doses of 30-90 kg/ha did not fully compensate this deficit, only in doses of 120-150 kg/ha of nitrogen fertilizers led to an almost equilibrated and even positive nitrogen balance in some years.

Key words*: balance, nitrogen, chernozem cambic, field, fertilization system.*

DESIGN AND OPTIMIZATION OF AN CHISEL-TYPE ACTIVE BODY INTENDED FOR SOIL WORK EQUIPMENT WITHOUT TURNING THE FURROW

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Abstract

Soil compaction is one of the major problems facing agriculture today because it increases soil strength and decreases fertility. Modifications to soil decompaction equipment, active bodies and management systems have been shown to provide opportunities to significantly reduce the incidence of compaction. The topic addressed in this paper represents a method of computer-aided design (CAD) combined with computer-aided engineering (CAE) used in the analysis of the choice of the optimal constructive variant to reduce the forward resistance forces of a chisel-type active body intended for soil work equipment without turning the furrow, in order to eliminate hardpan as well as deep compaction. Based on the resulting data, mass/drag coefficient ratios were determined for three analysed configurations. The comparison of these indicators led to the choice of the optimal constructive variant in the sense of the most performing, in order to reduce production costs with maximum efficiency.

Key words*: static simulation, dynamic simulation, design study.*

RESEARCH ON LAND SUITABILITY IN CUNEȘTI AREA, CĂLĂRAȘI COUNTY, FOR THE ESTABLISHMENT OF FOREST PLANTATIONS ON SANDY LANDS

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Abstract

Given the current situation regarding global warming, we intend to establish a forest plantation in the Cunești area of Călărași County, on a sandy land, prone to deflation, with accentuated climate deficit. According to the records of the Călărași Meteorological Station, four of the ten years analyzed have an average temperature of over 13^0C, higher by two degrees compared to the average of 1961-2000, of 11.2^0C. The physical and geographical conditions of the investigated area are characteristic for the Danube floodplain, where alluvial soils predominate, which in certain periods benefit from phreatic moistening. In order to determine the type and subtype of soil, its morphological and physico-chemical characterization, a soil profile and three pedological surveys were carried out, from which soil samples were collected on pedogenetic horizons up to the phreatic level (0-300 cm). Based on the 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, windbreaks, mixed forest species composition, calcaric fluvisol.*

PEDOLOGICAL AND AGROCHEMICAL STUDY ON THE AREA IN PERIȘORU AREA, CĂLĂRAȘI COUNTY

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Abstract

The pedological mapping was carried out in order to identify the soil type and assess its fertility based on physico-chemical characteristics. At the same time, agrochemical samples were collected from the arable horizon (0-20 cm) in order to determine the nutrient content. The main physical characteristics were determined, based on the collection of soil samples in natural settlement (metal cylinders). Based on the nutrient content, the crop fertilization plan was developed for each species and the expected production. Based on the results obtained, the humus content of the soil shows low values (less than 4%) unsuitable for a typical chernozem formed in the Baraganului area. A bonitation study was conducted for arable use, the soil being classified at the lower limit of Class II with 66 bonitation points, due to the less favorable climatic conditions and the phreatic level located below 10 m depth.

Key words*: improvement, soil cover, fertilization plan, agricultural technologies.*

PHYSICO-GEOGRAPHICAL CONDITIONS DEFINING THE QUALITY AND QUANTITY OF RESOURCES IN VALEA ALMĂJULUI AREA, CARAȘ-SEVERIN COUNTY

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Abstract

The undertaken research is found in the current scientific and practical concerns regarding the accumulation of knowledge regarding the physical-geographical conditions as elements defining the quality of ecopedological resources. Ecopedological resources constitute a subsystem that is closely related to plant and animal associations, together forming terrestrial ecosystems, they have the ability to transform cosmic energy into potential energy that can be stored in plant and animal biomass. Soil is a unique environment that contains energy accumulated through a multitude of pedogenesis, non-renewable, inherited processes and solar energy is linked to the existence of mankind. The Almaj Valley area, in this paper, is a project comprising seven territorial administrative units included in this area on an area of 109518 ha. The paper provides basic information and methodological elements regarding the qualitative evaluation of ecopedological resources and possible pressures on them, thus integrating into the wider field of complex studies of natural resources. The physical and geographical conditions of soil formation and evolution are briefly presented, mentioning how the zonal peculiarities of the considered space determine a great diversity of ecological conditions.

Key words*: soil, quality, rural, resources, sustainability.*

THE CONTENT AND QUALITATIVE COMPOSITION OF IRON COMPOUNDS OF ALBIC PANTOSTAGNIC LUVISOL UNDER LONG-TERM AGROGENIC INFLUENCE

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Abstract

Iron, as a typomorphic element of hydromorphic and semi-hydromorphic soils, significantly affects the processes of soil formation. The research carried out in a long-term stationary experiment shows that the composition of mobile forms of iron in the Albic Pantostagnic Luvisol is predominated by the oxide form Fe^{3+}. The highest amount of Fe^{3+} compounds is 160.6 mg/kg in the humus-eluvial layer of the soil in the control without fertilizer, the content of Fe^{2+} compounds is 46.6 mg/kg at pH_{KCl} 4.30. Long-term application of the system of organo-mineral fertilization and liming by hydrolytic acidity reduces the content of mobile iron compounds to 128.0 mg/kg, of which Fe^{2+} content is 12.64 mg/kg at pH_{KCl} 5.45. With an identical system of fertilization and liming by pH buffering capacity, the content of Fe^{2+} is 28.0 with a total content of 118.0 mg/kg and pH_{KCl} of 5.54. In the natural conditions of under forest and fallow land, the highest content of mobile iron is 231.7 and 383.1 mg/kg in the 0-20 cm horizon with a significant predominance of Fe^{3+} compounds, 210.1 and 366.3 mg/kg respectively.

Key words*: acidity, fertilizers, iron, liming, soil.*

THE ROLE OF IRON COMPOUNDS IN THE FORMATION OF THE FERTILITY OF HYDROMORPHIC SOILS OF THE FLOODPLAINS OF THE LEFT BANK FOREST STEPPE OF UKRAINE

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Abstract

The special role of iron compounds in the formation of the fertility of alluvial Fluvisols is an actual direction of research. The purpose of the work is to establish the laws of transformation, migration and accumulation of iron in floodplain soils, taking into account the peculiarities of the conditions of their formation and the influence of these processes on their fertility. These processes have an important genetic-diagnostic and agro-ecological role. The regularities of the content and profile distribution of non-silicate forms of iron in floodplain soils of the Left Bank Forest-Steppe of Ukraine with different degrees of hydromorphism are indicated in the article. Iron significantly affects the content of nutrients in plants, in particular, the content of phosphorus and potassium. Fixing them in a form inaccessible to plants can cause a deficiency in mineral nutrition of plants. The transformation of organic matter occurs with an increase in the content of the fulvic acid group under conditions of waterlogging. There is a sharp increase in the solubility of iron hydroxide at the same time. Collectively, all this leads to the migration of iron compounds along the soil profile and the formation under certain conditions of concretionary forms of iron that can impair soil fertility. The introduction of different doses of iron did not significantly affect the acid-alkaline balance of the soil solution. The pH remained within the neutral range.

Key words*: floodplain, alluvial soils, iron.*

ASSESSMENT OF SPATIAL HETEROGENEITY OF AGROPHYSICAL PROPERTIES OF ARABLE SOILS FOR PRECISION TILLAGE

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Abstract

The assessment of spatial heterogeneity of structural-aggregate composition, hardness and bulk density of soil was carried out using statistical and geostatistical data processing methods, which included empirical Bayesian kriging and spatial autocorrelation (Moran's index). The research was carried out on the example of arable soils of territorial objects, located in the area of the Left Bank Forest Steppe of Ukraine. It was found that the presence of heterogeneous relief forms within the objects, uneven distribution of precipitation, and the influence of economic activity significantly influenced the formation of small-scale soil heterogeneity. It was proved that the content of the lumpy (> 10 mm) and dusty (< 0.25 mm) fractions was characterized by the greatest variability, while the density and hardness indicators showed little variability. The impact of the studied indicators on the formation of crop yields was evaluated. On the basis of the analysis of 2-D diagrams, the peculiarities of the spatio-temporal distribution of the investigated soil parameters were evaluated and the field delimitation into working plots for differentiating the methods and intensity of mechanical soil tillage is substantiated.

Key words*: agrophysical properties, arable soils, precision tillage, spatial heterogeneity.*

THE EFFECT OF HISTORICAL POLLUTION ON MICROBIAL FUNCTIONAL KINETICS IN BIOREMEDIATED SOILS FROM BAIA MARE

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Abstract

This industry is a key contributor to environmental disturbances, with residual impacts such as contaminated water sources and heavy metal presence affecting local ecosystems. Microorganisms exhibit a high susceptibility to contamination by heavy metals and play a crucial role in the recycling of materials and the energy dynamics within the ecosystem. The revised Biolog-Ecoplate approach involves employing soil contaminated with heavy metals from Baia Mare at five polluted locations - Craica, Romplumb, Colonia Topitorilor, Ferneziu, and Urbis. The kinetics has been noted, referring to the percentage growth rate from 24 hours to the next 24 hours. The overall microbial functional profile exhibits multiple fast changes within a time frame of 24 hours, leading to a specific site-microbial activity. The results offer insights into significant characteristics of soil microbial functional communities affected by the presence of heavy metal pollution in all analyzed locations.

Key words*: functional microbial communities, biolog ecoplate, heavy metal toxicity, microbial community structure.*

THE INFLUENCE OF MODELING WORKS ON PROTISOILS WITH SPECIFIC GENETIC BEDROCK, IN THE CHARACTERISTIC RELIEF AREA OF DOLJ COUNTY

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Abstract

Through the research we have been carried out, it was aimed to identify the types of not levelled and modeled sandy soils, to determine the physical-mechanical, hydrophysical and chemical properties and, based on them, to ascertain the changes that appeared as a result of the modeling works, from a morphological point of view, in regarding the particle size composition and implicitly texture, density, bulk density, aeration porosity, total porosity, hydrophysical indices (hygroscopic coefficient (HC, %), wilting point (WP, %), water field capacity (WFC, %) available water capacity (AWC, %) yet, also, chemical properties (humus, soil reaction, bases saturation degree, supply of nutrients). Through a comparative study of the data obtained with the 4 identified sandy soil types (unleveled typical sandy soil, leveled typical sandy soil (uncovered), unleveled mollic sandy soil, leveled mollic sandy soil (covered), there have been observed an obvious influence of the leveling work on the mentioned properties that were found.

Key words*: sandy soil, leveled, not leveled, properties, fertility.*

PEDOLOGICAL STUDY IN THE SOUTHWESTERN PART OF MEHEDINȚI COUNTY, VRANCEA AREA

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Abstract

The town of Vrancea, Mehedinți County, belongs to Burila Mare Commune and it is located in the south-western part of the county wich is part of the west Oltenia Plain being located on the fluvial terraces of the Danube. On the studied territory there were formed and occur as soil units, Reddish Preluvosol on carbonate deposits, mollic Reddish Preluvosol on carbonate deposits, mollic Psamosol on aeolian deposits. The specific meso-relief of the reddish preluvosol is represented by the Danube terraces - the II Corabia terrace, altitude 15-22 m, and the psamosol - the Danube terraces - the IV terrace - Flamanda, with an altitude between 50 and 60 m. Preluvosols are characterized by a low content of humus, 2.70-2.93%, slightly acidic reaction, pH 6.13-6.43, low content in nitrogen and medium in phosphorus and potassium. Calcium carbonates are present in a high percentage, in the Cca horizon, and the chemical neoformations represented by $CaCO_3$ concretions have been identified. Psamosols have a medium humus content, 2.64%, a slightly acidic reaction, pH 5.83-6.23, medium-low nitrogen content, medium phosphorus and weak potassium.

Key words*: soil profile, soil horizon, humus, soil reaction, fertility.*

LOSSES OF SOIL THROUGH EROSION TO THE CHERNOZEM SUBTYPE ARGIC FROM THE PERIMETER OF THE STATION FOR STUDY OF SOIL EROSION LOCATED IN THE HILL AREA OF BUZĂU COUNTY - ROMANIA IN 2023

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Abstract

The paper aims to present the influence of erosion processes on the Chernozem subtype argic in the Station for the Study of Soil Erosion perimeter, located on the Valea cu Drum hydrographic basin, located of the left slope Slănic from Buzau County, in the area of Aldeni, Romania. The main objectives of this study were to present and interpret the data regarding the annual rainfall regime and the vegetation period, the study of the rains that produced runoff and erosion, respectively the surface runoff determined by these rains and the annual amount of soil washed from the plots control, differentially cultivated. The analysis of the experimental results shows that the year 2023 was dry, the recorded temperatures exceeded 19^0C in the June-August period, out of 17 rains recorded at the station during the summer period, 47% were less than 10 mm. Quantitative and qualitative study of the erosion process allowed the assessment of the amount of material washed from the soil surface (this being 41.9 t ha^{-1} on a 15%) by the runoff produced by the rains that fell during the summer.

Key words*: rainfall, watershed, chernozem, erosion, slop.*

THE IMPURE CLAY COATINGS AS IMPORTANT PEDOFEATURES OF THE PHAEOZEM FERTILITY BEARING

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Abstract

The soil fertility is induced and sustained by the soil constituents. In this respect, the clay is one of the main nutrient bearing. The presence of the clay pedofeatures (coatings and pore infillings) generally shows an intense leaching process of the constituents from the rooting zone. The leaching process also includes the nutrients depletion, and consequently a pH decreased. The results of the micromorphological investigation of the Phaeozems shows the presence of many impure clay coatings (consisting of clay and a large amount of colloidal humified organic matter), in all the pedogenetic horizons. The richness of the humic substances created a favourable environment for the microbiota. As a result, many microorganisms developed on the impure clay coatings, the evidence being the presence of many fungi spores, as well as the black mycelium of the mycorrhizal fungi on these coatings. The micromorphological investigation pointed out another facet of the intimate mechanisms of the Phaeozems related to fertility (as one of the most important ecosystem services).

Key words*: micromorphology, soil fertility, Phaeozems, microbiota, impure clay coatings.*

THE CALCIUM CARBONATE EVOLUTION INFLUENCING THE PHISICO-CHEMICAL CHARACTERISTICS OF THE LONG TERM IRRIGATED CHERNOZEMS AND THEIR CLASSIFICATION

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Abstract

The evolution of the soil architecture after the matrix lost the $CaCO_3$ under the water irrigation influence had important consequences on the evolution of the physico-chemical characteristics of the long term irrigated soils. The analytical data results showed that, in the case of the horizons with calcium carbonate pedofeatures, the bulk density reached higher values, comparing to the horizons free of $CaCO_3$. The paper represents also an alarm signal for the soil scientists that classified the long-term irrigated Chernozems from the Romanian Plain (with $CaCO_3$ washed deeper than 125 cm), to the Phaeozems, which represents a regrettable mistake. Between Chernozems and Phaeozems there are very important differences concerning: the quality and the quantity of the organic matter; the plasmic material mobility; the leaching process with clay coatings formation; $CaCO_3$ morphology, etc. The leaching of the $CaCO_3$ to >125 cm depth in the long-term irrigated Chernozems from the Romanian Plain is due to the anthropogenic influence, and it is not pedogenetic, that is why it is not a pertinent condition to classify these Chernozems as Phaeozems.

Key words*: Chernozems, long-term irrigation, bulk density, calcium carbonate, Phaeozems.*

RESEARCH ON THE CHARACTERIZATION OF SOIL RESOURCES SPECIFIC TO THE TERRACE AREA IN ROSEȚI COMMUNE, CĂLĂRAȘI COUNTY

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Abstract

The purpose of the paper was to study and evaluate the morphological, agrophysical and agrochemical characteristics of the soil, the environment and geographical conditions as well as the evaluation of the land suitability potential, from the terrace area of Roseți locality, Călărași County. The objective of these evaluations is to estimate the possibilities of maintaining the optimal natural potential of the soil in the process of a certain way of use in a long period of time. The studied area is located in the Southern part of Bărăganului Plain. Most of the lands located on this relief form are included in the agricultural circuit, and a large part of them have arable use. Land, especially arable land, must be protected against natural and/or anthropogenic degradation factors, ensuring the maintenance of production potential, as well as the sustainable use of soil resources. In the flat areas of the plain, there are roofs and wide depression areas, where the water from precipitation in rainy periods accumulates and stagnates for a long time, producing stagnogleization of the soil. This added moisture caused the soil to evolve from Chernozems to Cambic Phaeozems with a pH from weakly alkaline (8.2) to weakly acidic (6.5). Ground water is found at different depths, below 5 m and above 10 m. From a climatic point of view, the studied territory is characterized by average annual temperatures of 11.5^{0}C and average annual precipitation of approx. 475 mm. In the studied area, carbonate and Typical chernozems predominate, and in roofs cambic, well and medium humiferous Phaeozems of medium thickness (25-50 cm), formed on loamy and clayey rocks, with humus content values between 2.64-3.84%. The texture varies depending on the soil type and the pedogenesis process, from medium loam, clay loam to dusty loam in the roof areas. The soil supply of phosphorus is good to very good, with values ranging from 45 ppm to 62 ppm, and the supply of potassium is medium to very good, with values ranging from 180 ppm to 296 ppm.

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

RESEARCH ON SOIL AND CROP MACROELEMENTS CONTENT CORELATED WITH LAND RECLAMATION WORKS

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Abstract

As we know, in the last century agriculture began to be very intensively developed from a chemical point of view, which currently created certain problems on its organic component. Soil as matter is made up of two fundamental parts: organic and chemical. The organic part is made up of humus which directly represents soil fertility, the chemical part is represented by some macro and micro elements present in its structure. The studied area is located in the meadow area of Alba County, more precisely on the right bank of the Mureș River between the localities of Aiud and Ciugud. With the help of the I.C.P.A laboratory, we analyzed from different collection points the main indices of the soil pH, Humus, N, P, K. We also analyzed with a drone the N.D.V.I. index which shows us the state of vegetation of the crops based on the chlorophyll in the plant. Following the analysis of the specified indexes above, we can state that a decrease in the organic of the soil is observed below its average.

Key words*: agriculture, fertility, humus; soil, vegetation.*

THE INFLUENCE OF ORGANIC FERTILIZERS ON THE QUALITY OF ERODED COMMON CHERNOZEM

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Abstract

During the last 40-50 years, the surface of the eroded soils of the Republic of Moldova increased by approximate 284 thousand ha, or annually by 7 thousand ha. The annual damage caused by erosion is estimated at 200 million US dollars. The problem of restoring the fertility of soils degraded by erosion under current farming conditions can be solved by using local organic fertilizers, which can serve to maintain and increase soil fertility, and not as environmental pollutants, which occurs in most cases. Being used as organic fertilizers, they increase the productivity of agricultural crops by 30-40%, reduce the humus deficit by an increase of 150-200 kg/t. Organic fertilizers applied to eroded common chernozem improve the quality of the structure and the aero-hydric regime of the soil. The use of local organic fertilizers also has a positive impact due to the fact that they are directed to study and applied according to the recommendations for their integrated exploitation in agriculture where they have origins.

Key words*: Organic waste, soil fertility, soil properties, environment.*

A NEW BODY INVESTIGATION FOR SURFACE SOIL FRAGMENTATION BY USING GIS

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Abstract

Despite the recently hyped No Till, Strip Till, Min Till, etc. systems. tillage remains the most widely used system for agricultural production. The soil has the specific feature of providing the conditions for the growth, development and productivity of plants. The economic importance of soil is determined by its general characteristic fertility, which is its ability to supply plants with the necessary nutrients, water and air. The fertility of the soil depends on its condition, which is quantitatively expressed through its properties of porosity, density and humidity. Investigate a new body of active machine for surface soil treatment during a different values of soil humidity and velocity. The Results are arranged using statistical program for dates. From the results of the statistical operations are received regression equations. The received regression equations are introduced into GIS and presented in varied information layers. By these layers can be prepared a digital system to manage the soil aggregate composition.

Key words*: soil treatment, soil aggregate composition, GIS.*

METHODS OF REMEDIATION OF SALINE SOILS IN LONG-TERM EXPERIENCES AND THROUGH RICE CULTIVATION AT ARDS BRAILA

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Abstract

The paper presents results of some long-term experiences at the Braila Agricultural Development Research Station, with different mineral and organic fertilizers, as well as through rice cultivation. Through agrochemical analyses of the soil as well as through the analysis of the productions, it was found that the optimization of the fertilization system can be done both by the method and by the time of application, which are factors for increasing the efficiency of the fertilizing elements and the economy of fertilizers. The localized application of a small amount of N23P23 or N13P26K13 kg/ha s.a. fertilizers, the so-called starter fertilization, determined the increase in the efficiency of the use of fertilizers for all fertilizing elements. Thus, for phosphorus at equivalent doses, production increases of up to 18% were achieved, for nitrogen up to 5% and for potassium up to 4%. Also, rice cultivation has proven to be the fastest and most effective method of improving and capitalizing on saline soils, especially under the conditions of climate change.

Key words*: soil salinization, rice, crops.*

THE USE OF SECONDARY PRODUCTS FROM THE STEEL INDUSTRY ON AGRICULTURAL CROPS

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Abstract

In a global economic system conditioned by limited resources and faced with increasing worldwide demand as well as increasing environmental degradation, the only viable option remains the resource-efficient, circular economy. Our planet has limited quantities of essential resources such as water and soil. This paper provides information on research carried out using steel slag as a soil amendment and its influence on agricultural crops. The use of steel slag on chromic luvisols from the didactic farm Moara Domneasca has been successfully used as an amendment to correct soil reaction as an alternative to the currently used acid soil correction materials (limestone and dolomite). On the other hand, since slag contains essential plant nutrients such as P, Mn, Fe, Ca, etc. in different concentrations, its application has positively influenced crops production. This use allows reducing the consumption of natural resources and provides a great agricultural, environmental and economic gain by minimizing the negative environmental effects of steel slag.

Key words*: steel slag, soil amendment, mineral ferilizer, sustainability and green remediation materials.*

AGRONOMIC ASSESSMENT OF THE SUITABILITY OF BOTTOM SEDIMENTS OF PONDS FOR INCREASING SOIL FERTILITY

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Abstract

At the international level one of the main problems are the increase the area of degraded lands and the decrease of soil quality. The development of measures to protect and increase soil fertility, rational management of soil resources is central to achieving the Sustainable Development goals and a zero level of land degradation. One of the possible directions is the use of local raw materials, in particular bottom sediments of fishing ponds. On the example of pilot objectives in the Kharkiv region a study was conducted and the chemical composition of bottom sediments of fishing ponds was analyzed. The assessment of their agronomic value, taking into account the content of organic matter, total carbon, the content of mobile compounds of nitrogen, phosphorus, potassium was performed. It was determined that 90-235 kg of organic matter, 18-48 kg of carbon, 1-7 kg of NPK, 32-63 kg of Ca are introduced into the soil by 1 ton of sediments. Fertilizing efficiency and predicted impact of bottom sediments on soil fertility indicators and crop productivity were evaluated.

Key words*: agronomic value, bottom sediments, nutrients, organic matter, soil fertility.*

EFFICIENCY OF NITROGEN FERTILIZATION IN WHEAT AND BARLEY GROWN UNDER DIFFERENT FERTILIZATION SYSTEMS

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Abstract

Agronomic efficiency and Partial factor productivity of N were studied in wheat and barley grown in a long-term fertilizer trial and fertilization systems: Control, $N_{300}P_{400}K_{600}$+18 t vetch-oat mixture/ha, $N_{600}P_{400}K_{600}$ (stock fertilization), $N_{900}P_{400}K_{600}$, $N_{600}P_{400}K_{600}$+30 t manure/ha, $N_{600}P_{400}K_{600}$+4 t straw/ha, $N_{600}P_{400}K_{600}$ (annual fertilization) (I-IV crop rotations); Control, $N_{300}P_{300}K_{400}$, $N_{600}P_{300}K_{400}$, $N_{900}P_{300}K_{400}$, $N_{600}P_{300}K_{400}$+40 t manure/ha, $N_{600}P_{0}K_{400}$, $N_{600}P_{300}K_{0}$ (V-VII rotations); Control, $N_{250}P_{300}K_{200}$, $N_{500}P_{300}K_{200}$, $N_{750}P_{300}K_{200}$, $N_{250}P_{150}K_{0}$+60 t manure/ha, $N_{500}P_{0}K_{200}$, $N_{500}P_{300}K_{0}$ (VIII rotation). The studied rates were N_{60}, N_{120}, N_{180} (wheat) and N_{40}, N_{80}, N_{120} (barley). A high efficiency of N_{60} and N_{40} was found when N was incorporated into organo-mineral fertilization systems. Appling of 18 t vetch-oat mixture·ha or 60 t manure·ha increased Agronomic Efficiency of N (AE-N) and Partial Factor Productivity of N (PFP-N) to 54.5-71.3 and 81.8-112.8, respectively. The prolonged exclusion of phosphorus fertilization in the crop rotation strongly decreased AE-N and PFP-N up to 0.7-13.7.

***Key words**: AE-N, cereals, fertilization system, PFP-N.*

CROP SCIENCES

IDENTIFICATION OF SOME POTATO CLONES WITH RELATIVE RESISTANCE TO LATE BLIGHT (*Phytophthora infestans*) IN CENTRAL PART OF ROMANIA

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Abstract

In the National Institute of Research and Development for Potato and Sugar Beet Brasov, sixteen potato clones were evaluated to find the relative resistant one to late blight (Phytophthora infestans) and thereby diminish the number of fungicide sprays required. In the two years of study the presence of clones relatively resistant, which allows the development of an adequate protection strategy and the possibility to reduce the number of treatments has been observed. Disease development on foliage was assessed as percentage of foliage area damaged. The research was conducted under natural pressure of infection. From all clones studied, 1895/1, 1901/11 and 1895/4 showed the lowest level of resistance on the foliage, followed by 1927/1, 1941/8 and 1939/2. Instead, the clones 1901/6, 1930/3 and 1979/5 were located towards the upper limit of resistance on the foliage during the entire vegetation period.

Key words*: foliage, late blight (Phytophthora infestans), potato clones, resistance.*

FLIGHT DYNAMICS OF THE SPECIES *Diabrotica virgifera virgifera* Le Conte IN MAIZE CROPS IN CENTRAL MOLDOVA, IN THE PERIOD 2021-2023

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Abstract

The species Diabrotica virgifera virgifera Le Conte is known as a dangerous pest of maize. The insect was monitored at ARDS Secuieni in the period 2021-2023, with the help of yellow traps with glue, but also pheromonal ones placed in maize crops. During the three years of monitoring, the presence of this species was observed in the maize crops in the Central area of Moldova, totaling an average number of 663 specimens. The flight of the species started in the first decade of July in all monitored years, and continued until the end of September in 2021 and 2022, respectively until the first decade of October in 2023. The maximum flight peak of was different each year, registering in the third decade of July in 2021, in the first decade of August in 2022 and in the third decade of August in 2023. On average, the flight of the species started in the first decade of July and continued throughout the maize vegetation period, the maximum flight peak being recorded in the first decade of August.

Key words*: Diabrotica, flight, maize, pest, traps.*

PERFORMANCE OF SEVERAL SUNFLOWER HYBRIDS UNDER SEMICONTINENTAL CLIMATE OF SOUTHERN ROMANIA

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Abstract

In our paper, we present resistance at drought of eight sunflower hybrids in system Express Sun and in system Clearfield, belonging to NARDI Fundulea, in climatic condition of three years 2020, 2021 and 2022, by analyzing data regarding seed yield, hectoliter weight, seed oil content. Average seed yield in year 2020, was between values of 581 kg/ha at sunflower hybrid FD15CL44 and 2668 kg/ha at sunflower hybrid FD15E27, in year 2021, was between values of 2358 kg/ha at sunflower hybrid FD20CL70 and 4031 kg/ha at sunflower hybrid FD15E27 and in year 2022, was between values of 2814 kg/ha at sunflower hybrid FD22CL83 and 4232 kg/ha at sunflower hybrid FD18E41. Average hectoliter weight in year 2020, was between values of 44.6 kg/hl at sunflower hybrid FD22CL66 and 64.5 kg/hl at sunflower hybrid FD18E41, in year 2021, was between values of 33.6 kg/hl at sunflower hybrid FD20CL70 and 45.6 kg/hl at sunflower hybrid FD19E42 and in year 2022, was between values of 54 kg/hl at sunflower hybrid FD22CL83 and 66.4 kg/hl at sunflower hybrid FD21CL77.

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

STUDY OF AGRONOMIC CHARACTERISTICS OF AN ASSORTMENT OF SWEET CORN HYBRIDS

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Abstract

Sweet corn is a relatively new crop for our country and with certain peculiarities compared to conventional corn cultivation technology. The aim of this study is to contribute to the improvement of cultivation technology in relation to pedoclimatic conditions in the Berzovia area, by studying the relationship between cob weight and production of sweet corn cobs according to the maturity group in an assortment of 11 sweet corn hybrids compared with the local hybrid Estival. The study was carried out in the Ramna area, characterized by an early spring, the minimum germination temperature of 10ºC, taking place in the first days of April, a fact that allows obtaining early harvests. The results highlighted that cthe highest cob weight values were obtained in hybrids: Driver F1, Accentuate F1 and 11-Sweet Thing, between 336 and 368 g. Small cob weight values of approximately 232-255 g were obtained in hybrids the extra-early Estival and Spirit F1, the early Legend F1, Tyson F1, Starshine F1 and the semi-early hybrid Landmark F1. Regarding the production of sweet corn, SF201 F1, Jubilee F1, Driver F1, Accentuate F1 and Sweet Thing hybridswere well above the experience average in terms of cob production, surpassing the field average with gains between 2392.43 kg/ha and 5224.59 kg/ha, or in other words: the five hybrids surpassed the control by: 12.56%, 16.50%, 27.43%, 17.68%, respectively 16.76%.

Key words*: sweet corn, production, climatic conditions, vegetation period.*

THE INFLUENCE OF TILLAGE METHODS AND FERTILIZATION ON TWINNING AND THE OBTAINING OF PRODUCTIVE SIBLINGS IN THE GRAIN SORGHUM IN THE CONDITIONS OF SĂRĂŢENI, IALOMIŢA

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Abstract

Climate change is putting more and more pressure on the cultivation technology of agricultural land, for which it is necessary to adapt the cultivation technology. The number and quality of the productive brothers obtained in the sorghum culture depends a lot on the pedoclimatic conditions, but also on the technology applied in the culture. Analyzing the data of the three years of research, 2021 a year with high precipitation and 2022-2023, two years with a water deficit, the influence of climatic conditions on twinning can be observed. The deeper the loosening of the soil was, the higher the twinning was, tillage by scarification at 35 cm and at 45 cm excelled at all four fertilizations, thus having the highest growth rates of the number of productive siblings in sorghum culture. The most favorable combination of technological factors that ensured a maximum yield of twinning in 2022 of 3.6 productive brothers per plant, was represented by tilling the soil by scarifying at 35 cm and a fertilization of N100+P50+Foliar (Borocal).

Key words*: Sorghum bicolor L., tillage, fertilization, twinning, productive siblings.*

INFLUENCE OF THE VEGETATION-APPLIED HERBICIDES "ENVOKE" AND "STAPLE" ON SOME STRUCTURAL ELEMENTS OF PRODUCTIVITY AND YIELD OF COTTON (*Gossypium hirsutum* L.)

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Abstract

The research was conducted during the period 2021-2023 on the testing grounds of the Field Crops Institute in Chirpan with cotton cultivar Helius (Gossypium hirsutum L.). In a two-factor field experiment, the effect of two vegetation-applied herbicides: "Staple", containing 33.6% pyrithiobac-sodium, and "Envoke", containing 75% trifloxysulforon-sodium. Factor A included the herbicides "Staple" and "Envoke", applied once and twice during the phenophases of 4-5 leaf and bud development of cotton. Factor B included the three years of study. The highest yields of cotton were obtained with the herbicide combination "Staple" + "Envoke", applied once and twice during the phenological stages of 4-5 leaf and budding of cotton. The vegetation herbicides "Staple" and "Envoke", when applied once and twice during the phenophases of 4-5 leaf and bud development of cotton, did not affect the percentage of boll opening and the boll weight of the cotton cultivar Helius.

Key words*: cotton, vegetation-applied herbicides, boll opening, boll weight, seed cotton yield.*

CORRELATION DEPENDENCES OF QUANTITATIVE TRAITS IN WINTER PEA GENOTYPES

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Abstract

*In the past, majority of the plant breeding programmes were focused mostly on developing the cultivars with high yields. Recently, stable, quality and reliable yields under various environmental conditions have consistently gained importance over solely increased yield. The experiment was conducted during the period 2019-2021 at the National Agriculture Research Development Institute Fundulea in order to establish the phenotypic and genotypic correlations between the main quantitative traits in eight winter pea genotypes. The highest positive correlation was found between plant height and grain yield (r = 0.99***), the number of pods per plant with number of grains per plant (r = 0.90***) and grain yield (r = 0.87***) and plant height (r = 0.80***), the grains weight per plant with earliness (r = 0.83***); the highest negative correlation was registred between earliness and plant height (r = -0.83***), grain yield and earliness (r = -0.82***). Pea breeding should be focused on traits with consistent heritability and a positive effect on seed yield when selecting high-yielding genotypes, and on allowing for more widespread use of pea in various agricultural production systems.*

Key words*: winter peas, seed yield, correlation, yield component.*

PHENOTYPIC DIVERSITY OF COMMON BEAN (*Phaseolus vulgaris* L.) GERMPLASM, A POTENTIAL CROP FOR ENSURING FOOD SECURITY

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Abstract

Bean crop is of great economic interest, being among the most used grain legumes in human nutrition. Also, it can use like organic crop, with great ecological plasticity, cultivated from the plains to high altitudes, also being a good precursor for other crops, leaving the soil rich in nitrogen. Therefore, we must give priority to the phenotypic characterization of local bean germplasm to provide breeders with valuable genetic sources, useful in creating of productive advanced cultivars, resistant to adverse environmental factors, to ensure food security. The objective of this study was to evaluate variability of morpho-physiological and agronomic traits of some common bean landraces (Phaseolus vulgaris L.), well adapted to pedoclimatic conditions from different regions sites of the country, conditioned by the genetic factors of the species. These populations could be used in prebreeding programs to improve some morpho-physiological characteristics very useful for future new creations. We must give priority to the phenotypic characterization of local bean germplasm to provide breeders with valuable genetic sources, useful in creating of productive advanced cultivars, to ensure food security.

Key words*: common bean landraces, variability, variation, phenophasic, morphological and agronomic traits.*

RESISTANCE OF WINTER BARLEY TO FUNGAL DISEASES DEPENDING ON THE VARIETY

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Abstract

The results of research of winter barley varieties for resistance to foliar fungal diseases in the conditions of the Western Forest Steppe of Ukraine are highlighted. According to the assessment of resistance to diseases, and in particular to dark brown spotting, the following varieties were less affected: Dev'yatyy val, Status, Dariy, Val'kiriya; dwarf rust: Dev'yatyy val, Hladiator, Paladin Myronivs'kyy, Status, Dariy, Snihova koroleva, Val'kiriya; to striped mottling: Dev'yatyy val, Status. Zbruch, Status, Dariy and Val'kiriya were note to have the highest indices of complex resistance to pathogens of two diseases. It was detect that the most valuable are varieties that are characterized by a combination of a high index of complex resistance with individual resistance to some foliar fungal diseases.

Key words*: complex resistance index, dark brown spotting, dwarf rust, productivity, striped spotting.*

THE MOST COMMON DISEASES OF WINTER WHEAT IN THE CONDITIONS OF THE WESTERN FOREST-STEPPE OF UKRAINE

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Abstract

Winter wheat is the leading food crop in Ukraine and occupies almost half of the grain crops. Realization of the potential productivity of winter wheat is often limited by the development of phytodiseases, among which the most harmful in our zone are powdery mildew, septoriosis of leaves, leaf spots, etc recently, the search for new effective sources of resistance to diseases has become particularly important. The difficult economic situation in agricultural production dictates the search for ways to reduce costs and more efficient use of available resources. One of the directions in solving this task is the adaptation of existing technologies and the selection of varieties for specific soil and climatic conditions with winter hardiness and resistance to diseases. According to the results of our research 2016-2020, the most common diseases of winter wheat were: powdery mildew, dark brown spotting, pyrenophorosis, septoriosis. It was established that the highest index of resistance (I = 1.05) to the causative agents of powdery mildew (Erysiphe graminis f. sp. tritici) and dark brown spot (Drechslera tritici-repentis Ito) varieties: Oberih Myronivs'kyy Mudrist' odes'ka, and to the causative agent pyrenophora (Pyrenophora tririci-repentis) - Vodohray bilotserkivs'kyy, Oberih Myronivs'kyy (I = 1.05); to the causative agent of leaf septoria (Septoria tritici Rob. et Desm.) - Oberih Myronivs'kyy (I = 1.13).

Key words: *winter wheat, variety, powdery mildew, pyrenophorosis, dark brown spotting, septoriosis.*

THE RESULTS OF THE RESEARCH OF SOME NEW REMEDIES WITH FUNGICIDAL ACTION ON THE AUTUMN BARLEY CROP IN THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

Autumn barley plants are subject to the intervention of a complex of pathogenic agents, which include over ten species of diverse mycotic nature, as key objects of economic importance that annually cause serious damage such as: Ustilago tritici, Tilletia caries, T. foetida, Puccinia recondita, P. glumarum, P. graminis, Erysiphe graminis, Fusarium graminearum, Septoria tritici, S. graminum, Helminthosporium tritici-repentis. We have as aim and objectives research the testing remedies: Amistar PRIME, SE, Ampir, SC and Lot nr.1, SC with fungicidal action in combating key diseases at barley culture. The frequency and intensity of the attack was established, in the years 2022-2023, in values of 13-22%, in impact with environmental factors, and the biological efficiency of the treatments on test soils of the new remedies as a fungicide were 85-93% , at the level of the benchmark variant compared to the variants and doses applied.

Key words*: autumn barley, biological control, chemical management, disease, fungicides.*

BOTANICAL AND BASIC CHEMICAL COMPOSITION OF FORAGE FROM PERENNIAL GRASS CROPS GROWN IN MONOCULTURE AND MIXED GRASSLAND UNDER MOUNTAIN CONDITIONS

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Abstract

The experiment was carried out in order to evaluate the botanical composition and quality of fodder from perennial forage grasses (Festuca rubra L., Lolium perenne L., Dactylis glomerata L., Phleum pretense L.) grown in monoculture and in two-component mixtures with Trifolium pratense L. (50:50%) under mountain conditions. It was established that the studied grass species showed good adaptability and resistance to the specific soil and climate conditions of the experimental area. The relative share of grass species in monoculture meadows varied between 92.3% and 98.8%. The highest CP content in dry matter was recorded in Dactylis glomerata L. (101.4 g kg^{-1}) and Phleum pratense L. (97.9 g kg^{-1}). CP values exceeded the average by 6.1% and 2.4%, respectively. For the conditions of the Central Balkan Mountains, the mixtures of Festuca rubra L. and Phleum pretense L. with Trifolium pratense L. had the most balanced botanical composition (the ratio of grasses and legumes in the forage mass was 39.7:44.8% and 37.8:41.2%) and with the highest CP content. The indicator exceeded the average value by 37.8%, respectively 36.8%.

Key words*: perennial fodder grasses; botanical composition; basic chemical composition.*

GENOMIC APPROACHES AND GERMPLASM DIVERSITY FOR CHICKPEA IMPROVEMENT

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Abstract

The paper aimed to present different genomic approaches and the role of Cicer arietinum diversity in breeding. The chickpea is one of the promising pulse crops in Europe. Recent European strategies focused on imperative need of safety and secure food and clean environment highlighted the importance of new and performant pulses genetic resources available for farmers. Despite the nutritional, agronomic and environmental benefits of chickpea, this crop remains insufficient explored. The low level of European plant protein self-sufficiency is due to: the lack of breeding resources and knowledge gaps (low agronomic expertise, insufficient cooperation between stakeholders, non-competitive management of PGR), poor adaptation of protein plant cultivars in Europe. The study presents: (1) modern breeding approaches based on genomic approaches, (2) the diversity of chickpea by screening of the vast volume of accessions available in gene banks, (3) the role of inclusion of wild genetic material in current breeding programs, thanks to their feature to imprint tolerance/ resistance to different abiotic and biotic stressors.

Key words*: sustainable agriculture, wild germplasm, crop development, genetic variation.*

IMAGING ANALYSIS IN CORN CROP EVALUATION UNDER HYDRIC STRESS CONDITION

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Abstract

Imaging analysis (UAV images) was used to evaluate a corn crop under hydric stress conditions. From the analysis of the series of images (June 29 – T1, July 20 – T2, year 2022) the values of the RGB parameters resulted. Suplementary the luminance (Lum), normalized values (rgb), values in the HSB system, and INT, NDI and DGCI indices, were determined. The correlation analysis identified 18 very strong correlations between the parameters considered at the time of T1, and 10 very strong correlations at the time of T2. The PCA analysis led to the classification of the components: seven components in PC1 (R = -9.93 the highest value) and three components in PC2 (Lum = 0.970 the highest value) at the time of T1; four components in PC1 (r = -0.990 the highest value) and four components in PC2 (Lum = 0.949 the highest value) at time T2. The differences between the series of parameters, at the moments T1 and T2, were confirmed by values U = 18, p = 0.017 in the case of parameter G; U = 10, p = 0.0028 in the case of the B parameter; t = 9.4202, p < 0.01 in the case of NDI; t = 9.2066, p<0.001, U = 1, p < 0.001 in the case of INT; t = 9.3176, p < 0.001 in the case of DGCI; t = 7.5581, p < 0.001, U = 3, p < 0.001 in the case of Lum.

Key words*: component loadings, hydric stress, imaging analysis, maize, PCA.*

RESEARCH ON THE INFLUENCE OF CLIMATIC PARAMETERS ON THE GEOGRAPHICAL DISTRIBUTION OF THE PEST *Tanymecus dilaticollis* Gyll. IN THE ROMANIAN PLAIN

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Abstract

The aim of the work was to determine the influence of recent climate changes on geographical distribution of the pest Tanymecus dilaticollis Gyll. in the main maize and sunflower growing areas from south and southeastern Romania. In the period 2021-2022, monitoring of the adults activity in laboratory and field conditions, adults abundance and climatic parameters were carried out in 60 farms. The results showed that the increase in temperature favour the activity of Tanymecus dilaticollis, the adult active period longevity was found to expanded by approximately 20%. The pest adult's abundance during the maize and sunflower early vegetation period varied from 3.67 to 27.24 adults per square meters in 2021 and from 7.21 to 16.27 adults per square meters in 2022.

Key words*: pest, maize, climatic parameters, Tanymecus dilaticollis.*

MAIZE INSECT PEST MANAGEMENT IN A CHANGING CLIMATE - A REVIEW

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Abstract

Due to human activity, climate change has emerged as one of the most important issues of our time. Climate change has been generally recognized to have an impact on rising temperatures and extreme weather events, but it also has an equally serious impact on agricultural systems, particularly with regard to insect pests. The role of insect pests holds substantial importance in determining global food security and the sustainability of agriculture. According to the Food and Agriculture Organization (FAO), there is a projected need for a 60% increase in global food production by the middle of this century to meet the demands of a growing world population and their evolving dietary preferences. However, the existing impacts of climate change on agriculture are evident, affecting the biology, distribution, and potential outbreaks of pests across diverse land uses like maize crops. The concept of Integrated Pest Management (IPM), initially centered on insect control, underscores a strategic approach emphasizing the reduction of insecticide use. This reduction is achieved by prioritizing biological control, cultural practices, and other non-chemical tactics for pest management.

Key words*: monitoring, insect pest management, maize, climate change.*

COMMON BASIL IN THE REPUBLIC OF MOLDOVA - ACHIEVEMENTS AND PROSPECTS

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Abstract

The paper indicates the results obtained over 19 years of research on the common basil species (Ocimum basilicum L.) as an aromatic and food crop, the description of the cultivars bred and registered in the Catalogue of Plant Varieties of the Republic of Moldova, as well as elaborated technological elements. The data on the morpho-biological parameters and the production of fresh and dried raw material and essential oil in the researched cultivars were obtained after conducting different tests over several years in various scientific institutions. The cultivars of basil were selected according to the requirements of the regional and local market for aromatic herbs. The cultivars created and registered are meant for the food industry, but they have various purposes of use - those with lemon flavor are best suited for hot drinks and refreshing ones, those with savory and "sweet" flavored foliage - for garnishing appetizers and salads, and the cultivars with peppery flavored foliage - for the preparation of meat and fish dishes. Thus, 6 cultivars of aromatic basil have been created and registered, for various uses, suitable for the pedoclimatic conditions of our country and nearby areas, with high productivity of fresh and aromatic raw material.

Key words*: Ocimum, cultivar, aromatic herb, raw material.*

RESEARCH ON WHEAT SEED GERMINATION AS A FUNCTION OF TEMPERATURE, UNDER THE INFLUENCE OF TREATMENT WITH BIOSTIMULATORS AND AT DIFFERENT LEVELS OF FERTILIZATION

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Abstract

A bifactorial experiment was set up on the SCDA Caracal cernoziome in 2020 and 2021 to study the influence of biostimulator seed treatment (Ympact and Kerafol) on different doses and levels of fertilization. The seed was tested for germination at different temperatures (1°C, 10°C, 15°C and 20°C) as well as for the number of days required for germination. Germination was determined in a temperature-controlled growth chamber - Snijders Scientific. Without implying the influence of treatment, it was observed that wheat variety Glosa germinated at all temperatures, distinctly and very significantly more than at 1°C. However, there were no differences between the other temperatures, each taken as a control. The number of days required for germination were very significantly reduced from one temperature to another. At 1°C, wheat takes 33 days to germinate, while at 20°C, only 4 days. In the NPK fertilized variant in autumn + ammonium nitrate and foliar in spring, the germination of the seed obtained is very little differentiated between temperatures of 5, 10, 15 and 20°C as well as between the biostimulator treatment variants.

Key words*: biostimulator, fertilization levels, germination, number of days required for germination, wheat.*

RESEARCH ON THE INFLUENCE OF TILLAGE AND VARIETY ON CHICKPEA PRODUCTION IN PEDOCLIMATIC CONDITIONS FROM MOARA DOMNEASCĂ, ROMANIA

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Abstract

Recently, climatic changes have induced long periods of drought during growing season that caused a high dicrease of agricultural yields of classic grain legumes crop. In this circumstances, chickpea crop is considered to be more and more involved in crop rotation in Romania as it withstands drought best and has very good nutritional value. Thus, improving crop technology becomes an important aim for near future. This study aimed at the impact of tillage and chichpea varieties on quantity and quality index under climatic environment of Moara Domneasca in 2022 where at three varieties of chickpea (Burnas, Rodin, Kuky) three types of tillering were performed (plowing at 25 cm, subsoiling at 35 cm and disc harrowing at 12 cm). Finally, it was concluded that type of tillage most influenced yields than varieties, best average yield being 1575 kg/ha when plowing at 25 cm. Also, tillage types positively impacted quantity and quality indexes of chickpea yields in a higher degree than varieties.

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

EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF THE MONOECIOUS HEMP (*Cannabis sativa* L.) SEED OIL, VARIETY MARA 21

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Abstract

Cannabis sativa L. is one well-known medicinal plant that has attracted interest recently and throughout the years. Our research aimed to highlight the antimicrobial activity of hemp seed oil, the Mara variety cultivated under the conditions of the University of Life Sciences in Timisoara, on 12 microbial strains. The results demonstrated antimicrobial efficacy dependent from one species to another, as follows: an upward trend, positively correlated with the concentration increase tested in the case of: Streptococcus pyogenes, Staphylococcus aureus, Shigella flexneri, Pseudomonas aeruginosa, Salmonella typhimurium and Candida albicans with MIC between 0.2 mg/mL and 8 mg/mL. As well as a downward trend, negatively correlated with concentration in the case of strains of Escherichia coli, Listeria monocytogenes, Haemophilus influenzae, Bacillus cereus and Candida parapsilopsis, where MIC was present starting with the concentration of 0.2 mg/mL. In the case of certain strains (Clostridium perfringens), Cannabis sativa L. oil showed a pronounced strain-boosting effect, with significant stimulation of bacterial growth. The results support further research into the effect of Cannabis sativa L. vegetable oil as a potential antimicrobial agent for microbial strains.

Key words*: Cannabis sativa L., hemp seeds, seed oil, bacterial strains, fungal strains.*

THE CURRENT STATE OF KNOWLEDGE REGARDING OAT CULTIVATION TECHNOLOGY

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Abstract

Oats (Avena sativa L.) are a multi-functional cereal crop plant, used worldwide both for human food consumption and for the animal feed as fodder plant. Nowadays, globally, oats are one of the most important but underutilized cereals. Oat grains are a cereal crop with beneficial health properties having a high content of multiple nutrients. This cultivated plant is distinguished from other cereal plants due to its high fiber content, its low caloric density and the highest protein content (around 15%). Achieving high yields and good quality oat in particular requires sufficient water and nutrients to be administered at the right times and in balanced combinations. In addition to the oat variety, the applied culture technology is also very important, water and nitrogen supply being essential for this crop plant. The present scientific work presents a review related to the oat cultivation technology according to the additional mineral fertilization, crop rotation and the influence of predecessor plants, the practice of oat-field intercropping recommended for a more sustainable production of high-quality yield.

Key words*: oats, cereal, intercropping.*

INFLUENCE OF SOWING TIME ON YIELD COMPONENTS OF WINTER BARLEY (*Hordeum vulgare* L.)

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Abstract

Sowing time is one of the most important technological link in winter barley crop as it may influence the quality of the yield. The aim of this study was to find out the influence of late sowing times at Lucian variety, grown under pedoclimatic conditions of Giurgiu county between 2021-2023. The assessments were conducted in order to evaluate production elements and the quality parameters (number of shoots, number of kernels on ear, the 1000-kernels weight, protein content and starch content). During the experimental period, the best results were recorded when sowing was performed at the beginning of November at 600 seeds on square meter, resulting in 6074 (2022) and 6254 kg/ha yield (2023). As far it concerns the quality components investigated, the best results were recorded when the Lucian barley genotype was sown in early November, that significantly influenced the grain yield and yield components in two succesive years.

Key words*: barley, sowing time, yield, yield components.*

EFFECT OF SOWING DENSITY ON QUANTITY AND QUALITY OF PRODUCTION IN WINTER BARLEY (*Hordeum vulgare* L.)

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Abstract

Winter barley (Hordeum vulgare L.) is an important crop in Romania grown under different pedoclimatic conditions over whole country. The aim of this study was to establish the influence of four different sowing densities (300, 400, 500 and 600 seeds/m^2) of Lucian variety and of Jallon hybrid (200, 250, 300 and 350 seeds/m^2), under pedoclimatic conditions of Giurgiu county during 2021-2022. Assessments were conducted in order to evaluate production elements and the quality indexes (number of tillers, plants height, number of ears, number of grains/ears, the 1,000-grains weight, protein content and starch content). The results obtained showed that yield was obviously influnced by sowing density and by variety grown. Hybrid Jallon has provided the highest yield (7,875 kg/ha) when sown at 350 seeds on square meter. An yield of 6,487 kg/ha has been recorded when Lucian variety was sown at 600 seeds on square meter. Productivity elements and quality indicators of barley yield were strongly influenced more by sowing density than variety sown.

Key words*: winter barley, density, quality indexes, varieties, genotypes.*

PECULIARITIES OF SUNFLOWER DISEASES DEVELOPMENT IN THE LEFT-BANK FOREST-STEPPE OF UKRAINE

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Abstract

The article presents the results of research conducted in 2023 on the basis of the Dokuchaevske Experimental Field of the State Biotechnology University. The aim of the work was to study the complex of fungal pathogens of sunflower and to investigate the dynamics of the most harmful of them in the conditions of the Left-Bank Forest-Steppe of Ukraine. The instability of weather conditions in the Left Bank Forest-Steppe (heavy short-term showers alternating with drought) and violation of agricultural practices (non-compliance with crop rotation, sowing dates, unsuccessful predecessors, etc.) lead to sunflower diseases of different etiology. The time of occurrence and the degree of development of the disease is determined by the meteorological conditions of the year, the timing of sunflower sowing and the biological characteristics of the fungi themselves. The study of the development of fungal diseases of sunflower showed that the most harmful and widespread diseases during the study period were: rust (Puccinia helianthi Schw.), downy mildew (Plasmopara helianthi Novot. f. helianthi), phomopsis stem canker (Phomopsis helianthi Munt. Cvet. et al.).

Key words*: sunflower, diseases, crop rotation.*

COMPARATIVE RESEARCH OF PRODUCTIVE AND QUALITATIVE INDICATORS IN LAVENDER VARIETIES CULTIVATED IN EASTERN BULGARIA

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Abstract

Lavender (Lavandula angustifolia Mill.) is one of the most significant essential oil crops in Bulgaria. It is a perennial bush belonging to the Lamiaceae family and is mainly cultivated for its fresh inflorescences. The experimental work was conducted in the Eastern Bulgaria region, specifically in the city of Aytos, during the period of 2020 to 2022. The experiment was carried out on cinnamon forest soil type using a randomized block design with four replications and a plot size of 10 m^2. Three lavender varieties were tested: Hemus, Yubileyna, and Sevtopolis. The aim of the investigation was to establish the productivity and quality of lavender varieties cultivated in the eastern part of Bulgaria. The analysis of the results showed that over the three-year experimental period, the highest yield of fresh inflorescences was obtained from the Sevtopolis variety, while the highest percentage of essential oil content, as well as the highest essential oil yield, was realized from the Yubileyna variety. The content of linalyl acetate and linalool is 1:0.7 only in the Hemus variety, which defines the essential oil as high quality.

Key words*: lavender, variety, yield, quality, essential oil.*

RESULTS ON THE CORRELATION BETWEEN FLOWERING AND PRODUCTIVITY IN SOME PEANUTS GENOTYPES GROWN ON SANDY SOILS IN SOUTHERN OLTENIA

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Abstract

The research was carried out in the period 2021-2022 at the Research and Development Station for Plant Culture on Sands Dabuleni, with the objective of evaluating the vegetative growth, main productivity elements and the production of eight peanuts genotypes grown on sandy soils. The results showed that the percentage of flowers transformed into gynophores and the percentage of gynophores transformed into pods were characteristics that contribute to the increase of production in peanuts grown on sandy soils. The total number of flowers per plant was negatively correlated with the percentage of flowers transformed into gynophores and pods, while the percentage of flowers transformed into gynophores and pods were positively correlated with pod production. The highest pod production was obtained in the Viviana genotype which had the lowest number of flowers per plant and the highest percentage of flowers that developed into pods.

Key words*: peanuts, sandy soils, production, pods.*

PHENOTYPIC DISTANCE OF BULGARIAN AND HUNGARIAN COMMON WINTER WHEAT GENOTYPES

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Abstract

The field experiment was conducted during the period 2020-2023 on an experimental field at Institute of Plant Genetic Resources "K. Malkov" in town of Sadovo, central southern Bulgaria. Five Hungarian, 4 standart varieties and 16 advanced lines winter common wheat were included in the experiment. The following traits were reported: grain yield, test weight, 1000 grains weight and plant heigth. The mathematical processing of the obtained results was carried out by Duncan`s multiple range test, mean, min and max values, CV and standard error, PC and Cluster analysis. Greater diversity was observed in the traits 1000 grains weight, test weight and height, while grain yield was less. The analyzes carried out will also help to select parental forms to create new varieties with the potential for high yield and quality.

Key words*: common winter wheat, phenotypic distance, cluster analysis, PC analysis.*

GROWING POTATOES WITH REDUCED TILLAGE

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Abstract

The aim of the experiment is to study the possibility of growing potatoes with a limited number of soil cultivation, at the beginning of the vegetation. The experiment was conducted at the Vrazhdebna training field of the University of Forestry, on fluvisols. The experiment is laid out according to the growing distance of 70 x 30 cm, with the Soraya variety. The soil cultivation was carried out pre-planting, at the beginning of the experiment and consisted of cultivation at a depth of 20-25 cm and subsequent furrowing at 70 cm between the furrows. During the growing season of the plants, the weed communities in the experiment were recorded, after which the inter-row weeds were mowed. There are two variants - with one mowing and with two mowing of the weeds, with the shredded plant mass being used as mulch. The average yield from one plant with double mowing is 1.428 kg, while with the single mowed option it is 1.015 kg.

Key words*: potatoes, reduced tillage, weeds, yield.*

HETEROSIS BASED ON MALE STERILITY IN COTTON

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Abstract

Heterosis is a method of increasing productivity and is used in many crops. In cotton, heterosis is mainly related to yield and fiber length. Two male-sterile cotton lines ms 273 and ms 274 were included in crosses with five modern varieties: Chirpan-539, Natalia, Rumi, Helius and Nelina. Heterosis manifestations were found for productivity/plant (7.4-63.8%) and fiber length in the F_1 hybrids. The cultivar Chirpan-539 and Rumi variety, with high GCA for fiber length and high variances of SCA, emerged as suitable for heterosis selection of this trait. The crosses 273 × Nelina and 274 × Nelina, with the highest productivity\plant (39.5-42.1 g) and the highest heterosis (61.9-63.8%), the second one with high SCA effects, are of interest for the heterosis selection of productivity. The crosses 274 × Chirpan-539 and 274 × Natalia, with the longest fibers (28.9-29.3 mm) and heterosis (2.1-3.5%), the first one manifested high SCA effects, are of interest for the heterosis selection of fiber length. The results obtained are encouraging for the development of heterotic selection and practical use of heterosis in cotton based on male sterility.

Key words**:** *cotton, inheritance, combining ability, productivity, fiber length.*

THE INFLUENCE OF MINERAL FERTILIZERS ON THE DYNAMICS OF THE ACCUMULATION OF MAIN MACROELEMENTS IN THE SOIL AND IN WHEAT PLANTS

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Abstract

The experiment was carried out on chernozem during 2020-2021 in Dolj county, the wheat variety used is Glosa, an early autumn wheat, resistant to drought. The experiment was placed in the field according to the block method, in 4 repetitions with 8 variants. Following the use of different doses of fertilizers, the dynamics of nitric nitrogen, mobile phosphorus and mobile potassium in the soil, in the plant and in the grains were monitored at 3 determination dates, as well as the production obtained. After the analyzes carried out, it was found that the soil is rich in nitric nitrogen, ammoniacal nitrogen, the plants having at their disposal the nitrogen necessary for nutrition, and as regards the content of P and K, the soil is well supplied with these elements. Following the dynamics, the decrease in the content of main macroelements was observed, the younger the plants, the richer they are in these elements, and as the vegetative growth phase ends, the content decreases.

Key words*: fertilizers, wheat, protein, production.*

THE CONSEQUENCES OF THE USE OF FERTILIZERS ON THE PRODUCTION OF THE MAIN CULTIVATED PLANTS, IN THE SOUTH-EAST REGION, ROMANIA

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Abstract

In the recent past in order to increase the harvest, the production per hectare and its protection against pests and diseases, began to be used, in high doses, chemical and natural fertilizers. The aim of this paper is to analyse the impact of using five categories of fertilizers: chemical, nitrogen, phosphate, potassium and natural fertilizers from 1990 to 2022, in the South-East region of Romania, a predominantly agricultural area on vegetable agricultural production taking into account the three main types of crops: grains, maize, sunflower. In the 33 years, in the South-East region of Romania, the following amounts of chemical fertilizers 2.72 tons of 100% active substance/hectares; nitrogen fertilizers 2.22 tons of 100% active substance/hectares; phosphate fertilizers 1.79 tons of 100% active substance/hectares; potassium fertilizers 1.37 tons of 100% active substance/hectares and natural fertilizers 651.83 tons of 100% active substance/hectares. The analysis of the impact of fertilizers grains production varies from 2808398 tons in 1990 to 3387102 tons in 2022.

Key words*: chemical and natural fertilizers, agricultural production, main types of crops.*

THE STATISTICAL ANALYSIS OF THE PRODUCTIVITY AND THE BENEFIT OF PESTICIDES APPLICATION IN THE SOUTH-EAST REGION, ROMANIA

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Abstract

Without doubts, a balance between the application of pesticides, productivity and soil health control is essential for assuring sustainable agricultural performance. Nevertheless, pesticides proceed to be a critical tools for worldwide food guarantee, but their negative consequences should not be ignored precisely when sustainable agriculture is the world-wide target. The purpose of the present article is to present a statistical analysis using a parametric and a nonparametric correlations coefficient in order to study the effect of using three categories of pesticides: insecticides, fungicides, herbicides from 1990 to 2022, in the South-East region of Romania and the productivity of: barley, rape and soybeans. During the studied period, the quantity of pesticides per hectare is the following: insecticides 30.67 kilograms of active substance/ha; fungicides 103.81 kilograms of active substance/ha and herbicides 45.16 kilograms of active substance/ha. The statistical analysis shows that the highest correlation between insecticides and herbicides is that with barley of 0.816 and 0.860, while for fungicides is with rape -0.683.

Key words*: pesticides, statistical analysis, SE Region, Romania.*

GRAIN YIELD STABILITY ANALYSIS USING PARAMETRIC AND NONPARAMETRIC STATISTICS OF BULGARIAN AND HUNGARIAN COMMON WINTER WHEAT GENOTYPES

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Abstract

The research was conducted in the period 2020-2023 on the experimental field at the IPGR "K. Malkov", town of Sadovo. 5 Hungarian varieties, 16 advanced lines and 4 Bulgarian varieties of common winter wheat were evaluated for grain yield and stability. The stability of the grain yield was determined by the variances of stability (σi2 and Si2), equivalency (Wi), the criterion of phenotypic stability (Ysi), regression coefficient b_i and general adaptability. The highest average yield for the study period was obtained from MV-Nemere 864.4 kg/da, followed by RU179/1400 and MV-Nador -766.6 and 766.5 kg/da. The yield formed by the Hungarian varieties is relatively high and they are of interest for selection improvement work. In terms of grain yield, the lines RU 129/3053 and RU 177/486 have a complex stability assessment. The variety Sadovo1 is defined as very stable in different environments and valuable for selection programs.

Key words*: common winter wheat, grain yield, variances of stability, equivalency, phenotypic stability.*

ASSESSMENT OF THE HERBACEOUS CANOPY RADIATION PROFILES AND FORAGE QUALITY IN THE MOUNTAIN GRASSLANDS FROM FUNDATA AREA, ROMANIA

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Abstract

This work presents the mapping of the herbaceous canopy radiation profiles and forage quality in the mountain grasslands from the Fundata area, Romania. The dominant species is Agrostis capillaris and many other valuable grasses and legumes grow in the area. The measurements considered floristic composition, LAI, canopy height, and forage quality i.e., ash, protein, total fiber, nitrates, and phosphorus, respectively. The altitude influences the floristic composition and forage quality. The pastoral value was assessed as 67 which is considered as good value with a grazing capacity of 1-2 livestock units/ha. For sustainable grassland management in mountain areas, the role of perennial canopy amplifies, acquiring the valences of multifunctional utilization and requiring reliable methods for environmental protection and enhancing the natural specific landscape.

Key words*: floristic composition, LAI, canopy radiation, forage quality, altitudinal gradient.*

PRODUCTIVITY ASPECTS OF SOME ANNUAL FORAGE MIXTURES IN THE CONDITIONS OF BANAT PLANE

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Abstract

The current trends in agriculture in recent years are to considerably reduce the intake of chemical fertilizers, use of pesticides, and the costs of the energy consumption. Thus, the current focus is directed towards finding technological solutions to meet these requirements. One viable solution is mixes made from annual legumes and grasses. They constitute an important energy-protein source in the nutritional balance of the fodder ration. The purpose of this experiment was to identify the most efficient ratio (forage pea – oats) in terms of dry matter production (DM) and raw protein (CP). In the experimental device, two oat varieties (O) were sown in the spring and then used mixed with a pea variety (P). The proportions in which they were sown are P 33% + O 66%, P 50% + O 50%, P 66% + O 33%. For both varieties of oats, we used the same shares. According to the results obtained, the highest production of dry matter (DM) was obtained with P 50% + O 50% and the highest raw protein content was obtained with M 66% + O 33%.

Key words*: dry matter, forage mixtures, productivity, raw protein.*

YIELD AND GRAIN QUALITY OF WINTER WHEAT UNDER SHORT-TERM ORGANIC AND MINERAL FERTILIZATION IN A SYLVOSTEPPE AREA FROM ROMANIA

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Abstract

Common wheat (Triticum aestivum L.) is one of the most widespread cereal crops in Romania. Various factors, including the fertilization regime, climatic conditions, etc. can influence wheat yield and quality. It is commonly known that fertilization has a fundamental position in obtaining high yields and high-quality grains. Given the current trend towards the use of organic matter for fertilization and the reduction of synthetic fertilizers to mitigate the climate effects, our study aimed to assess the effects of short-term organic and mineral fertilization on wheat grain yield and quality. The field trial was set up at the Research and Development Station for Agronomy (RDSA) of Moara Domnească belonging to USAMV of Bucharest, Romania, on a preluvosoil-type soil. Three doses of manure compost (15 t/ha; 30 t/ha and 60 t/ha) were applied in the autumn of 2021 either alone or in combination with NPK complex fertilizers 20:20:0. The yield components, yield, and grain quality of winter wheat were positively affected by the application of organic and mineral fertilizers, with significant differences being observed between variants and compared to the control (soil).

Key words*: winter wheat, organic amendments, mineral fertilization, wheat yield, grain quality.*

ENRICHMENT OF THE SALAD BEET GENE POOL

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Abstract

A current trend could be the use of specific forms of beet to extract natural dyes, sugars and proteins from the beets' roots and leaves for the food industry. The selection of new varieties of salad root beet with a round shape of the root and hybrids with sugar beet to enrich the qualities during heat treatment is quite promising. In 2019-2022, individual crosses of sugar beet MS lines with salad beet pollinators were carried out. For evaluation and selection individual offsprings of the paternal salad beet, and hybrid offspring of the maternal sugar component were tested in a field trial for productivity and dry content. After selection, 6 elite populations of salad beet and 6 of their hybrids with sugar beet were propagated and evaluated. The results of the test indicate almost doubled yields of the hybrid forms after their stabilization with a single selection. The significantly higher sucrose content compared to the pollinators' content was also stabilized.

Key words*: salad beet, selection, productivity, dry content.*

CANOPY STRUCTURE AND LIGHT INTERCEPTION IN *Dactylis glomerata*, *Medicago sativa* and *Trifolium repens*: A NEXUS AMONG BIOLOGICAL EFFICIENCY AND FORAGE PRODUCTION

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Abstract

The study aimed to establish the nexus among biological efficiency and forage production by analyzing the canopy structure and light interception potential in orchard grass (Dactylis glomerata), alfalfa (Medicago sativa), and white clover (Trifolium repens). The measurements were performed in Gherghita Plain, at Pucheni village on large plots in 2023 by using the Delta-T Devices Sunscan Analysis system. The leaf area index (LAI), light parameters, and microclimate indicators were retrieved in each canopy of the studied species at various layers of 10 cm from the bottom to the top of the canopy. Consequently, a close relationship was observed between the biological efficiency, the leaf area distribution, and potential forage production for both grass species and legumes. The results are useful for planning biometrical parameters when developing new performant cultivars.

Key words*: LAI, extinction coefficient, leaf area distribution, beam fraction, light use efficiency.*

CULTIVATION OF SORGHUM IN POLAND AND ITS BIOACTIVE COMPOUNDS CONTENT

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Abstract

The intensive breeding work provided to study the possibilities of cultivating sorghum varieties that give fully mature seeds every year in temperate climate conditions. Five prospective varieties of sorghum were selected for field research. The average grain yield was 3-8 t/ha at 15% moisture. It indicates that with the ongoing climate change, it is possible to grow sorghum above 50 degrees north latitude. In addition, the research carried out so far in Poland has shown the high nutritional potential of this plant and the richness of active substances contained in sorghum grain from domestic crops. It has been shown that the tested material is a rich source of bioactive compounds with antioxidant properties. Among the carotenoids, lutein and zeaxanthin were the most found, and in the case of sterols, sorghum grain contained the most beta-sitosterol. Moreover, catechin is a flavonoid present in the highest concentration in the analyzed grain samples. Among the phenolic acids, the highest content in sorghum seeds was found for ferulic, p-coumaric and protocatechuic acids.

Key words*: sorghum, bioactive compounds, cultivation, seeds, climate change.*

RESEARCH CONCERNING POSSIBLE ALTERNATIVES AT SEED TREATMENT WITH NEONICOTINOIDS FOR CONTROLLING THE *Tanymecus dilaticollis* Gyll ATTACK AT SUNFLOWER CROPS

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Abstract

Maize leaf weevil (Tanymecus dilaticollis Gyll) is one of the main pests of the sunflower in Romania. This pest can destroy sunflower seedlings. Seed treatment with systemic insecticides was the most effective measure for maize leaf weevil control. After the ban of the neonicotinoids in the EU, no alternative for sunflower seed treatment remained available in Romania. This study has tested possible alternatives for replacing the neonicotinoids, for controlling the maize leaf weevil. The experience was carried out at the NARDI Fundulea, in the southeast of Romania, in 2021 and 2022. This study has tested seed treatment with cypermethrin active ingredient, seed treatment with cypermethrin, followed by foliar treatment with cu deltamethrin or acetamiprid, seed treatment with neem oil, and treatment with a biological insecticide on the base of Beauveria bassiana entomopathogen fungus, in two doses. This study, in both years, hasn't registered significant statistical differences concerning weevil density between treated sunflower plots and control (untreated) plots. Regarding maize leaf weevil attack on sunflower plants, in both years it hasn't registered significant statistical differences between the control and treated plots.

Key words*: sunflower, weevils, damages, early stages.*

DEVELOPMENT OF DURUM WHEAT (*Triticum turgidum* subsp. *durum* (Desf.) Husn.) GROWN AFTER A DIFFERENT PREDECESSOR UNDER ORGANIC FARMING CONDITIONS

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Abstract

During the period 2019-2022a field experiment was carried out with durum wheat variety 'Progress', grown after three predecessors - peas, cotton and sunflower on the experimental field in Field Crops Institute - Chirpan under the conditions of organic farming. The beginning and duration of the following phenological phases were tracked: emergence, third leaf, tillering, spindle, outgrowth and full maturity. In organic cultivation of durum wheat after a pea predecessor, the phenological phases from budding to full maturity occur 6 days earlier than in the other two predecessors. It was found that during the study period the yield was greater after the predecessor pea. In the same variant, durum wheat plants are taller and have higher values of the reported indicators. The highest number of emerged 539 and recovered plants 492 was reported after predecessor cotton in the 2019/2020 crop year.

Key words*: durum wheat, organic farming, predecessors.*

ASSESSMENT OF THE PRODUCTIVE POTENTIAL AND ESSENTIAL OIL QUALITY OF *Salvia sclarea* AFTER LEAF TREATMENT

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Abstract

In line with the needs of the Green Deal, Europa's Common Agricultural Policy follows the strategy for sustainable agriculture. The biostimulators, which are gaining increasing popularity, are an essential tool for ensuring an integrated approach of all agricultural raw materials. The aim of the present study is to investigate the effect of the biostimulators Speed$^{b®}$ and Amino Expert® Impuls, as well as of the foliar fertilizer and immunomodulator Acramet Ultra® on the elements of productivity, yield of fresh inflorescences, essential oil content and composition of Salvia sclarea. The experiment was arranged according to the randomized block method in four replications with plot size of 15 m^2. The used products affected positively the productivity, as the treatment with Speed$^{b®}$ led to highest increase in the yield of fresh flower spikes with 25% when comparing with the control. Only the treatment with both biostimulators increased the essential oil content, as the highest values were obtained when using Amino Expert® Impuls. Based on the results, the products could be recommended and successfully used depending on the production direction.

Key words*: biostimulators, essential oil composition, Salvia sclarea, yield.*

YIELD AND STRUCTURAL COMPONENTS OF THE SPIKE OF LOCAL SPECIES OF *Triticum dicoccum* Sch., *Triticum spelta* L. AND *Triticum monococcum* L. IN THE CONDITIONS OF CENTRAL SOUTH BULGARIA

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Abstract

In the period 2018-2021 at the Agricultural University of Plovdiv, Bulgaria, a comparative study was conducted on the productivity of three local species of Triticum dicoccum Sch., Triticum spelta L. and Triticum monococcum L. A block method was used, in four replications, the size of the reporting plot was 10 m². The influence of the year and the species on the yield and the structural components of the spike were studied. It has been established that grain yield is formed under the strong and proven influence of the year. There are also proven differences between the yields of individual species (Triticum spelta L. - 2906 kg/ha; Triticum monococcum L. - 2660 kg/ha; Triticum dicoccum Sch. - 2268 kg/ha). The longest spike forms Triticum spelta L. - 8.2 cm, and the shortest - Triticum dicoccum Sch. - 3.5 cm. The largest number of spikelets formed Triticum monococcum L. (19.2). Triticum. spelta L. has been proven superior in terms of number of grains per spike and grain mass per spike to the other two species.

Key words: spike, *Triticum dicoccum Sch., Triticum monococcum L., Triticum spelta L., yield.*

AGRO-CLIMATIC CONDITIONS FOR GROWING OF SUNFLOWER IN DIFFERENT CLIMATIC AREA IN BULGARIA

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Abstract

Assessment of agro-climatic resources of the agricultural regions relates to the biological requirements of the crops and the applied agricultural techniques. Agro meteorological conditions determine 65-80% of the potential productivity of agricultural crops. In the years after 2000, unfavorable tendencies in the values of meteorological elements, as well as an increase in the frequency of extreme weather events, are a fact. These features of the weather create risky conditions for the cultivation of sunflower in some areas of traditional producers of this crop. The aim of this study is the assessment of the agro-climatic conditions for the cultivation of sunflower in Bulgaria. A comparative analysis and evaluation of the agro-climatic conditions for growing sunflowers in three locations - Chirpan, Karnobat and G. Toshevo and their influence on the growth, development and productivity of sunflowers was made. The experimental fields are located in two climatic sub-regions of the European-continental climatic region - moderately continental (G. Toshevo) and transitionally continental (Chirpan and Karnobat) regions. The new climatic norms of the meteorological elements for the period 1991-2020 were used in the comparative analysis.

Key words*: sunflower, hydrothermal conditions, Principal component analysis (PCA), phenology, yield.*

THE INFLUENCE OF SEED TREATMENT ON GRAIN YIELD AND THEIR QUALITY IN SOME VARIETIES AND LINES OF WHEAT (*Triticum aestivum* L.)

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Abstract

Wheat crops are affected by various pathogens and pests. which can cause considerable production losses. that is why it is essential to carry out seed treatments. The biological material was represented by the Trivale variety, being an older variety, resistant and adapted to specific soil conditions, and two new wheat lines. This paper presents results obtained during one year, regarding the effect of seed treatment and additional fertilization on the production and quality of the Trivale wheat variety and lines A4-10 and A44-13. The use of fertilizers is important because it causes qualitative and quantitative changes. The experimental factors studied, factor A - genotype, factor B - seed treatment, factor C - fertilization, generated statistically assured interactions.

Key words: *quality, fertilization, wheat, production, seed, treatment.*

COMPARATIVE ANALYSIS OF VARIOUS WINTER WHEAT VARIETIES CULTIVATED UNDER THE CLIMATIC CONDITIONS OF ARDS BRAILA

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Abstract

In the context of ensuring better food security and in line with the objectives of the field crop research strategy, increasing wheat production capacity remains a priority. This has been achieved by studying a set of local and foreign winter wheat varieties to test their genetic potential in specific pedoclimatic conditions of the ARDS Braila area of influence, respectively, the North-East Baragan. During the agricultural years 2020-2021 and 2021-2022, a total of 14 varieties of autumn wheat were tested under conventional technology conditions. Yield levels under the conditions of an optimal rainfall agricultural year 2020-2021 were satisfactory for the wheat crop, and yields in the range of 5582-7994 kg/ha were obtained. In the agricultural year 2021-2022, characterized by very dry rainfall throughout the year, with a total deficit of 155.7 mm compared to the multi-year average, wheat yields were in the range of 5435-6746 kg/ha.

Key words*: winter wheat, pedoclimatic conditions, yield.*

FORMATION OF PRODUCTIVITY AND QUALITY INDICATORS OF SOYBEAN GRAIN DEPENDING ON THE ELEMENTS OF ORGANIC CULTIVATION TECHNOLOGY

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Abstract

The article presents the results of studies of the influence of weed control measures and seed inoculation on the productivity and quality of soybean varieties under organic cultivation. The highest level of grain yield in the varieties Angelica, ES Visitor and Ezra was obtained by hilling soybean plants in the phase of the 1st true leaf - 2.11, 2.43 and 2.48 t/ha. The maximum grain yield was obtained in the variety Ezra - 2.19 t/ha, in ES Visitor it was 2.10 t/ha, and in Angelica - 1.81 t/ha. The maximum number of beans per plant (31.8 pcs.), number of seeds per plant (38.6 pcs.), their weight (7.99 g) and weight of 1000 seeds (165.6 g) was obtained in the variety Ezra for inoculation with the preparation Hystik soya against the background of hilling soybean plants in the phase of the 1st true leaf. Among the studied soybean varieties, the maximum protein content was 41.8-44.1% in Angelica, and 21.0-23.0% in ES Visitor. Weed control measures did not affect the fat and protein content of soybean grain.

Key words*: soybean, variety, organic technology, seed inoculation, weed control measures.*

SOME AGROBIOLOGICAL PECULIARITIES AND QUALITY INDICES OF BIOMASS OF *Macleaya cordata* 'MIHAELA'

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Abstract

Plume poppy – Macleaya cordata (Willd.) R.Br., Papaveraceae family is a perennial herbaceous species with medicinal, melliferous, ornamental and energy biomass utility. The harvested stem biomass from Macleaya cordata can be used as feedstock for the production of solid fuel – briquettes and pellets. The objective of this research was to evaluate some agrobiological peculiarities and quality indices of biomass of Macleaya cordata 'Mihaela' grown in experimental field of the NBGI MSU Chişinău, Republic of Moldova. At the end of the flowering period, Macleaya cordata shoots reach 303-320 cm in height, with 35.8-38.2% leaf share. The content of alkaloids in Macleaya cordata leaves was: 7.36-8.12 mg/g sanguinarine, 5.91-6.82 mg/g chelerythrine and 0.659-0.757 mg/g fagaridine. It has been determined that the stem dry matter productivity of Macleaya cordata harvested in August was 1.19-1.40 kg/m^2, but – of plants harvested in November – 1.67-1.79 kg/m^2. The comparative analysis of cell wall components revealed that Macleaya cordata substrate contained 406-503g/kg cellulose, 212-243 g/kg hemicellulose and 91-104 g/kg acid detergent lignin, the estimated theoretical ethanol yield from cell wall carbohydrates averaged 448.7-541.8 L/t in Macleaya cordata substrates.

Key words: *agrobiological peculiarities, alkaloids, biomass, gross calorific value, Macleaya cordata 'Mihaela' theoretical ethanol potential.*

FORMATION OF YIELD AND BIOCHEMICAL PARAMETERS OF WINTER WHEAT GRAIN DEPENDING ON AGRONOMIC PRACTICES OF CULTIVATION

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Abstract

In the Northern Steppe of Ukraine, a significant effect of weather conditions, predecessors, fertilisation and sowing dates on the formation of yield and biochemical parameters of winter wheat grain was established. It was found that the cultivation of winter wheat on black fallow and after spring barley resulted in higher yields at the optimal sowing date (20-25 September) compared to early (5-10 September) and late (5-10 October) sowing dates. Pre-sowing application of complete mineral fertiliser and nitrogen feeding led to an improvement in both yield and grain quality of winter wheat. Moreover, more significant increases in winter wheat yield were recorded after the non-fallow predecessor. The durum winter wheat of Burshtyn variety produced a lower yield compared to the soft wheat varieties, but it exceeded these varieties in terms of protein content. The sedimentation values of durum wheat flour were very low (in the range of 12-20 ml), which indicates the specificity of its uses. At the same time, the sedimentation values of flour of soft wheat varieties used for baking purposes varied between 35-50 ml, depending on the agronomic practices of cultivation.

Key words: *biochemical parameters of grain, fertilisation, predecessor, sowing date, winter wheat, yield.*

RESEARCH REGARDING THE INFLUENCE OF INTERMEDIATE CROPS ON POTATO HARVEST AND QUALITY FOR CONSUMPTION

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Abstract

The research was carried out in the Bozovici Depression located in southwest Romania. From which it follows that the area falls under the moderate temperate continental climate. The soil type is semicarbonate eutric alluvial soil. The experiments were bifactorial in which factor A was the preceding plant and factor B was the number of nests/hectare. The choice of the bean (Vicea faba L) used as an intermediate plant is motivated by its ecological flexibility and the amount of green mass it produces. The synthesis of the harvest results obtained in the experimental cycle 2021-2023 for potatoes showed that the highest harvest was obtained in the variant autumn barley + grain of 32,376 kilograms/hectare followed by the variant of autumn wheat + grain of 31,287 kilograms/hectare, and the lowest harvest was obtained in the variant in which the potato followed after grain corn of 26,492 kilograms/hectare. Among the plots tested, the variant with 65,000 nests/hectare stood out.

Key words*: potato, intermediate crops, yield impact.*

EFFECT OF MICRONUTRIENTS APPLIED TO WINTER WHEAT

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Abstract

Foliar fertilization provides plants with the nutrients needed for optimal development much faster compared to conventional (root) fertilization. Each element has an important role in plant metabolism. To evaluate the influence of micronutrients, the liquid fertilizer whose content is shown in table 1 was experimented in the southern area of Romania on the Izvor variety, for two consecutive years (2020-2022). The research was carried out according to the method of randomized blocks, in three repetitions, with four foliar applications. These were: FA 0 (control), FA 1 (one foliar application) to FA 4 (four foliar applications). Application intervals were seven days, and the first foliar application was made seven days after full emergence. The results indicated that the effect of micronutrients can be significant in terms of yield, 1,000-grain weight and harvest index. Also, the interaction between year and foliar application was significant for chlorophyll b production and 1,000-grain mass. The experimental variant with the 4 foliar applications indicated a 15% increase in productivity. So, foliar application of micronutrients is a more efficient procedure in the field of wheat nutrition compared to the soil application method due to the higher absorption rate. Research shows that foliar fertilization can be an effective method to supplement and stimulate root uptake of elements to increase productivity.

Key words*: chlorophyll, foliar fertilization, micronutrients, productivity, wheat.*

RESULTS WITH WEEDS COMPETITION AND THEIR CONTROL IN SOYBEAN CROP

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Abstract

In the area of heavy clay soils in the South, soybeans are weedy at high levels. Currently, new, diverse and especially complex results are still required in the success of weed-free soybean crop. On the one hand, studying the relationship between soybean plants and weeds is important in determining the best measures to reduce competition. In conditions of natural weeding, large amounts of biomass are formed, on average 13.48 t/ha. In the weedy control, soybeans produce in most years between 200 and 600 kg/ha, which represents about 20% of the total. From the structure of the weeds, AM were at 61%, AD at 26%, and PD constituted 13%. The interaction with weeds resulted in total biomass losses of 2/3 of normal, and the accumulation of dry weight in grain it was reduced to a rate of only 1.1 g/m^2/day, compared to the normal 10.2 g/m^2/day. Mechanical and manual weeding brought a total production increase of 1938 kg/ha, and herbicides favored the formation of grain production of over 2000 kg/ha. In the current conditions of climate change, the reduction of herbicide doses must be done with great caution.

Key words*: competition, herbicides, weed control, weeding systems, soybeans.*

FIRST GROWING CYCLE PERFORMANCES OF PERENNIAL WHEAT GENOTYPES

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Abstract

Intermediate wheatgrass, or perennial wheat (Thinopyrum spp.), a relative of common wheat (Triticum aestivum L.), exhibits a perennial growth habit and offers resistance to a diverse range of biotic and abiotic stresses, making it valuable in sustainable wheat production. This study evaluated the performance of 20 perennial wheat genotypes and two commercial bread wheat varieties in Bornova, Turkey, during the 2021-2022 growing season. Perennial wheat, a relative of common wheat, demonstrates a perennial growth habit and resistance to various stresses, making it valuable for sustainable wheat production. The experiment, following a randomized complete block design, measured seven agromorphological traits. Commercial varieties Basribey and Masaccio showed superior plot yields (224 g/plot and 218 g/plot, respectively), with genotype G19 closely following (145 g/plot). Genotype G11 exhibited the lowest plot yield (13.8 g/plot). For single plant yield, perennial wheat genotypes G13 and G21 performed similarly to Basribey and Masaccio, indicating their promising potential. The study concludes that these promising perennial wheat genotypes need further investigation in subsequent years to assess their continued performance and explore their quality characteristics.

Key words*: Perennial wheat, yield, intermediate wheatgrass, sustainable grain.*

HELMINTOLOGICAL BIOLOGICAL CONTROL IN SOYBEAN (*Glycine max* L.) UNDER THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

An important step in the process of increasing the productivity and quality of soybean (Glycine max L. Merr.), grown under the conditions of the Republic of Moldova, is the phytosanitary control on the parasitic helminthological fauna in order to apply the necessary protection measures. The investigations were carried out in 10 administrative districts of the North-Central – South-East areas, 10 localities, on 15 soybean sectors from various areas cultivated with fabaceae, where over 200 soil samples were collected, for further analysis in the laboratory. As a result of the helminthological investigations, the degree of impact was established, being represented by the number density of 50-250 individuals 100 g/soil, with an abundance of 10-25%, in spring. The indices of frequency and intensity of helminthologic impact were estimated at higher values (10-30%) in late spring-summer, differing among plantations. The complexes of phyto-nematode parasites consisted of 22 species, of 8 families and 2 orders. The endoparasites of the Pratylenchidae family, genus Pratylenchus predomonated, followed by the ectoparasites and semiendoparasites of the Hoplolaimida, Telotylenchidae, Criconematidae, Neotylenchidae, Tylenchidae families, differentiated by areas and environmental conditions.

Key words*: soybean, nematodes community, phytosanitary monitoring, abundance, trophic groups, diversity of species, helminthological diseases.*

EFFECT OF DIFFERENT TYPES OF MINERAL FERTILIZATION ON YIELDS AND RESISTANCE TO PHYTOPATHOGENS AND ENVIRONMENTAL STRESS IN WHEAT

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Abstract

The study was conducted within the Longstanding Stationary Fertilizer Experiment (LSFE) in IASS "Obraztsov Chiflik", Rousse with the aim of establishing the influence of different options of mineral fertilization on yield and resistance to environmental stress and the development of phytopathogens in common wheat. It was found that the highest yield for the period - 6,080 kg ha^{-1}, was obtained in the experimental plot with full mineral fertilization ($N_{15}P_{12}K_7$), which represents more than a two-fold increase compared to the average yield obtained from the control. Phytopathological analysis shows that the seeds obtained from the variant with full mineral fertilization have the lowest percentage of phytopathogens (0.75-2.00%) while 22% of the seeds in the control was damaged by Tilletia. The variants with potassium fertilization (K_7) stand out as the most resistant to atmospheric drought during the four-year research period, with the reported values - 58.61μS cm^{-1}, being 12% lower, compared to the control. The highest resistance to soil drought was established for the variants with potassium (K_7) and phosphorus (P_{12}) fertilization, respectively 83.02 μS cm^{-1} and 83.05 μS cm^{-1}.

Key words*: drought resistance, mineral fertilizers, phytopathogens, wheat, yield.*

THE INFLUENCE OF DIFFERENT TYPES OF COMPLEX FERTILIZERS DEPENDING ON THE METHOD OF APPLICATION ON THE PRODUCTION OF THE SUNFLOWER CROP

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Abstract

Sustainable agriculture is correlated with the rational use of fertilizers, mineral nutrition being one of the main production factors that directly influence the achievement of safe, constant and quality agricultural production. The use of modern, intensive, but equally environmentally friendly technologies can ensure the production objectives of farmers, ensuring the profitability of activities carried out in compliance with production and environmental protection norms. In the research carried out, three types of complex fertilizers were used for sunflower cultivation, namely: NPK 20-20-0, NPK 10-24-0 and NPK 18-46-0, these being applied in two ways: localized and scattered. Following the productivity analyses, the best production was obtained in the variant fertilized with the product NPK 10-24-0 applied as spread (2573.95 kg/ha) and the lowest production was obtained in the variant fertilized with NPK 20-20-0 product applied localized (1566.75 kg/ha).

Key words*: sunflower, fertilization, production, application method.*

ANALYZING THE IMPACT OF CLIMATE VARIATIONS AND FERTILIZER APPLICATION ON SOYBEAN CULTIVATION ACROSS WESTERN, SOUTHERN AND CENTRAL REGION OF ROMANIA

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Abstract

Analyzing the soybean productions obtained at the national level in recent years, it has been observed that they are increasingly higher from year to year. This aspect reflects the growing interest of farmers in cultivating this plant. This work highlights how the climatic conditions in the year 2023 and the quantity of fertilizers applied influenced the development of soybean plants as well as the bean production. The experiment was conducted in three different agricultural areas in Romania, using four soybean varieties, and the fertilizers were applied in two different quantities. Throughout the vegetation period, several biometric measurements were taken, and the results of the experiment revealed how the climate of the selected regions, as well as the rate of applied fertilizers, influenced the development of the plants and the yields obtained.

Key words*: agriculture, biometrics, climate, fertilization, soybean.*

STUDY OF THE ECOLOGICAL STABILITY OF SOME ESSENTIAL-OIL AND OILSEED TECHNICAL CROPS IN BULGARIA

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Abstract

In the present work, the "genotype-environment" interaction of the yields of essential oil and oilseed technical crops in Bulgaria is investigated and analyzed. Data are presented for a fourteen-year period related to yields of: rose, lavender, mint, coriander, valerian and lemon balm, sunflower, canola, soybeans, peanuts, pumpkins. It was established that among the essential oil crops with the highest yields is mint (9250 kg/ha), and with minimum yields - coriander (914.3 kg/ha). Mint proves to be the crop with the greatest degree of susceptibility to environmental factors in terms of yields compared to other crops of this group. Among the oilseed technical crops, rapeseed has the highest, but unstable, yields (2063.8 kg/ha). Pumpkins for seeds are the lowest (662.9 kg/ha). The most resistant to external factors are sunflowers and pumpkins, which makes them a preferred crop for cultivation in regions with changing climatic conditions.

Key words*: ecological valence, essential oil crops, one-way analysis of variance, technical oil crops.*

VARIABILITY OF SOME INDICATORS OF TRITICALE VARIETIES (× *Triticosecale* Wittm.) COMPARED TO THE GRAIN YIELD

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Abstract

A field trial has been carried out in the Experimental field of the Agricultural University - Plovdiv. The experiment was arranged according to the split-plot method. The following varieties were studied: Lasko, Boomerang, Respect and Attila (split-plot), grown under two levels of nitrogen fertilization - 60 and 180 kg/ha nitrogen (main plot). The variety Lasko differed significantly as less productive. All Bulgarian varieties have approximately the same crude protein content in the grain. Compared to them, Lasko has a higher protein content. From the correlation analysis between grain yields and other indicators, it was found that all structural elements (plant height; the number of spikes per plant; length of spikes; the mass of grains per spike and mass of 1000 grains) are positively related to the grain yields. The crude protein content is negatively related to the grain yields from which it can be concluded that higher grain yields leads to a decrease in the crude protein content in it.

Key words*: triticale, nitrogen fertilization, yield.*

TESTING NEW DURUM WHEAT VARIETIES FOR PRODUCTIVITY

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Abstract

In the Educational, Experimental and Implementation Base of the Agrucultural University of Plovdiv, a field trial was conducted in 2018-2021, in which new varieties of durum wheat (Triticum durum Desf.) were tested, including: Viomi, Saya, Railidur and Helix. The varieties were compared with the Predel variety, which is the productivity standard in Bulgaria. From the field trial it was proved that the productivity of durum wheat variety Helix was the highest 4.732 t/ha which is 0.511 t/ha (12.1%) higher grain yield compared to the standard variety Predel. The yields of the other durum wheat varieties studied were as follows: variety Viomi 4.572 t/ha with 0.351 t/ha (8.3 %); variety Saya 4.421 t/ha with 0.200 t/ha (4.7 %) and variety Railidur 4.379 t/ha with 0.158 t/ha (3.7 %) more grain compared to variety Predel.

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

NEW BULGARIAN HIGH YIELDING COTTON VARIETIES - KRISTAL, ORFEY AND SNEJINA

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Abstract

Productivity and technological fiber properties of three new cotton varieties - Kristal, Orfey and Snezhina, created by intraspecific (G. hirsutim L.) hybridization and included in varietal trials carried out at the Field Crops Institute in Chirpan, were studied. The three varieties, in seed cotton yield, on average over a three-year period, exceeded the standard cultivar Chirpan-539 by 9.1%, 12.8% and 23.0%, respectively. These varieties combined higher productivity with higher lint percentage, greater boll weight in Orfey and Snejina and higher 1st fruit branch in Kristal and Orfey. In the State Variety Test, Kristal variety in seed cotton yield was equal to the cultivar Chirpan-539, surpassed the cultivar Avangard-264 by 6.4%, and in lint yield exceeded both standards, respectively by 2.3% and 13.3%. Orfey variety in seed cotton yield and lint yield was equal to the standard cultivars. Snejina variety in seed cotton yield of 2155 kg.ha^{-1} and in lint yield of 876 kg.ha^{-1} exceeded both standards, Chirpan-539 by 3.5% and 3.2% respectively, Avangard-264 - by 6.1% and 4.4%. All three varieties had good fiber quality.

Key words*: cotton, G. hirsutum L., fiber properties, lint yield, seed cotton yield.*

INFLUENCE OF IRRIGATION METHODS AND REGIMES ON SESAME SEED YIELD

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Abstract

The purpose of the study was to establish the effect of different methods (sprinkling, surface and subsoil drip irrigation) and different soil moisture content (HB) (70-75% HB, 75-80% HB and 80-85% HB) on water consumption and seed yield of sesame plants. The research was conducted in the semi-arid climatic zone of the Southern Steppe of Ukraine. In these studies, the best method of irrigation and the optimal level of soil moisture for sesame plants were established. The seed productivity of sesame and the elements of the yield structure under different methods and soil moisture levels were established, as well as the indicator of water use efficiency was determined.

Key words*: sesame, irrigation, sprinkling, drip irrigation, total water consumption, yield, water use efficiency.*

EFFECT OF TILLAGE SYSTEMS ON THE YIELD AND QUALITY OF WINTER WHEAT GRAIN

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Abstract

Thus, the paper presents the results of the research carried out on the winter wheat crop, in the period 2020-2023, in the pedoclimatic conditions from A.R.D.S. Secuieni-Neamț, regarding the influence of three tools, namely, the plough, the chisel, and the disk, works carried out at four working depths (15 cm, 20 cm, 30 cm and 30 cm + 10 cm) and two working modes (work done out in every year in alternation: one - two - three years), and two working modes (work done out in every year in alternation: one - two - three years). During the three years of experimentation, the averages of the winter wheat yield varied within quite large limits, from 4676 kg ha^{-1}, in the variant where the land was permanently worked with the disk at a depth between 12-15 cm, and the maximum of 5936 kg • ha^{-1}, in the version in which the work carried out was to plow at 30 cm + 10 cm. Regarding the content of protein, oil, and starch, they had close values between the variants, the tillage not influencing these quality indices.

Key words*: growth, soil, tillage, winter wheat, working depths, yield.*

SELECTIVITY OF DIFFERENT IMAZAMOX-CONTAINING HERBICIDES AT CLEARFILED® AND CLEARFIELD PLUS® SUNFLOWER HYBRIDES

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Abstract

In the period of 2022-2023, a field experiment was conducted in the Plovdiv region on an alluvial-meadow type of soil. The phytotoxicity of four imazamox-containing herbicides at different application dose rates was evaluated in the sunflower hybrids SY Bacardi CLP and Coloris CL. The experiment includes the following treatment variants: 1. untreated control; 2. Pulsar 40 - 1.25 l ha $^{-1}$; 3. Pulsar Plus - 1.6 l ha $^{-1}$; 4. Pulsar Plus - 2.00 l ha $^{-1}$; 5. Saltus - 0.5 l ha $^{-1}$; 6. Saltus - 0.65 l ha $^{-1}$ and 7. Maza 4 SL - 1.25 l ha $^{-1}$. The highest phytotoxicity was recorded 7 days after treatment with the herbicide Saltus - 0.65 l ha $^{-1}$ in both sunflower hybrids. The seed yield in all treated variants of the two hybrids in the both crop years was lower than those of the check (untreated controls, maintained weed-free by hand). The highest oil content (41.5%) in the seeds on average for the experimental period is measured by the hybrid Coloris CL treated with Pulsar Plus - 1.6 l ha $^{-1}$.

Key words*: selectivity, phytotoxicity, imazamox, sunflower, seed yield, oil content.*

PHENOTYPIC EVALUATION OF SEED PRODUCING ABILITY OF ALFALFA (*Medicago sativa* L.) CLONAL PROGENIES

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Abstract

The objective of present study was to assess seed yield and yield related traits of alfalfa clonal progenies. The phenotypic variation of traits within progenies was also determined. Eleven alfalfa clonal progenies of native origin were object of investigation. The experiment was carried out at the Experimental field of the IASS Obraztsov Chiflik, Rousse for three-year period. The traits plant seed yield (PSY), plant height (PH), generative stem number (GSN), inflorescence number (INP), pod number (PNI), seed number (SNP) and 1000-seed weight (TSW) were evaluated. There were statistically significant differences among clonal progenies for all studied traits. Five progenies (PM30, JM13, GM27, SL83 and PM18) were identified as very valuable genetic source with potential for developing high seed yielding varieties. There was established PSY, PNI and SNP exhibited moderate to high phenotypic variability within progenies, while PH and TSW expressed low variability. Data confirm possibility of used the traits number of pods per inflorescence and number of seeds per pod as criteria of germplasm selection for seed yield improvement.

Key words*: alfalfa, Medicago sativa, progenies, seed yield, variability.*

STUDY REGARDING THE WEED CONTROL IN GRAIN SORGHUM CROP

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Abstract

Compared to corn, sorghum is more sensitive to the action of synthetic chemicals in the administered herbicides and most of the time the plant stagnates in growth for a few days, even if the application doses are moderate. As the spectrum of weeds is quite diverse in Romania, there are species that are difficult to control in sorghum culture, such as Sorghum halepense, Setaria ssp. or Echinochloa crus-gali L., in this research we tested several variants of weed control using herbicides applied in pre and post emergence. The most valuable variant in combating weeds in grain sorghum crop proved to be the variant with Dual Gold (S-metolachlor 960 g/l) 1.5 l/ha applied in pre-emergence + Trek P 334 SE (Pendimetalin 64 g/l + Terbuthylazine 270 g/l) 2.5 l/ha applied post-emergence, variant which had a calculated Abott's coefficient of 98.2%. The combination of Dual Gold (S-metolachlor 960 g/l) 1.5 l/ha + Casper 0.4 l/ha (5% prosulfuron+50% dicamba) also provided a high cultural hygiene assurance, and was close to the previous variant with a calculated coefficient of 97.5%.

Key words*: grain sorghum, herbicide efficacy, weed control, yields.*

ASPECTS ON THE CHEMICAL COMPOSITION OF POTATOES TUBERS (VARIETY ALBASTRIU MOV) INFESTED WITH SPECIES *Ditylenchus destructor* Thorne, 1945

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Abstract

It was determined that, in the potatoes tubers (Solanum tuberosum L.), variety Albastriu mov, infested with nematode Ditylenchus destructor, the invasion intensity is 613.3 individuals/gram, the amount of dry matter is lower - 17%, than in non infested potatoes - 23%, the amount of protein is also decreasing and the amount of water is with 5% higher. The investigated potatoes tubers contain all 20 proteinogenic amino acids (AA), characteristic for plants, but the difference is that the amount of amino acids detected in infested tubers decreases, compared to that contained in non infested ones. In both infested and non infested potatoes tubers, the maximum values belong to non-essential amino acids - aspartic acid + asparagine (24.6% - non infested potatoes; 18.4 - infested potatoes) and glutamic acid + glutamine. We found that the quantitative variations of the main components - dry matter, water, proteins, amino acids, which occur in the infested plant tissue of potatoes tubers Solanum tuberosum, are directly dependent on the presence of the parasite Ditylenchus destructor, in the process of nutrition with the cytoplasmic content of the plants cells, as well as invasion intensity.

Key words*: amino acids, potatoes tubers, Ditylenchus destructor, infestation.*

RESPONSE OF WINTER CANOLA (*Brassica napus* L.) TO TREATMENT WITH GROWTH REGULATORS AND BIOSTIMULATORS - A REVIEW

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Abstract

The main problem in the technology of growing winter oilseed rape comes down to overcoming adverse consequences in early and late development of winter oilseed rape, which leads to the failure of the harvest from the sown areas or unsatisfactory yields with low quality indicators. This necessitates the need to seek and use ways, methods and means to reduce or overcome these adverse consequences. One of the ways for this is the application of means /substances/ with growth-regulatory action and substances with biostimulating action. Therefore, it is necessary to study the influence of substances with growth-regulatory action and substances with biostimulating action. Rapeseed is a strategic crop for global agriculture. The application of growth regulators and biostimulators is an important element of the technology of growing winter oilseed rape. Plant growth regulators allow deployment of the productive potential of hybrids and increase the quality indicators of the production. They lead to morphological and physiological changes in plants, plant growth inhibition, inhibition of plant gibberellins biosynthesis and inhibition of sterol biosynthesis, reduction of internode elongation, increased chlorophyll content, delayed senescence, increased antioxidant potential and improvement in alkaloid production. Bioregulators reduce the biotic and abiotic stress in plants. Their use leads to an increase in cellular energy, the permeability of the cell membranes of the root system increases, the penetration of mineral nutrients from the soil solution into the plants is improved, which promotes better absorption of nutrients by the plant, the growth of the root system increases, the aboveground mass and dry matter yield. The application of plant bioregulators leads to an increase in productivity and its quality, but also contributes to the development of sustainable agriculture and the protection of the environment. Analytical review of cited sources and presented results regarding various aspects of impact on growth, development, productivity and quality gives reason to conclude that the toolkit that will be applied to develop strategies and biotechnological approaches to overcome stress in the development of rapeseed.

Key words*: rapeseed, growth regulators, biostimulators, yield, quality.*

AN EXPERIMENTAL STUDY ON CROP EVAPOTRANSPIRATION IN ROMANIA

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Abstract

In Romania, evapotranspiration at bare soil or covered by crops is monitored within the experimental evapotranspiration stations: Căldărușani, Voinești and Poiana Brașov. Many experimental researches are carried out, in order to analysed the variation of crop evapotranspiration, in relation to the climatic parameters and soil moisture. The experiments carried out in recent years, have shown that starting from 2021 until 2023, at the level of G1 lysimeters, no more infiltrated water quantities were recorded, so all the amount of water was evaporated. It was also observed that in the year 2022 the sunflower and maize crops did not reach the stage of maturity. In 2023, an experiment was carried out that aimed to compare the maize evapotranspiration in a natural regime and exposed to additional watering (Căldărușani station). The water addition rate was established based on specialized literature and by applying CropWat model. Additional waterings generated different evapotranspiration values. The waterings changed the values of soil moisture and helped the plant not to reach the wilting point before ripening.

Key words*: evapotranspiration, crop, maize, irrigation, Romania.*

A COMPARATIVE STUDY OF SOME SOIL HERBICIDES FOR ANNUAL WEEDS CONTROL IN MAIZE

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Abstract

In 2022 and 2023, a field plot trial with the maize hybrid P 9241 was conducted. The trial was performed on the experimental field of the department of `Agriculture and herbology` at the Agricultural University - Plovdiv, Bulgaria. The evaluated herbicidal products were Adengo® 465 SC (225 g/l isoxaflutol + 90 g/l thiencarbasone-methyl + 150 g/l cyprosulfamide (antidote)), Gardoprim Plus Gold® 550 SC (312.5 g/l s-metolachlor + 187.5 g/l terbuthylazine), Camix® 560 SE (60 g/l mesotrione + 500 g/l s- metolachlor) and Stomp Aqua® (455 g/l pendimethalin). The herbicidal products were applied alone after sowing before germination of the crop. The weed infestation of the experimental field was presented by Digitaria sanguinalis (L.) Scop., Chenopodium album L., Amaranthus retroflexus L., Xantium strumarium L., Abutilon theophrasti Medic, Datura stramonium L., Solanum nigrum L., and Portulaca oleracea L. The infestation with these weeds resulted in a very low average grain yield for the untreated control (270.54 kg/da). The highest herbicidal efficacy as well as the highest seed yields after the alone application of Camix 560 SE was recorded.

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

RESEARCH ON CYTOGENETIC EFFECTS INDUCED BY TREATMENTS WITH DIFFERENT MUTAGENIC SUBSTANCES IN *Arachis hypogaea* L. (ARAHIDS)

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Abstract

The mitotic division, from a genetic point of view, ensures the copying of the genetic message in duplicate, transferring it to the descending cells and transmitting the genetic message from one cell to another within an individual (organism), maintaining the constants, number, shape and size of the chromosomes. In mitosis, the processes that take place are irreversible. As a result of mitosis, each of the two daughter cells has a diploid number of chromosomes (2n) in which DNA is included which gives the identity of the genetic information with the mother cell Mitosis interests in a special way, due to the wide possibilities offered by the karyotype study, a basic component in the identification of species. The mitotic index is one of the parameters successfully used in cytogenetic studies of mitosis. The main purpose of the research was to capture the cytogenetic effects induced by the mutagenic treatments in arahids species (Arachis hypogaea L.). For cytogenetic investigations, radicular meristems obtained from the germination of peanut seeds were used, which were later used to obtain microscopic preparations by the method developed by Feulgen. Following the research carried out it was established that the most pronounced mutagenic effect of mitotic indecision reduction was obtained after sodium azide treatments. In the case of ethyl metalsulfonate and dimethyl sulfate, there were noted increases in mitotic indecin at concentrations of 0.2% and 0.4%.

Key words*: peanuts seeds, ethyl metansulfonate (EMS), dimethyl sulfate (DMS), sodium azide (SA), mitosis.*

PHENOLOGICAL DEVELOPMENT AND GRAIN YIELDS FOR TRITICALE VARIETIES IN CENTRAL SOUTHERN BULGARIA

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Abstract

The phenological development and grain yield of triticale varieties of different originated were studied in a three-year field experiment for the period 2019-2022. Based on the De Martonne Drought Index, the conditions of the growing seasons were characterized. The dates of the occurrence of the main stages of plant development were recorded, and the interphase periods were characterized based on the number of days with an active temperature above 5°C, the sum of the active temperature, the average temperature, and precipitation. Correlational dependences between grain yield and meteorological parameters during the interphase periods were found. The functional relationship between the amount of precipitation and grain yield was described using mathematical models thus, the grain yield can be predicted. The effects of the environment and the interaction between the varieties and the environment on grain yield were confirmed. The most productive varieties among the tested ones were shown.

Key words*: phenological development, grain yields, triticale.*

THE IMPROVEMENT OF *Nardus stricta* L. PERMANENT MEADOW FROM THE DORNA DEPRESSION THROUGH MINERAL AND ORGANIC FERTILIZATION

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Abstract

In Romania, the grassland area dominated by Nardus stricta L. covers 200,000 hectares. Meadow degradation is caused by changes that occur in plant growing conditions and in the structure of vegetation. For long time, technological works and improvement measures were not applied on permanent meadows in Romania which led to a decrease in their production and to their degradation. The aim of this study was to evaluate the dynamics of productivity and quality of fodder, following the application of measures to stimulate and improve the production and quality of grasses on the permanent grasslands of Nardus stricta L. in the intramontane Depression of Vatra Dornei, from the North-Eastern Romanian Carpathians. At the same time, it was ensured that effects on the environment were minimal. The applied measures to Nardus stricta meadows, such as organic and mineral fertilization, led to a good plant growth and brought important changes in the chemical composition of the forage obtained (increase the content of CP and decrease the content of ADF and NDF). Thus, the quality and the digestibility of the feed improved significantly.

Key words*: Nardus stricta L. meadows, mulching, organic and mineral fertilizers, crude protein, forage quality.*

OVERVIEW OF FUNGAL PATHOGENS INVOLVED IN WHEAT LEAF SPOT COMPLEX - PREVALENCE, RELATIVE IMPORTANCE AND PLANT RESISTANCE

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Abstract

Under this general name are included the symptoms caused by several phytopathogenic fungi. The negative effect on wheat plants is mainly due to the reduced photosynthesizing area and the accelerated aging of the leaves, which leads to the poor nutrition of the grain, significant losses in yield and lowering the quality of the production. This determines the great economic importance of these diseases and the need for their in-depth study. The term wheat septoria refers to diseases caused by three anamorphic fungal pathogens of the genus Septoria. The fungal pathogens involved in the leaf spotting complex include the tan spot diseases caused by Pyrenophora tritici-repentis, Cochliobolus sativus, Monographella nivalis and several species of the genus Alternaria. An important component of the integrated control of septoriosis is genetic resistance. No complete resistance has been established in wheat to Zimoseptoria tritici, Parastagonospora nodorum and Parastagonospora avenae f. sp. triticea. Over 20 major Septoria tritici blotch resistance genes have been mapped. Sources of quantitative resistance that are longer lasting under field conditions have also been identified.

Key words*: fungal pathogens, genus resistance, Septoria wheat, spred.*

STUDY OF QUANTITATIVE AND QUALITATIVE INDICATORS IN WHEAT

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Abstract

The aim of the conducted research is to observe the behavior of various winter wheat cultivars under the influence of both biological and technological factors. In the experiment, five distinct wheat varieties (Glosa, Joker, Apache, Alcantara, and Anapurna) were subjected to analysis. Subsequent to the research, the Joker variety emerged as the most economically viable and resilient cultivar. Despite its higher seed cost and comparatively lower bakery indices, it compensated with a significantly elevated production yield. Key quality indices monitored throughout the experimental cycle include hectoliter mass (MH), protein content, and gluten content. The mean values of hectolitre mass per storage volume obtained for the five exceptionally promising wheat varieties align within the ranges specified in the Official Catalogue of Varieties. Notably, the Glosa variety exhibited the highest protein content at 14.2%, while the Joker variety demonstrated the lowest at 11.6%. Average gluten content values ranged from 20% to 32%. The data presented herein highlight the robust productivity potential of gleic chernozems. Capitalizing on groundwater supply, these soils consistently yield high crop outputs even in periods of drought.

Key words*: wheat, production, quality indices.*

ALLELOPATHIC EFFECT OF *Elettaria cardamomum* ESSENTIAL OIL VAPOURS ON THE WINTER SEED MYCOFLORA AND GERMINATION

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Abstract

Developing agroecosystems to reduce yield losses, effective use of water resources, and environmentally friendly innovative biotechnological interventions to stop using more chemical pesticides and fertilisers have been the focus of several sustainable strategies. Our research aimed to identify the allelopathic in vitro effect of Elettaria cardamomum essential oil (ECEO) on wheat seeds regarding the antifungal efficacy and germination stimulation. Surface-sterilized seeds (n = 100) were transferred in sterile Petri dishes (Ø 120 mm), and the ECEO doses were 5µL, 25µL, 50µL and 100µL. The Petri dishes were transferred to a growth chamber and kept at 25 °C in the dark for 5 days. Consequently, the microflora and germination rate was assessed on the PDA medium. The results suggest that the minimum concentration needed for ECEO to affect the seeds contamination index was at 25µL, while values of 50µL and 100µL inhibited the germination, resulting in germination rates at 86% and decreasing to 43%. ECEO oil exhibited promising antifungal activity and seems to have a potent fumigant activity against wheat mycoflora and could be used as possible future natural agent in agriculture.

Key words*: antifungal, Elettaria cardamomum, essential oil, germination, wheat seed.*

OPTIMIZING DRIP IRRIGATION YIELD IN GRAIN MAIZE CULTIVATION IN EASTERN ROMANIA

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Abstract

Maize cultivation stands as a vital pillar in Eastern Romania`s agriculture, significantly contributing to food security and the local economy. In the face of climate change and increasing production demands, optimizing irrigation methods becomes crucial. This article explores the impact and advantages of drip irrigation on the yield of maize crops in the region. Modern technology allows for the customized configuration of drip irrigation systems, considering the specific needs of maize cultivation and local conditions. By providing water at the right time and in optimal quantities, drip irrigation significantly contributes to the increase in maize crop yield. Drip irrigation in maize cultivation in Eastern Romania represents an efficient and sustainable solution for optimizing agricultural yield. Through the adoption of these modern technologies, farmers can ensure increased and sustainable production, contributing to the prosperity of the region

Key words*: drip irrigation, uniform water distribution, crop efficiency, water provision, sustainable solution.*

INNOVATIVE SOLUTION DESTINED TO CONTROL SUGAR BEET PRODUCTION, SUGAR PRODUCTION AND SUGAR YILED

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Abstract

The search for innovative strategies for promoting sustainable approach of sugar beet cultures includes identification of new products and management practices destined to weed control. Such products, besides effectiveness against weeds, also involve a good crop tolerance to herbicide, resulting in high production and productivity. Research in the field resulted in the development of market available SMART systems including sugar beet varieties. The purpose of this study is to test the efficacy of an intelligent solution of crop management in specific SMART sugar beet varieties, using a new herbicide based on foramsulfuron, and thiencarbazone-methyl, and the influence of this approach on sugar beet production, sugar yield and production. The experiment was organized in 2023, in a private farm from Cuci village, Mureş County, Romania. Four sugarbeet varieties (Belamia, Hopper, Djerba, and Kipunji) used both as SMART and classic (Class) formulas were used to emphasize the differences in yield, sugar yield, and relative sugar yield. The results of the study show the efficacy of using the SMART system, which has as results improvements in sugarbeet yield and yields traits, expressed by sugar and relative sugar yields for all studied varieties.

Key words*: efficacy, intelligent approach, new products SMART systems.*

INFLUENCE OF TRACE ELEMENTS ON THE QUALITY PARAMETERS OF CORN GRAIN FOR BIOETHANOL PRODUCTION

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Abstract

The paper presents the results of studies of the effect of foliar fertilization with a bacterial preparation based on beneficial symbiotic and associative microorganisms Biomag, microfertilizers `Rostock` corn, Ecolist Mono Zinc carried out in the phase of 5-7 and 10-12 leaves of corn on the level of pre-harvest grain moisture, number of rows of grains, number of grains in a row, weight of 1000 grains, starch content in grain, productivity and bioethanol yield in hybrids of the early maturing group Kharkivskyi 195 MV (FAO 190) and DKS 2971 (FAO 200), mid-early group DKS 3795 (FAO 250) and DKS 3871 (FAO 2480) and mid-season group DK 315 (FAO 310) and DK 440 (FAO 350) in the agroecological conditions of the Forest-Steppe of the Right-Bank Ukraine. The research is based on the assessment of the effectiveness of optimizing the supply of plant nutrients through foliar fertilization in the formation of grain yield and quality, and the possibility of processing grain into bioethanol is also shown, provided that grain yield increases and its quality is appropriate.

Key words*: maize, bioethanol, nutrients, micronutrients, pre-harvest moisture starch, yield, foliar fertilization.*

MANAGEMENT OF FEW MAIN WHEAT DISEASES USING ALTERNATIVE ORGANIC PRODUCTS WITH FUNGICIDE EFFECT - A REVIEW

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Abstract

Worldwide the majority of fungal wheat diseases may be controlled chemically, but natural plant products have been shown to exert biological activity against wheat fungal pathogens in vitro and in vivo and can be used as bio-fungicidal products. Natural plant products have a specific mode of action and a confined target range. They are also often harmless to hostile microorganisms, have a shorter shelf life, and provide no residual traits. Frequently included in integrated pest management (IPM) schemes, they are generally less hazardous to humans and the environment than traditional synthetic chemical pesticides. Also, the use of chemical products is limited due to undesirable environmental effects and the emergence of resistant pathogens to fungicides. The major compounds that have been investigated to date include phenols, flavonoids, quinones, terpenes, tannins, alkaloids, lectins, polypeptides, saponins and sterols. These products may have fungicidal or fungistatic activity on plant pathogens or they can create conditions unfavourable for establishment and multiplication of pathogenic microorganisms on host plants. In this study, we have discussed the sensitivity of most important fungal pathogens of wheat against different natural extracts products and essential oils and their main components, together with their modes of action in controlling wheat diseases. The option of replacing fossil oil-based chemicals with plant product formulations fits well with food and agriculture policies directed to the future.

Key words*: wheat diseases, pathogens, natural products, plant extracts, essential oils.*

INFLUENCE OF TECHNOLOGICAL FACTORS ON SOIL MOISTURE, WEEDING AND SOYBEAN YIELD POTENTIAL IN THE ROMANIAN PLAIN

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Abstract

Soybean productivity can be significantly increased by optimizing the technology in accordance with the genetic characteristics of the crop and the pedoclimatic conditions. Crop rotation, sowing time and row spacing are important factors affecting growing habit and productivity. Our research focuses on the influence of these factors along with other technological elements and the climate evolution influence on soil moisture, weeding and crop yield. The research carried out in the experimental field of NARDI Fundulea proposes to establish the influence of crop rotation, sowing date and row spacing on yield. The yield variations were given by the difference between the production potential and the harvests obtained in the field under specific climate and technology conditions. Resulted yields were evaluated in relation to the inputs and management factors to identify the most probable causes of the differences between the variants. Wider row spacing, the 3-4 years rotation and early sowing, allowed us to obtain the maximum productivity and quality for soybean.

Key words*: soybean, technology, soil moisture, weeding, yields.*

AERIAL MULTISPECTRAL IMAGING FOR DETECTION AND QUANTIFICATION OF WEEDS

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Abstract

Multispectral remote sensing is a new effective technique to evaluate crops phenology, plant health and the weeds presence. The study aims to exploit the possibilities of multispectral imaging for detection the weeds in winter wheat. The phenological changes of different weeds was also investigated, employing the calculation of six vegetation indexes during a period of three months. The vegetation indexes were as follows: CIG, GRNDVI, GRVI, CVI, NDWI2, NDVI. The influence of weed species on the value of the corresponding vegetation index within each reporting period was investigated. The control value was the one calculated for areas sown with wheat without weeds. It is established that the factors: phenophase and weed type have a statistically significant influence on the researched indexes. The GRVI is the only index on which plant phenophase does not have a significant effect. Regarding the NDVI values, no permanent trend for the presence/absence of a certain weed was found. In almost all phenophases, high values of the index were calculated in both weed varieties and weed free wheat.

Key words*: multispectral imaging, vegetation indices, wheat, weeds.*

PRODUCTIVITY AND BAKING QUALITY OF AUTUMN WHEAT VARIETIES UNDER DIFFERENT TECHNOLOGICAL CONDITIONS ON THE CARACAL CHERNOZEM

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Abstract

Over a period of three years (2019-2022), 25 varieties of autumn wheat were studied at SCDA Caracal (University of Craiova), in terms of yield and its quality under different technological conditions (fertilization level and sowing time). Several aspects were addressed: the variability of the characters influencing quality and the way the applied technologies influence it; the productivity and baking quality of the tested wheat varieties, depending on the applied technologies; the stability of the studied characters for the tested wheat varieties; the ranking of the values of the studied characters expressed by a score-based ranking. The results showed that yield gain could be obtained by increasing the nitrogen dose and that the quality of the yield was significantly improved by delaying sowing. Increasing the nitrogen dose resulted in higher yields, protein content, wet gluten content, flour power and gluten index, all of which were statistically assured. The most stable character was found to be hectolitre mass, whereas yield was medium stable and the wet gluten content was unstable for all varieties tested. The highest ranked Romanian varieties were Dropia, Glosa and Șimnic 50.

Key words*: autumn wheat, yield, technologies, protein content, wet gluten content, hectolitre mass.*

PHYSIOLOGICAL RESPONSE OF SOME SOYBEAN GENOTYPES TO WATER STRESS AND COMPENSATION EFFECT AFTER REHYDRATATION

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Abstract

Soybean is a very important crop due to its multiple uses, but hydric stress can substantially reduce soybean production. The response of soybean plants to drought and the compensation effect of growth after rehydration has been very little studied. In this context, this paper presents results regarding the response of some soybean genotypes to water stress and soil rehydration. Our goal being to identify genotypes that have a compensation mechanism in response to drought to support breeding for drought resistance and higher yields. Eight soybean genotypes were studied under greenhouse conditions. Water stress inhibited the growth of soybean plants. After rehydration, soybean plant height and leaf surface showed a rapid growth/recovery and produced good compensation compared to the root system where the compensation phenomenon was less. Water stress reduced the chlorophyll content and upon rehydration, different levels of compensation were observed in each studied genotype, there was even one genotype that showed an overcompensation.

Key words*: soybean, drought, compensation effect, physiological traits.*

CORRELATION AND REGRESSION DEPENDENCES BETWEEN PRODUCTIVITY, COMPOSITION AND ENERGY-NUTRITIVE VALUE OF GRASSLANDS OF PERENNIAL RYEGRASS AND LEGUME FODDER CROP

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Abstract

The study was conducted in the experimental field of the Research Institute of Mountain Stockbreeding and Agriculture of Troyan, with the aim of determining the correlation and regression dependences between some basic chemical indicators and the energy nutritional value of perennial ryegrass and legume fodder crop grown in monoculture and mixed grasslands. Data analysis shows that the amount of crude protein has a statistically significant impact on the in vitro digestibility of dry matter (r = 0.82) and the number of feed units (r = 0.88 - for FUM and r = 0.87 - for FUG). The yield of fresh matter was positively correlated with the dry matter yield (r = 0.83), the amount of NDF (r = 0.74) and hemicellulose (r = 0.80). The high correlation and dependence between fiber components of perennial grasses and legume fodder crops gives a clear assessment for forage quality. The coefficients of determination between structural fiber components and crude fiber concentration ranged from $R^2 = 0.5176$ to $R^2 = 0.9186$, with very well-proven statistical significance of the equations.

Key words: *Lolium perenne L., legume fodder crops, energy value of fodder.*

EXPERIMENTAL RESULTS ON ALTERNATIVE WAYS OF INCREASING THE pH OF ACID SOILS, USING CARBONATION MUD (DEFECATION LIME), THE WASTE FROM SUGAR BEET INDUSTRY

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Abstract

The waste precipitate from sugar technology contains $CaCO_3$ and aggregated or adsorbed non-sugars. This work is an attempt to investigate the possibility of using sugar beet waste-carbonation lime residue (sludge) as an amendment to correct the pH of acid soils, embracing and implementing the concept of circular energy crop. Research were carried out during three agricultural years (2020-2022), in the experimental field of the National Institute of Research and Development for Potato and Sugar Beet Braşov, Romania. A total number of 96 experimental sugar beet plots were analyzed, divided into six variants (variables), V1-control, V2-$CaCO_3$ (classic), V3-V6 different amounts of carbonation lime sludge (Factor A), using two methods of incorporating amendments into the soil and different amounts of fertilizers (4 experiments) (Factor B). The use of defecation lime had an impact on soil pH, yield production (very significant differences compared to the control), sugar production (very significant differences compared to the control), and less on sugar biological concentration (significant differences compared to the control). For evaluating the results, analysis of variance (ANOVA) and Duncan multiple range test were used.

Key words*: amendment, carbonation sludge, sugar beet, pH.*

COMPARATIVE STUDY OF GROWTH AND DEVELOPMENT OF COMMON WHEAT IN ORGANIC AND CONVENTIONAL AGROCENOSES

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Abstract

The study was conducted in the period 2017-2020 at the Agricultural University, Plovdiv, Bulgaria. A comparative study of growth and development of common winter wheat variety Trakiyka under organic and conventional farming conditions was conducted. To achieve the objective, a two-factorial field experiment was set up using the method of fractional plots with a plot size of 10.5 m^2, in three replications. The soil fertilizers YaraMila Complex (for the conventional) and Italpolina (for the organic) were applied in the two agrocenoses. No differences were found in the occurrence and duration of phenological phases and interphase periods. Differences in plant height were found on average over the study period. In conventional technology, plants at full ripeness are 3.4 cm taller than those in organic - 94.45 cm. Under conditions of conventional agrocenosis, the cultivar forms a higher number of tillers per plant - 3.2 compared to the organic - 2.7. The tendency is maintained in the indicators number of productive tillers per plant and number productive stem/m^2. The cultivar shows comparative stability of both indicators under conventional and organic cultivation.

Key words*: organic farming, wheat, Triticum aestivum L., fertilization, development.*

RESEARCH REGARDING *Didymella pinodes* (Berk & Blox) CONTROL IN PEAS AT ARDS PITESTI

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Abstract

Didymella pinodes (Berk & Blox) is the main agent of anthracnose, one of the most important fungal diseases of peas worldwide and in Romania. The objective of this research was to estimate the level of anthracnose attack in the Alvesta and Nicoleta pea genotypes in the experimental conditions at ARDS Pitești-Albota, during 2022-2023. The following variants were tested: V1 control (untreated); V2 fluxapyroxad + difenoconazole; V3 azoxystrobin + difenoconazole; V4 Biosem (biological product); V5 cyprodinil + fludioxonil. The frequency (F%), intensity (I%) and attack degree (AD%) of the disease were calculated. The level of degree of attack varied with the variety and the treatment applied. The lowest value of the attack degree was registered in the Alvesta variety with AD=2.2% in the fluxapyroxad + difenoconazole variant, in which the production also had the highest value of 3300 kg/ha. Nicoleta variety registered higher values of attack degree compared to Alvesta variety.

Key words*: pea, Didymella pinodes, treatment, attack degree, variety.*

STUDY ON WINTER WHEAT PRODUCTION AND QUALITY IN THE PECICA-ARAD AREA

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Abstract

Although at present, both in our country and internationally, in the world grain trade, protein content is an indicator of grain quality, it is positively correlated with other quality indicators such as gluten content, gluten index and sedimentation index. The present study followed the influence of mineral fertilization and pedoclimatic conditions in the Pecica-Arad microzone on the level of production and its quality, expressed by protein content, gluten content, gluten index and sedimentation index. The study was conducted between 2019 and 2021, in the low plain of the Mures Meadow. The variety used in the experimentation was Ciprian, created at SCDA Lovrin. The protein content values achieved at the 5 N doses highlight that it ranges from 11.84% (N0) to 15.34% (N120). Analyzing the production obtained also from the point of view of the values of quality indicators (wet gluten over 25%, gluten index 86.33 and sedimentation index above the threshold of 50) and comparing these values with the regulated limits for each one, we can appreciate the special quality of the harvest.

Key words*: wheat, protein, gluten, quality.*

TESTING SOLUTIONS FOR FIGHT AGAINST ANNUAL AND PERENNIAL GRASS WEEDS IN POTATO

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Abstract

Controlling weeds in potato fields is essential for maximizing crop yields and quality. Weeds compete with potato plants for nutrients, water, and sunlight. Up to date, the issues connected to improvement of superior valorization of active substances used in weed control continue to be a real challenge. In this respect, a trial was conducted to identify the efficacy of implementing the advanced "Isolink" technology in the fight against annual and perennial grass weeds in Redsec and Roclas potato varieties. A bifactorial experiment approach was used, with treatment and potato variety as factors. The efficacy of "Isolink" technology was tested in comparison with conventional practices using the fluazifop-p-butyl as active substance versus quizalop-p-ethyl. The trial was installed in a private vegetal farm located in Cluj County, Căpușu Mare commune (46°47'26"N, 23°17'32"E). Eleven weed species, six annual, and five perennials, were identified. The efficacy of fluazifop-p-butyl administration is significantly higher, compared with quizalop-p-ethyl. Considering cluster analysis, the weed species, regardless annual or perennial, belong to different groups function of their responses to treatments.

Key words*: cluster analysis, fluazifop-p-butyl,"Isolink" technology, quizalop-p-ethyl.*

RESEARCH ON THE EFFECTIVENESS OF SOME FUNGICIDES IN COMBATING CROWN RUST OF OATS

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Abstract

Oats (Avena sativa L.) currently rank sixth in world cereal production after corn, rice, wheat, barley and sorghum. In 2021, the area cultivated with oats in Romania was 87000 ha, and the average production was 2413.8 kg/ha. The importance of oats is given by its many uses in animal husbandry, human nutrition, beer production, in the cosmetic and pharmaceutical industry, etc. In the present work they are presented the symptoms that manifested the infection with the fungus Puccinia coronata (Corda); the morphological characters of the uredospores, the spores that ensure the propagation (spread) of the disease in culture, and of the teliospores, the resistance spores through which the disease spreads over time (transmission), from one year to another; the effectiveness of tested fungicides whose active substances contain: prothioconazole 53 g/l + spiroxamine 224 g/l + tebuconazole 148 g/l; 100 g/l mefentrifluconazole+300 g/l metrafenone. The research focused on the Ovidiu variety and was carried out under natural infection conditions, during the vegetation period of 2021 in Mircea Vodă commune, Brăila county. The effectiveness of the fungicide treatments applied to the oat crop was reflected in a production increase between 265 and 365 kg/ha.

Key words*: oats, crown rust, fungicides, efficacy.*

THE INFLUENCE OF ORGANIC AND MINERAL FERTILIZATION ON SUGAR BEET CULTURE IN COVASNA COUNTY

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Abstract

Sugar beet is a species whose importance contradicts the current situation of its cultivation at the national level, namely its increasingly low presence in the crop. The crop technology and the increased attention that the plant needs during the vegetation period, transform the sugar beet crop into a `niche` crop. The work is based on the analysis of the data obtained in the agricultural year 2022-2023 following the establishment of an experimental sugar beet field trial. After fertilizing the variants with the established doses of organic, mineral, or organo-mineral fertilizers, different morphological characters were analyzed, such as the plant length, plant diameter, the length of the parcel, the diameter of the parcel, the weight of the plant, but also the main elements of production, such as the percentage content of sugar, root production per hectare and total sugar content/ha.

Key words*: sugar beet, area, sugar production, correlations, technology.*

THE USE OF THE SENTINEL 2 SYSTEM FOR THE MONITORING OF AGRICULTURAL CROPS

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Abstract

This research uses geomatic technologies (GIS and remote sensing) in order to monitor agricultural crops within the Didactic Experimental Station (DES) of the ULS "King Mihai I" from Timisoara. The studied area is located in Western Plain of Romania. In this study, remote sensing images taken from the https://dataspace.copernicus.eu/ portal from the Sentinel 2 system were used during the year 2023. Thematic maps were accomplished in natural colours, false colors and remote sensing indices were calculated NDVI, NBR and NDMI. The NDVI varied between 0.242 and 0.879, the NBR varied between -0.185 and 0.714, and the NDMI varied between -0.250 and 0.454. Very strong correlations were found between these 3 indices, as follows: between NDVI and NDMI R^2 = 0.9346, between NDVI and NBR R^2 = 0.9322, and between NDMI and NBR R^2 = 0.940. The analyzed crop was corn and the area was aprox. 160 hectares.

Key words*: correlation, NDVI, NBR, NDMI, remote sensing, Sentinel 2.*

RESEARCH ON FOLIAR DISEASES ON TWO-ROW BARLEY, MURIGHIOL LOCATION, TULCEA COUNTY

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Abstract

The aime of our research was to detect diseases and the effectiveness of some treatments on two-row barley during 2021-2023, in the Murighiol location, Tulcea County. The biological material was represented by the Romaniţa spring two-row barley variety. The experiment monitored the attack in treated and control variants. The analyzed pathogens were Blumeria graminis f. sp. hordei, the powdery mildew pathogen, Pyrenophora teres, the net blotch pathogen and Rynchosporium secalis, responsible for the appearance of rhynchosporiosis. The lowest values of the powdery mildew attack in the control variant were recorded in 2023, with values of the degree of attack of 14.9% and 23.5% in 2022. The application of treatments reduced the attack and had an effectiveness of over 73% in controlling powdery mildew during the analyzed period, around 71% in 2022 and 75% in 2023 in controlling net blotch. The rhynchosporiosis attack was sub-unitary.

Key words*: two-row barley, pathogens, diseases, degree of attack.*

THE INFLUENCE OF MICROBIAL BIOFERTILIZERS ON THE BALANCE OF NUTRITIONAL ELEMENTS ON SOILS WITH DIFFERENT DEGREES OF EROSION

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Abstract

Currently, the problem of degradation of the effective soil fertility of the Republic of Moldova is reaching a critical scale, being unsatisfactory on 90% of the agricultural land. The annual uncompensated losses of organic matter as a result of mineralization exceed the level of 700 kg/ha, and the total deficit resulting from erosional losses is 1100 kg/year. The main factors that conditioned the establishment of a negative balance of organic matter are the lack of crop rotations, the intensification of erosion processes, the increased costs of chemical fertilizers, as well as the unfavorable climatic conditions manifested by excessive droughts with annual frequency. All together lead to the intensification of chemical, physical and biological degradation processes. In this article, the results of the research are presented, regarding the influence of microbial biofertilizers from the PGPB group (plant growth promoting bacteria) on the balance of nutrients on soils with different degrees of erosion. It was demonstrated that the application of bacteria suspensions, Ps. aureofascens, Az. chroococcum and Ps. fluorescens, contributes to the more intensive accumulation of some nutritional elements, which leads to balancing plant nutrition, as well as increasing the fertility of degraded soils.

Key words: *degradation, erosional perder, organic matter, biofertilizers, fertility.*

THE DYNAMICS OF THE HEIGHT IN MAIZE HYBRIDS IN DIFFERENTIATED FERTILIZATION AND TREATMENT CONDITIONS WITH THE BIOSTIMULATOR UTRISHA, ON THE CHERNOZEM FROM CARACAL

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Abstract

A trifactorial trail hybrid maize x level fertilization x biostimulants treatment (Instinct and Utrisha) was placed on the chernozem from Caracal in the spring of 2023. The doses of urea administered at sowing were 50, 100, 150 kg/ha, and the graduations of the biostimulator treatment factor consisted of untreated, Instinct 1 L/ha + Utrisha 250 g/ha, Instinct 1.7 L/ha + Utrisha 333 g/ha and Instinct 2.5 L/ha + Utrisha 400 g/ha. The greatest plats height was recorded in the first two weeks in the variant treated with Instinct 2.5 L/ha + Utrisha 400 g/ha, regardless of the maize hybrid and the dose of urea used - 182%. In the next measurement interval, the height decreased, but the highest value was also recorded in the previous variant and with the recommended dose - 47%. At the last measurement, the height was greatly diminished (under 20%) and the variants treated with Instinct and Utrisha, regardless of the dose, did not emphasized significant differences. Urea fertilization did not affect the plants height at any of the measurement moments.

Key words*: hybrid, corn, waist dynamics, biostimulator, chernozem.*

RESEARCH ON THE RELATIONSHIP BETWEEN PRECOCITY AND YIELD FOR THREE SPECIES OF STRAW CEREALS (WHEAT, TRITICALE AND BARLEY) TESTED ON THE CARACAL CHERNOZEM

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Abstract

The study of the precocity-yield relationship was carried out through two components: correlation of heading date - yield using data from national comparative crops for 3 species (wheat, triticale, barley) tested in the period 2020-2023 and the influence of species and growing season on yield, with data from a two-factor experiment, where the precocity groups tested for each species were differentiated from each other by +3-5 days (early to medium) and 8-14 days (medium to late). The results obtained showed that for none of the species in any of years was there a correlation between precocity expressed in days from January 1st and yield, mainly due to the fact that the varieties tested were not highly differentiated in terms of growing season. There were no differences regarding yield for wheat and triticale, but differences were obvious regarding yield for wheat and barley (20.19 q/ha) and triticale and barley (23.73 q/ha). About growing season, there were differences between the yields of medium-early, as well as medium-late varieties, but no differences were highlighted between the yields of early-late varieties.

Key words*: correlations; precocity; straw cereals; yield.*

FATTY ACID COMPOSITION AND OIL YIELD OF SUNFLOWER HYBRIDS (*Helianthus annuus* L.) SOWN IN DIFFERENT TIMES

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Abstract

The fatty acid composition and oil yield on six sunflower hybrids were assessed to notice the effect of sowing time (ST). ST was set taking into account the Celsius degrees at the soil depth of 7 cm at 7 a.m.: ST1 at 5°C, ST2 at 7°C and ST3 at 9°C. The research was performed in the field experiments in Tulcea county in 2021 under rainfed conditions. Averagely oil composition in oleic acid was lower at ST1 (33.93%) and higher in late sowing time (ST2 - 35.05%, ST3 - 35.44%) while linoleic acid was higher at ST1 (54.47%) and lower at ST2 (52.96%) and ST3 (52.31%). The highest oil yield was at ST 2 (1064.46 kg ha^{-1}) fallowed by ST1 (969.16 kg ha^{-1}) and ST3 (858.34 kg ha^{-1}).

***Key words**: fatty acid, sunflower, sowing time, oil yield.*

THE ROLE OF TEMPERATURE IN THE OCCURRENCE OF PESTS IN MAIZE CROP

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Abstract

In recent years, the pest attack on the maize crop has proven to be a huge problem for all farmers, both from the point of view of the technological base and from the perspective of the pesticides used. Due to the long monoculture of maize, a major increase in the attack of Tanymecus dilaticollis and the larvae of Ostrinia nubilalis and Helicoverpa armigera was found. However, not only monoculture or the impossibility of combating pests favored their multiplication, but also climatic factors. In recent years, the temperatures during the winter are very advantageous for pests, the winters being quite mild from the point of view of low temperatures. This paper summarizes the behavior of the density of pest populations in maize, during 2 years, where the influence of temperature and monoculture on them and the moments of appearance in the culture are highlighted.

Key words*: maize, crop protection, pests.*

WESTERN CORN ROOTWORM (*Diabrotica virgifera virgifera* Le Conte) - APPEARANCE AND DISTRIBUTION IN CENTRAL-SOUTH BULGARIA

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Abstract

From a plant-protection point of view, corn is attacked by many enemies (multivorous and specialized), which significantly reduce the yield, in individual years they multiply massively and are able to completely compromise the harvest. In recent years, a new corn enemy has appeared, the western corn rootworm (Diabrotica virgifera virgifera Le Conte), which is causing significant problems. For this purpose, the appearance and population dynamics of the species were followed. The studies were conducted during the period 2022-2023 in corn fields in the region of Chirpan and Plovdiv on an area of 1000 ha. Carrying out monitoring in the region of Central- South Bulgaria is important for establishing the spread of the species and organizing a whole complex of phytosanitary measures to limit the spread of the western corn rootworm.

Key words: *Diabrotica virgifera virgifera, monitoring, Central-South Bulgaria, maize.*

THE MANAGEMENT OF WEEDS USING NEW GENERATION HERBICIDES IN MAIZE

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Abstract

Maize (Zea mays L.) is one of the most versatile multi-purpose crop used as feed and food crop beside other no-food uses. During 2023 year a field experiment in a randomized complete block design with three replications and fourteen treatments was carried out in the Agricultural and Research Station Caracal with the aim of evaluation of weed control in maize, using new generation herbicides. The treatments were composed of isolated and associated herbicides and all were considered selective in maize via pre-emergence (PRE) and post-emergence (POST) applications. The efficacy evaluation was done at 7, 14, 21 and 28 days since each treatment targeting CHEAL, HIBTR, DATST, POLSS, CONAR, ECHCG, SETVI, SORHA, CYNDA, DIGSA, MATSS, AMBEL, GALPA, POROL, SOLNI. Results revealed that, among the herbicidal treatments, the best efficacy was recorded by SAE 053 H/01 + Baracuda doze p.c. 1.2 + 0.5; SAE 053 H/01 + Nico 40 OD doze p.c. 1.2 + 0.5; SAE 053 H/01 + Baracuda +Nico 40 OD doze p.c. 1.2 + 0.5 + 0.5.

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

EXPLORING THE IMPACT OF SOWING DATES AND CLIMATIC CONDITIONS ON MAIZE YIELD AND QUALITY

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Abstract

In order to evaluate the influence of different sowing dates and climatic conditions, on maize yield and quality parameters (protein, fat, starch and moisture), a field polifactorial experiment was carried out in three different years at Research and Development Station for Agriculture (RDSA) Turda. Twelve maize hybrids of different maturity classes were studied using a randomized block design, with three replications, plots of 7 m^2, on medium high soil with loam clay texture, pH 6.7. Three factors were analysed in the experiment: the experimental year with three graduation, sowing date with four graduation and maize genotype with 12 graduations. The experiment provided results from four different sowing time, when measured soil temperature was: 4°C, 6°C, 8°C and 10°C respectively. Each maize hybrid was sowed on 2 rows of 5 m length and 70 cm distance between rows. The results revealed a high influence of sowing date and climatic factors on maize yield and quality. When very early (4°C) and early (6°C) sowing dates were experimented an important decrease in maize yield was obtained compared to optimum or late sowing time.

Key words*: maize, sowing date, quality, yield.*

PRODUCTIVITY EVALUATION OF GRAIN SORGHUM CULTIVARS AND PROMISING LINES

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Abstract

The high drought tolerance and plasticity of sorghum renews its economic importance for a stable production of fodder grain in the frequently appearing extreme droughts. During the period 2020-2022 a wide range of varieties and promising lines of grain sorghum from foreign and native selection were tested in terms of grain productivity. Climatic changes in recent years require the maintenance of varieties and hybrids with a wide ripening range and the selection of varieties with greater adaptability to extreme abiotic factors. The obtained results confirm the high productive potential of grain sorghum. The selected promising grain sorghum lines have high potential for grain yield and optimal biotype.

Key words*: sorghum, productivity, promising lines.*

THE APPLICATION OF OPTICAL SENSORS FOR CLOSE DETECTION IN WHEAT YIELD ESTIMATION USING THE NDVI INDEX

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Abstract

Wheat (Triticum aestivum) is one of the most important staple crops that contribute extensively to global food security. Considering the fact that various factors influence wheat production, nitrogen (N) stands out as the most significant, being a crucial nutrient for crop growth and development, affecting both yield and crop quality. Based on this, the identification of vegetative indices as numerical indicators of plant conditions has begun, with the NDVI (Normalized Difference Vegetation Index) being the most widely applied. Therefore, in this study, during the growing season, active multispectral proximal optical sensors, namely Plant-O-Meter (POM) and GreenSeeker, were used in field trials to assess differences and provide early yield estimation. In the experiment, two wheat varieties were cultivated and sown at two seeding rates of 190 kg ha^{-1} and 240 kg ha^{-1}, with four different nitrogen (N) supplies of 0 (control), 50, 100, and 150 kg ha^{-1}. Vegetative plant measurements using sensors were conducted in multiple repetitions, covering all vegetative development stages. Relationships between grain yield and the NDVI index measured throughout the season were assessed using the coefficient of determination (R^2).

Key words*: Wheat, NDVI (Normalized Difference Vegetation Index), active multispectral proximal optical sensors.*

ALLELOPATHIC EFFECTS OF AQUEOUS EXTRACTS OF *Asclepias syriaca* ON GERMINATION AND DEVELOPMENT OF CULTIVATED PLANTS

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Abstract

Asclepias syriaca is an invasive species with negative effects on agriculture, health and ecosystem biodiversity. In recent years (2017-2023), in Romania, the species has been frequently observed in crops. The aim of the present study was to investigate the effects of Asclepias syriaca extracts on seed germination, growth and seedling development in Zea mays L., Glycine max L., Helianthus annuus L. and Medicago sativa. Asclepias syriaca plants were harvested in October, after drying they were ground. The bioassay experiments were carried out in the laboratory in 2022. Root, stem and leaf extracts were prepared with distilled water in concentrations of 5%, 10% and 15%. Maize, soybean, sunflower and alfalfa seeds were placed in Petri dishes (10/dish) and then treated with extracts. After 14 days of placement, the germination percentage, root length, plant height and plant weight were determined. All extracts influenced seed germination. Asclepias syriaca 15% root extracts more influenced root length, plant height and weight.

Key words*: extract, Asclepias syriaca, germination, plant height, plant weight.*

TEMPORAL ASSESSMENT OF POTATO RESILIENCE IN CHARACTERISTIC CULTIVATION AREAS FROM ROMANIA

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Abstract

In line with the priorities of the European Green Deal, in particular the climate adaptation strategy and the EU`s climate change mitigation ambition for the years 2030 and 2050, assessing potato resilience in a changing climate to face both natural and induced hazards by humans, requires planning, management and extension of researches. Thus, a long-term multiannual climate synthesis (over 25 years) was carried out, in order to evaluate temporal potato resilience in areas with known favorability for potato cultivation in Romania (Brasov, Covasna, Harghita, Suceava, Dolj). Interlinking synthesis results supports attenuation and adaptation to identified emerging threats. The trend during the potato vegetation period (April-October) was highlighted and the hydro-thermal coefficient was calculated. In all traditional areas of potato cultivation, a constant trend of increasing air temperature and decreasing precipitation during the summer has been observed, especially in the flowering-maturing phenophase, when the plants achieve maximum water consumption, with a very important role in the process of intense accumulation of production.

Key words*: climate resilience, favorability area, multiannual synthesis, potato, hydro-thermal coefficient.*

MATHEMATICAL APPROACH FOR ASSESSING THE IMPACT OF FOLIAR NUTRITION ON THE MAIN INDICATORS IN MAIZE HYBRIDS

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Abstract

Climate changes towards global warming and drought are leading to disruption of the world`s water balance. Maize is a crop of strategic importance for agriculture. Therefore, it is important to study the potential capabilities of the crop at different levels of agrotechnics. For this purpose, a field experience with five hybrids of corn was set. Observations were made on the productivity of hybrids for silage and for grain. The development of the hybrids during the growing season was monitored. We tested three levels of foliar fertilization. The obtained yields and parameters of the structural elements of the yield of the five hybrids show how responsive each is to optimizing the nutritional regime. The field experience was carried out under irrigated conditions. Trends are registered after conducting a statistical analysis of the results.

Key words: *maize, fertilization, yield, regression.*

PRODUCTIVITY AND STABILITY OF BULGARIAN TRITICALE CULTIVARS UNDER DIFFERENT LEVELS OF NITROGEN FERTILIZATION AND CONTRASTING ENVIRONMENTS

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Abstract

In order to determine suitable combinations between genotypes and agronomy practices based on productivity, stability and adaptability, four triticale genotypes (Kolorit, Bumerang, Respekt and Atila) were studied in three contrasting growing periods and under four levels of nitrogen fertilization. The productivity, stability and adaptability were determined by using the method of Eberhart and Russell and by AMMI analysis. Cultivar Bumerang was with the highest productivity, in all levels of nitrogen fertilization, while cultivar Respekt was with the lowest yields. A tendency was observed toward higher effect of the genotype, while the effect of the year conditions decreased with the higher nitrogen nutrition; the effect of the genotype x environment remained almost constant. The highest stability, averaged for this experiment, was that of cultivar Bumerang, and the lowest - of cultivar Kolorit. With the exception of the variant without nutrition, both cultivars had a comparatively stable response to the other nitrogen norms, which makes them suitable for growing under the soil and climatic specificity of Bulgaria at varied nutrition regimes.

Key words*: adaptability, nitrogen nutrition, fertilizer norm, triticale, stability.*

ENERGY AND PROTEIN FEEDING OF BIOMASS FROM TWO MAIZE HYBRIDS IN RUMINANTS

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Abstract

The research was conducted in the period 2022-2023 in the experimental field of the Department of Plant Breeding, Faculty of Agriculture of Trakia University, Stara Zagora, Bulgaria. In this study, the nutritional value of three maize hybrids was investigated. The productivity of hybrids grown in non-irrigated and irrigated conditions was determined. The influence of feeding with liquid foliar fertilizers on the productivity of corn hybrids has been studied. The chemical composition has been investigated and the nutritional value of the biomass has been determined. A regression analysis was performed between some parameters and trends were detected. The analysis of the results shows a tendency towards an increase in the crude protein content of the variants treated with nutritional products. An average increase of 36.4% for LG 31.390 and 14.8% for Knezha-461 was reported over the study period. When giving the hybrid, no signi- ficant differences were found in terms of the content of PFA. The data shows that the values of FUM and FUG move within narrow limits for the variants. A negative RDP was found, which is an indicator of nitrogen deficiency for microbial protein synthesis in the rumen. Linear regression models show a strong relationship between crude protein content and biomass yield. The coefficients of determination were established for the two hybrids, LG 31.390, $R^2 = 0.9255$ and Knezha-461, $R^2 = 0.7205$, respectively.

Key words*: maize, biomass, fertilization, nutritional value.*

IRRIGATION WATER PRODUCTIVITY UNDER DRIP IRRIGATION OF TWO CORN HYBRIDS

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Abstract

A field experiment with two maize hybrids was conducted to analyze the influence of irrigation and feeding, with nutrients, on productivity, irrigation efficiency and irrigation water productivity. The experiment was conducted under non-irrigated and irrigated conditions. The object of the research are two maize hybrids: Premeo and Knezha-461. Optimizing the irrigation regime provides an increase in corn yields for grain by 237.1% in Premeo and by 233,1% in Knezha-461 compared to the non-irrigated option. Optimizing the irrigation and nutrition regime leads to an increase in productivity by 340.8% in Premeo, and in Knezha-461 by 313.5%. The corn hybrid Premeo 11.4 kg/mm stands out with the highest irrigation water productivity, followed Knezha-461 with 10.3 kg/mm, average for the study period. A trend towards an increase in the productivity of irrigation water with an increase in the productivity of the maize hybrids was found. It was established that the Premeo corn hybrid has a higher effect per 100 m^3 of irrigation water, on average for all variants - 722.2 kg/ha, while for Knezha-461 the effect is 656.1 kg/ha.

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

THE INFLUENCE OF MINERAL FERTILIZATION TYPE ON THE PROTEIN CONTENT OF RAPESEED SEEDS AND MEAL

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Abstract

Rapeseed (Brassica napus) stands as one of the preeminent oil-bearing crops globally, attributable to its elevated seed oil concentration, robust hybrid production capabilities within the extant crop, and its versatile applications. The advent of erucic acid and glucosinolate-free hybrids has significantly broadened the utility of rapeseed-derived cakes and meal, characterized by a substantial protein content ranging from 38% to 41.9%. This study aimed to elucidate the impact of mineral fertilizer type on the protein content of both rapeseed and its resultant meal. Three distinct mineral fertilizers were tested in the experiment: E34 (10:24:0 + 0.1Zn + 0.1Br + 20 SO_3), DAP (18:46:0), and the 20:20:0 fertilizer type. The findings unequivocally underscored the discernible impact of fertilizer type on the protein content of rapeseed seeds. Notably, the protein content ranged from 19.80% in the 20:20:0 fertilization variant to 22.04% in the E34 fertilization variant. Similarly, the protein content of the resultant meal exhibited variance, oscillating between 38.07% in the 20:20:0 fertilization variant and 39.81% in the E34 fertilization variant. These outcomes accentuate the pivotal role of mineral fertilization in modulating the nutritional composition of rapeseed and its derivatives.

Key words*: fertilization, protein, rapeseed.*

FEATURES OF GROWTH AND DEVELOPMENT OF *Hyssopus officinalis* L. IN THE CONDITIONS OF THE SOUTHERN STEPPE OF UKRAINE

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Abstract

Each year, the pharmaceutical industry`s demand for high-quality medicinal raw materials increases, leading to the need for the cultivation of the most commonly used medicinal plants. According to statistics, over 40% of all drugs, including 75% of medicines, are produced from medicinal plants. In the southern regions of Ukraine, the cultivation of stress-resistant crops with high productivity and enhanced quality characteristics of raw materials is essential, especially those that can thrive under high temperatures and low relative humidity conditions. Medicinal and essential oil crops could be suitable for this region. Hyssop (Hyssopus officinalis L.) is a non-traditional plant from the Lamiaceae family, which has been cultivated in Ukraine over the past decade. The article presents the results of phenological observations and biological growth and development characteristics of Hyssopus officinalis L. under introduction conditions. The growth dynamics of the plants are studied, and three developmental stages are considered: the latent stage, the vegetative stage, and the generative stage. The obtained results can be used in breeding work and in providing practical recommendations for the cultivation and propagation of hyssop.

Key words*: introduction, Hyssopus officinalis L., medicinal hyssop, ontogenesis periods, phenological observations.*

STORAGE PROTEINS OF BULGARIAN VARIETIES AND ADVANCED LINES OF DURUM WHEAT

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Abstract

The research focused on 25 genotypes of durum wheat varieties and advanced lines created in the Field Crops Institute in Chirpan, Bulgaria. A-PAGE and SDS-PAGE methods were used to investigate the allelic composition of γ-gliadins, high molecular weight (HMW-GS), and low molecular weight (LMW-GS) glutenins. Two of the γ-gliadin fractions were identified in the analyzed genotypes. Gliadin fraction γ-45 in this investigation has a much lower frequency (24%) compared to gliadin fraction γ-42 (76%). According to the identified allelic combinations in the Gli-B1 and Glu-B3 loci of the studied genotypes, two main types were established (LMW-1 and LMW-2) that determine gluten strength. Protein subunit 2 (allele b) was identified in a significant part of the analyzed genotypes at the Glu-A1 locus, which is associated with higher gluten strength. In the Glu-B1 locus, genotypes with HMW-subunits 6+8, 7+8, 13+16, 14+15, 17+18 were established. Genotypes containing HMW-subunits 7+8 and 17+18 in combination with LMW-2 glutenin subunits have been identified, which are characterized by the best gluten properties. This information could be useful for identifying genes, for creating new durum wheat lines with improved gluten quality.*

Key words: *A-PAGE, SDS-PAGE, gliadins, glutenins, durum wheat.*

POSITIVE EFFECTS OF ORGANIC AND INORGANIC FERTILIZERS ON YIELD COMPONENTS AND GRAIN QUALITY OF WINTER WHEAT

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Abstract

Intensive farming systems are based on mineral fertilizers, especially on inputs of synthetic N fertilizers, which have had a major contribution to the improvement of agricultural crop yields. On the other hand, the extensive use of mineral fertilization determines a range of negative effects on soil and the environment including soil acidification, soil microbiological activity, the reduction of biodiversity, and climate changes. One of the main arguments for use the organic fertilizer is related to its benefits on soil fertility. The application of organic fertilizers presents a more sustainable method of food production. The combined application of different types of fertilizer aims to obtain high grain yield and superior grain quality, following at the same time the restoration of soil proprieties. Two winter wheat genotypes were tested during two experimental years in different fertilization systems for their reaction regarding some morpho-productive and grain quality components. Depending on climatic conditions the combined fertilizer, manure (20 t ha^{-1}) + NPK (120 kg ha^{-1}) has a significant effect on morphological traits and grain quality indices.

Key words*: fertilization, manure, winter wheat, yield components.*

PESTS OF MAIZE CROPS AND INTEGRATED CONTROL STRATEGY IN ROMANIA

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Abstract

Maize cultivation in Romania represents 2.3-2.5 million ha annually, which confirms its food importance for humans and animals, but also its industrial and commercial use. Various researches conducted in different locations of Romania indicated that pests (Tanymecus dilaticollis, Agriotes spp., Helicoverpa armigera, Diabrotica virgifera virgifera, Ostrinia nubilalis) can caused up to 100% losses in maize crops, especially in the first stages of vegetation. Recently, other very damaging pests have been reported to the maize crop as new threats or/and quarantine pests, which can cause major damages in the future, for example: Spodoptera frugiperda, Elasmopalpus lignosellus, Tylenchorhynchus claytoni, Chilo partellus. These new pests have established themselves in Europe, therefore the risk of spreading is very high. The data from literature were analysed on the pest short description, the mode of damage and the most effective control strategies through chemical, biological and cultural operations in the maize growing regions in Romania. It is important for growers to recognize all stages of these insects that attack maize crops, to making the correct decision by Integrated Pest Management (IPM) and/or other effective control methods.

Key words*: maize, pests, integrated control strategy, IPM.*

THE EVOLUTION OF PESTICIDES USE IN THE CONTEXT OF SUSTAINABILITY OF AGRI-FOOD SYSTEMS

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Abstract

Future agriculture strategies and policies need to be developed to reduce the use and risks of pesticides, support agricultural production and food security, and encourage the development and adoption of sustainable practices. In the world, in 2021, more than 3.5 million tons of pesticides were used, i.e. 1.4 million tons more than in 2000. The amount of herbicides used in 2021 was higher by about 8.5 million tons compared to 2000, and fungicides and insecticides by 2-3 million t. For the European Union and Romania, there was a decrease in the quantities of all categories of plant protection products. This reflects the permanent concern of today`s society, decision-makers, and citizens to improve the quality of life and the environment, biodiversity, and safe agri-food products through the sustainable use of pesticides and to promote the wider use of alternative ways of crops protecting against pests, weeds, and diseases.

Key words*: agri-food system, health, pesticides, sustainability.*

RESEARCH ON THE INFLUENCE OF THE CULTIVATED GENOTYPE AND THE SOWING SCHEME ON THE GRAINS QUALITATIVE PARAMETERS AT TWO-ROW BARLEY

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Abstract

The quality of two-row barley grains, the main raw material in the beer manufacturing sector, is directly influenced by the management of some variables related to the cultivation technology, so that the selection of the most valuable genotypes and the establishment of an optimal density of plants per unit area represent the guarantee the success of this culture. The present research aimed to testing the behavior at new two-row barley genotypes and to identify the most optimal sowing scheme so that, at harvest, the grains meet the requirements imposed by the standards in force regarding the physical and chemical parameters which define the quality of the grains. The results of the research highlighted the superiority of the Salamandre variety which, by ensuring a sowing density of 350-450 germinating grains/m^2, was clearly superior to the Tepee and Bosut varieties in terms of grain quality in the soil-climatic conditions specific to the N-W area of the Romanian Plain.

Key words: *two rows barley; sowing scheme; genotype; physical quality parameters; chemical quality parameters.*

INFLUENCE OF THE TECHNOLOGICAL PRACTICES OPTIMIZATION ON THE YIELD COMPONENTS AT TWO-ROW BARLEY FOR BEER IN THE NORD-WESTERN CONDITIONS OF THE ROMANIAN PLAIN

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Abstract

Identification of the most valuable genotypes and the establishment of an optimal density per surface unit at the establishment of the crop are two of the technological links with a decisive role in the yield components in the two-row barley crop intended for the manufacture of beer. The results of this research highlighted the fact that, in the pedo-climatic conditions specific to the N-W area of the Romanian Plain, the Salamander variety behaved best in terms of productive capacity, achieving productions of over 7.500 kg of grains/ha under the conditions of using a density of over 250 g.g./m^2 while, from the point of view of grain quality, the highest values of the mass of 1.000 grains were obtained in the Salamandre and Tepee varieties, regardless of the sowing density established at the establishment of the crop.

Key words*: two-row barley for beer, genotype, plant density, yielding components, productivity.*

CHLOROPHYLL CONTENT, PHENOLOGY, AND MORPHOLOGICAL TRAITS OF WHEAT UNDER SALINITY STRESS

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Abstract

Natural and anthropogenic salinization through intense and progressive periods of drought, as well as due to the use of fertilizers or the soil parental material lead to soil qualities degradation. In this context, one of the most important crops, wheat, is threatened. The general aim was to test and establish ten wheat varieties tolerance to salinity stress in order to help the farmers who face this issue. Specific objectives include measuring the chlorophyll content and some morphological parameters like plant height, grain number, shoot dry biomass, arista and spike length. The experiment was set up in field conditions, in mezocosms, under six saline doses 15-30-45-60-75 mM NaCl and control without salt, in five replications. The results highlighted different effects depending on the tested variety and also of applied salinity doses. The most concentrated dose of 75 mM NaCl drastically reduced the values of almost all morpho-physiological parameters to all varieties. In conclusion, different tolerance patterns were observed based on the interaction between variety and the salinity dose.

Key words*: abiotic stress, BBCH scale, development, SPAD units, variety.*

INHERITANCE IN F1 AND TRANSGRESSIVE VARIABILITY IN F2 POPULATIONS OF MAIN SPIKE LENGTH SOFT WINTER WHEAT

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Abstract

The character of inheritance of the main spike length in F1 and transgressive variability in F2 populations was studied by hybridization of the maternal form of early maturing winter wheat varieties with medium early, medium early and medium late varieties. It was found that in most combinations of crosses, the inheritance of the length of the main spike was positive dominant. In 2018-2019, with the exception of the Kolchuga/Chornyava combination (2018), positive hypothetical heterosis for the length of the main spike was determined and 35 out of 40 hybrids had positive true heterosis. The significant influence of hybridization components and year conditions on the main spike length, degree of phenotypic dominance and heterosis was established. The majority of F_2 populations significantly exceeded the parental forms in terms of the extreme maximum length of the main spike, indicating a significant formation process and the possibility of conducting selections for the studied trait. In 2019-2020, 26 out of 40 F_2 populations showed a positive degree and frequency of transgressions in spike length.

Key words*: heterosis, hybrid, main spike length, F2 populations, varieties.*

RESEARCH ON THE INFLUENCE OF SOME ELEMENTS OF TECHNOLOGY ON MORPHO-PRODUCTIVE PARAMETERS IN *Bromus inermis* Leyss. SPECIES

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Abstract

The research-conducted during the period 2022-2023 at the Research and Development Station for Meadows Vaslui (46°40`-36°10` north latitude and 27°44`-20°40` east longitude), aims to evaluate the influence of fertilization and the distance between plant rows on the plants height (cm), shoots number (shoots·m^{-2}), panicle length (cm), number of nodes per inflorescence and number of branches per inflorescence for smooth brome (Bromus inermis Leyss.*), variety Mihaela. A bifactorial experiment, 3 x 5 type, was set up according to the method of subdivided plots, with the plot harvestable area of 20 m^2, in three replications and the studied factors were the distance between rows with three graduations and fertilization with five graduations being studied the interaction between the two factors. During the growing season, numerous plant measurements were made according to the proposed methodology. Within the study, it was found that by applying mineral fertilizers and by sowing at bigger distances between rows higher plants were obtained, with a higher number of shoots·m^2, also the panicle length, the number of nodes per inflorescence and number of branches per inflorescence were higher.*

Key words*: plants height, shoots number, panicle length, number of nodes per inflorescence, number of branches per inflorescence.*

MALT QUALITY PARAMETERS OF DIFFERENT BARLEY VARIETIES

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Abstract

The study presents the technological malt quality of the facultative six-row barley variety Smarald, winter six-row barley Ametist and Simbol varieties, and winter two-row barley Artemis and Wintmalt varieties. The Romanian genotypes were compared with one of the best varieties recommended for malt and beer in the Czech Republic, the winter two-row barley genotype Wintmalt. In the studied barley varieties, the protein content ranged between 9.3-12.5% and all the varieties (except the two-row Artemis variety) registered a starch content over the standard (60.0%). Regarding the extract, just one variety had a value of over 80% (six-row Smarald variety) with the highest malt extract, followed by Simbol and Wintmalt varieties (79.9% and 79.4%, respectively). The values of diastatic power ranged from 189 ^{0}WK (Simbol variety) to 419 ^{0}WK (Wintmalt variety). The apparent final attenuation moved from 77.9 to 81.2% in all varieties, the lowest value being registered by the Artemis barley variety. All the studied genotypes have presented an increased β-glucan content (479-1610 mg/l), except the Wintmalt variety which registered the lowest level of this quality index (216 mg/l).

Key words*: barley, variety, quality indices, malt.*

EFFECTS OF DIFFERENT FOLIAR TREATMENTS AT MAIZE CROP

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Abstract

Foliar treatments are an important tool to enhance productivity of the maize plants and their ability to support stress factors. These treatments can be done with foliar fertilizers, biostimulator products or by using fungicide products with a stay-green effect on maize plants. The aim of this study is to present how effective foliar fertilization is on the quality and yield on maize crop. In this respect a field research was performed in the specific growing conditions of South Romania (44°12`55`N, 26°51`51`E) in the years 2022 and 2023. The experimental factors were represented by two foliar fertilizers (Microfert-U and Kingfol Zn), two biostimulator products (Terra Sorb and Atonik), and one fungicide (Rentengo) with a stay-green effect. The obtained results brought attention to the positive effects of fungicide Retengo to the maize grain yield.

Key words*: key words: maize, effective, yield, biostimulators, foliar fertilization.*

EFFECTS OF DIFFERENT NITROGEN RATES AND FERTILIZERS AT MAIZE CROP UNDER GROWING CONDITIONS OF SOUTH ROMANIA

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Abstract

Nitrogen is one of the most important nutrients for plant growth. Maize is the world's widely grown highland cereal and primary staple food crop who also requires careful work because nutrient deficiencies at key growth stages can affect plant productivity. As an alternative, urease inhibitor fertilizers have appeared on the market to increase N supply to crops. The aim of the study is to evaluate the effect of different levels of common urea, urea treated with nutrisphere, urea-ammonium nitrate solution(UAN) and ammonium nitrate on the efficiency and productivity of the nitrogen fertilization in corn. In this sense a field research was performed in the specific growing conditions of South Romania in the years 2022 and 2023. The obtained results brought attention to the positive effects of urea treated with nutrisphere to the maize grain yield.

Key words*: corn, efficiency, productivity, urea, urea treat with nutrisphere.*

THE BEHAVIOR OF LOCAL AND FOREIGN WINTER WHEAT VARIETIES IN DIFFERENT SOWING DENSITIES, IN AN ECOLOGICAL SYSTEM IN THE NORTH AREA OF THE COUNTRY

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Abstract

In Romania, climate changes have determined in recent years, the intensification of water deficits (very often associated with drought) during the vegetation of agricultural crops, in almost all areas of the country. Cultivating autumn wheat varieties that can withstand drought and heat well and adapting cultivation technology to climate changes are decisive factors in obtaining stable and economically efficient productions. In the agricultural year 2022-2023, in A.R.D.S. Secuieni, Neamț County, a multifactorial experiment of the 10 x 3 x 1 type was established, which aimed to determine an optimal density depending on the varieties used and the climatic conditions. The experiment was laid out according to the method of parcels subdivided into 3 repetitions, with the following factors: Factor A - variety, cu 10 graduations (a_1 = Trublion; a_2 = Centurion; a_3 = Katarina; a_4 = Glosa; a_5 = Aspekt; a_6 = Izvor; a_7 = Avenue; a_8 = Solehio; a_9 = Alcantara; a_{10} = Hyxperia); Factor B - plant density, with 3 graduations: (b_1 = 250 germinable kernels/sm; b_2 = 360 germinable kernels/sm and b_3 = 500 germinable kernels/sm.); Factor C - location, cu 1 graduation: c_1 = Secuieni. Productivity elements are influenced by sowing density, variety and experimental conditions. The Glosa variety is the common winter wheat variety with the largest share in the structure of varieties grown in the all the Romania country. It achieves high and stable yields (8,559 kg /ha), with a protein contain 14.2, the highest average protein contain on the tested varieties. For the northern part of the country, good results were obtained when 250 g.g/m^2 were used for the variety Centurion, a yield production of 10,008 kg/ha. The hybrid wheat, Hyxperia variety obtained the highest yields (8,745 kg/ha) regardless of the climatic conditions of the year, proving ecological stability and plasticity, with a protein content of 11.9%.

Key words*: wheat, ecological system, sowing rate, wheat varieties, hybrid wheat, grains weight per ear, TGW, HLM.*

INFLUENCE OF SOWING DATES ON SEED YIELD AND HARVEST MOISTURE OF MAIZE HYBRID PARENTAL LINES

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Abstract

This study presents the findings of research aimed at determining the seed yield and harvesting moisture of inbred lines, parental components of maize hybrids of various FAO groups, depending on sowing dates in the agroecological conditions of the Forest-Steppe region of Ukraine. The research is based on the evaluation of different FAO group lines-parental components of Ukrainian breeding: early-maturing - OR26A (FAO 240), AV20B (FAO 260), OR28A (FAO 260); mid-maturing - OR32A (FAO 320), AV30B (FAO 320). The seed moisture content before harvest for the lines-parental components of hybrids varied within the FAO group and sowing dates. Yield calculation demonstrated that the realization of seed yield potential for each inbred line depends on the genotype and sowing dates. Improving the elements of variety agrotechnics for lines - parental components of maize hybrids of different FAO groups provides an opportunity to increase seed productivity of lines for timely seed provision of hybridization areas and the accelerated introduction of innovative hybrids into production.

Key words*: maize, lines - parental components, sowing time, collecting seed moisture, seed yield.*

APPLICATION OF FOLIAR HERBICIDES TO CONTROL BROADLEAF WEEDS IN RYE (*Secale cereale* L.)

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Abstract

Rye (Secale cereale L.) is an important crop used for food, animal feed and bioenergy. Weeds are one of the main factors limiting the growth and development of the crop. The aim of the present study was to determine the efficacy of foliar herbicides against broadleaf weeds and the treatments' influence on growth and reproductive performance of rye, 'Millennium' cultivar. During the period 2021/2022 and 2022/2023, a field experiment with rye was carried out on the experimental field of the Agricultural University of Plovdiv, Bulgaria. The herbicidal products Sekator OD - 0.15 l ha^{-1}, Axial One - 1.00 l ha^{-1}, Biathlon 4D - 55 g ha^{-1}, Granstar 75 DF - 15 g ha^{-1}, and Aminopielik 600 SL - 2.00 l ha^{-1} applied in tillering stage of rye (BBCH 29) were evaluated. The efficacy of the studied products by the 10-score visual scale of EWRS was reported. The application of Biathlon 4D - 55 g ha^{-1} provides the best control against Papaver rhoeas L., Descurainia sophia L., Consolida orientalis J. Gay, Capsella bursa-pastoris L., Lamium purpureum L. and Fumaria officinalis L. At the same treatment rye yields as well as accompanying biometric indicators were the highest.

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

MISCELLANEOUS

MONITORING THE DYNAMICS AND ABUNDANCE OF APHID SPECIES - VECTORS OF POTATO VIRUSES

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Abstract

The very early emergence of the vectors of potato virus poses a very serious risk to the phytosanitary quality of potatoes and for that their monitoring is very important in anticipating their maximum flight. To monitor the flight dynamics of aphid species with vector capacity in seed potato crops, in 2020-2022 at Brasov, 3 yellow water traps placed at different distances from the potato field edge and a 12.2 m high suction trap were used to capture flying aphids. 22 vector aphid species were selected from the catches of the two types of traps; their flight was analyzed in relation to the climatic data from the years of monitoring. Some of the dominant and eudominant virotic vectors (Aphis fabae, Brachycaudus helichrysi, Rhopalosiphum padi, Myzus persicae, Hyalopterus pruni, Aphis sambuci, Phorodon humuli, Aphis craccivora) started their activity, from the first decade of May and their maximum flight was different from one species to another and from one climatic year to another. The suction trap was an efficient tool in capturing vector aphids, in order to monitor their flight.

Key words*: aphids, monitoring, potato, virus vectors.*

SAPROXYLIC INSECTS AND FUNGI IN FORESTS OF THE REPUBLIC OF MOLDOVA

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Abstract

Climatic chances, and most precisely extended drought, have a negative impact on forests ecosystems. Such conditions can increase the incidence of pests and diseases in the forests, and change the behavior of saproxylic insects and fungi, which migrate from the dead wood to the stressed trees. The aim of this study is to reveal the fungal species associated with saproxylic insects collected from debilitated trees found in the strictly protected area of the Plaiul Fagului Nature Reserve. A total of 21 fungal strains were isolated from the insects' body of coleopteran species Platypus cylindrus, Scolytus carpini, Stereocorynes truncorum and Xyleborus monographus collected from Quercus petraea trees - edifier of the European-type natural forests in the Republic of Moldova. This study is the first one describing the fungal diversity associated with saproxylic insects in the Republic of Moldova.

Key words*: saproxylic insects, fungal diversity, natural forests, pest, diseases.*

THE ECOLOGICAL ROLE OF SOME FUNCTIONAL GROUPS OF INVERTEBRATES - A REVIEW

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Abstract

It is known that biological diversity is the variability among living organisms from all sources`. It includes diversity within species (genetic diversity), between species (organic diversity) and ecosystems (ecological diversity). Based on scientific literature screening we learned that the link between the functioning of an ecosystem and its biodiversity is a substantial scientific challenge. The present paper highlight that this challenge is more pronounced in soil. Soil is a significant reservoir of biological diversity that supports a wide range of key processes and provides a multitude of ecosystem services. Microorganisms and microfauna (protozoa and nematodes) in the soil are responsible for transforming organic and inorganic compounds into forms that are easily accessible to plants and other organisms through processes such as organic matter decomposition and nutrient cycling. Mesofauna are essential in the food web, increasing the availability of energy and nutrients, especially nitrogen. Soil macrofauna and megafauna are known as ecosystem engineers; they alter soil porosity, water, and gas transport, and bind soil particles, which reduces soil erosion.

Key words*: biodiversity, ecological role of invertebrates, functional groups of invertebrates, soil.*

CHEMICAL COMPOSITION AND NUTRITIVE VALUE OF TEFF BIOMASS (*Eragrostis tef* (Zucc.) Trotter) UNDER THE INFLUENCE OF SOWING RATE AND NITROGEN FERTILIZATION RATE

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Abstract

In 2021-2022 the influence of three sowing rates (10, 15 and 20 kg ha^{-1}) and four nitrogen fertilization rates (0, 30, 60 and 90 kg ha^{-1}) on the chemical composition and the nutritive value of teff biomass (Eragrostis tef (Zucc.) Trotter) was tested for the area of Central South Bulgaria. It was established that nitrogen fertilization increases crude protein content, it being the highest when fertilized with 90 kg ha^{-1} nitrogen and sowing rate of 15 kg ha^{-1} in both harvest phases. Increasing the nitrogen and sowing rates, a negative trend is observed on the content of crude fat, crude fiber and ash, and a positive trend on the content of non-nitrogen extractive substances. The content of feed unit for milk (FUM) and feed unit for growth (FUG) does not change significantly both under the influence of the applied increasing doses of nitrogen fertilization and when the sowing rate is increased. Climatic factors have the strongest influence on the chemical composition of teff biomass. Nitrogen fertilization has a strong influence on the content of crude protein and ash, and harvesting phase - on the content of crude fat and crude fiber.

Key words*: Eragrostis tef (Zucc.) Trotter, chemical composition, nutritive value, sowing rates, nitrogen fertilization rates.*

BRASSICACEAE SPECIES (*Brassicaceae* Burnett) IN THE COLLECTION OF "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE) AS POTENTIAL HONEY PLANTS

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Abstract

The collection of honey plants of the "Alexandru Ciubotaru" National Botanical Garden (Institute) includes species of different position in the taxonomic system. Thus, 5 species of the Brassicaceae Burnett family have been researched - flowering herbaceous annual and perennial plants. These species belong to 5 genera. The genus Brassica is represented in the collection by B. napus L. subsp. oleifera DC. (rapeseed); Sinapis L. - Sinapis alba L. (white mustard); Isatis L. - Isatis tinctoria L. (woad); Bunias L.- Bunias orientalis L. (the Turkish wartycabbage, warty-cabbage, hill mustard); Crambe L. - Crambe cordifolia Steven. (greater sea-kale, colewort). All of these species start the growing season early and the flowering stage occurs in May-June, providing honey-producing and pollinating insects with food. Flowering is staggered, abundant, lasting about 20-30 days. The flowers are attractive for a wide range of insects, the most common belong to the order Hymenoptera: Apidae; Diptera: Syrphidae. Both cultivated and wild brassicaceae can bring a significant contribution to the diversification and use of the potential sources of nectar and pollen in the Republic of Moldova.

Key words*: Brassicaceae Burnett, diversity, honey plants, insects*.

RESEARCH ON THE INFLUENCE OF COMMON LEAF SPOT ATTACK ON THE MINERAL CONTENT IN LUCERNE

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Abstract

Common leaf spot of alfalfa is one of the most important diseases of alfalfa that primarily affects the foliage of plants. Our research followed the influence of the attack of this disease on the mineral content of the plants affected by the attack of the micromycete Pseudopeziza medicaginis f.sp. medicaginis-sativae to the causative agent of common leaf spot of lucerne. Samples were made with plants free from the pathogen and with characteristic attack and the concentration was determined (g per 100g dry plant). The attack of the fungus Pseudopeziza medicaginis f. sp. medicaginis-sativae (Schmiedeknecht) Schmiedeknecht influenced the concentration of micro and macronutrients in alfalfa. For some elements (Cd, Co, Ga, In, Pb) the concentration values were below the detection limit of the method.

Key words*: alfalfa, fungus, mineral.*

IN VITRO ANTIFUNGAL ACTIVITY OF SOME BIOPESTICIDE PROTOTYPES ON THE FUNGUS *Fusarium* spp.

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Abstract

Our research was to evaluate the antifungal activity of a prototype biofungicide with antifungal and fertilizing activity, in the variants, combinations of plant extracts of skinduf and tagetes, steroidal glycoalkaloids from tomato, camelina oil and protein hydrolyzate, on the mycelial growth of the fungus Fusarium spp. The research followed in vitro mycelial growth at 3, 6, 9, 12 days by measuring the diameter of the colonies and determining the average value. The effectiveness of the variants of the prototype was calculated and it was found that the highest value of the effectiveness, over 50%, was recorded on vegetative growth up to 9 days of observation, for both variants. After 12 days of observation, the effectiveness decreased, reaching 19.55% in variants with tagetes extract.

Key words*: antifungal activity, micelial growth, eficacy.*

PRELIMINARY ANALYSIS OF 8 BEE POLLEN SAMPLES COLLECTED AT THE MOARA DOMNEASCĂ EXPERIMENTAL STATION DURING AUTUMN 2021

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Abstract

The present study describes the results of a pollen analysis carried out using light microscopy of 8 bee pollen samples collected from apiaries established within Moara Domnească experimental station (Ilfov County) during the fall of 2021, after a summer characterized by very hot and dry weather conditions, especially during the months of June and July. The preliminary analysis indicated buckwheat pollen (Fagopyrum esculentum, Fam. Polygonaceae) as predominant in the pollen grains that were analyzed, then it indicated pollen similar to that of sunflower (Helianthus annuus), but also found in other Asteraceae species (Senecio type pollen) and in smaller amounts Crepis type pollen (can be weeds in crops or ruderal plants: Taraxacum, Leontodon, Cichorium, Tragopogon), Fabaceae-like pollen (Trifolium sp.) and Cirsium type pollen (can be Cirsium arvensis - weed in crops, but also other plants). In Romania, there are few areas cultivated with buckwheat, mostly in the northern part of Moldova. However, this is a fast-growing annual that can be grown as a late-season melliferous cover crop, whose flowers provide both pollen and nectar for honey bees and other pollinators.

Key words*: autumn pollen, bee pollen, buckwheat, optical microscope, pollen morphology.*

PERSPECTIVES ON FIELD PROTECTIVE SHELTERBELTS: AN ESSENTIAL COMPONENT FOR AGROFORESTRY SYSTEM EXPANSION ACROSS ROMANIA

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Abstract

Protective shelterbelts in agricultural fields are pivotal for expanding agroforestry systems in Romania. However, the current state of shelterbelts in the country is not as good as it used to be six decades ago. The decline is attributed to deforestation in the latter half of the previous century and a combination of limited investments and bureaucratic hurdles. The objective of this study was to gauge the perceptions of the public in Romania regarding the necessity and significance of field protective shelterbelts. A questionnaire comprising ten open and closed questions was created using Google Forms, primarily focusing on the roles of key stakeholders in this domain. The survey was disseminated on the "Pădurile din România" Facebook page, resulting in a collection of 319 responses over a three-day period (December 2nd, 3rd and 4th, 2023). The participants in the survey also provided several valuable proposals.

Key words*: agroforestry systems, field, forest, opinion, shelterbelt.*

PRELIMINARY DATA ABOUT THE INVASIVE ABILITY OF *Solidago canadensis* L. AND ITS ESTABLISHMENT IN CROPS IN OUR COUNTRY

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Abstract

The two species of Solidago, S. canadensis and S. gigantea, which were introduced in our country, as well as other parts of Europe, as ornamental plants, have become invasive in natural areas and, more recently, in crops. Several physical, biochemical, or biological characteristics support its ability to intrude into natural environments and crops. The vigorous monopodial growth of the stem until the inflorescence is induced enables species to attain a height of 2 meters, supported by extensive sclerenchyma rows found within the stem's internal structure. Using our observations and available S. canadensis occurrence data from the literature, we created an updated chorology map illustrating the species distribution in Romania. Subsequently, we used the R software, with the SSDM package, to generate the potential distribution map of S. canadensis in Romania based on these data. In creating the potential distribution map of S. canadensis, we considered various environmental variables corresponding to the species' ecological preferences, such as climatic, pedological, anthropogenic factors, and water regimes. The model performed well, effectively highlighting the environmental factors influencing the species' dispersion in Romania and the areas potentially affected by the spread of S. canadensis.

Key words*: chorological map, invasive ability, Solidago canadensis L.*

RECENT RESULTS REGARDING THE ENTOMOFAUNA EXISTING IN SOME BOXWOOD PLANTATIONS FROM IAȘI AREA

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Abstract

Boxwood (Buxus spp.) is one of the most popular ornamental plants grown in landscaping due to its green foliage and low maintenance requirements. Commercial varieties of boxwood are propagated by cuttings, and the life cycle of the plant in the nursery can vary depending on the culture technology. The experience took place in the period 2022-2023 within a subunit of the ROMSILVA National Forest Management, in the Iași area. The aim of this study was to evaluate the existing entomofauna within the three variants established in the breeding grounds. The material was collected using the Barber-type soil traps every year from the beginning of May to the end of September, with a difference of 10-14 days. The obtained results revealed a different structure of the taxonomic groups during the study period, the weights being directly influenced by the climatic conditions. From the analysis of the collected entomofauna, species belonging to 12 orders were identified. The most representative was the order Hymenoptera 27.35%, followed by the order Isopoda (19.72%) and the order Coleoptera with a value of 17.49%

Key words*: Boxwood, entomofauna, Barber traps, Coleoptera, climatic conditions.*

MELOIDOGYNE SPECIES THAT POSE A THREAT TO POTATO CROP IN ROMANIA

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Abstract

The most important root-knot nematodes specific for potatoes crops in Europe are Meloidogyne chitwoodi and M. fallax which are regulated as Union quarantine pests, according to Commission Implementing Regulation Annex II B of EU Reg. 2019/2072). A monitoring program is ongoing for detection and identification of quarantine and regulated non quarantine pests with economic importance for Solanum tuberosum in Romania. One of the goals of this program is to have a clear situation of nematodes which can occur in order to establish the status of them in Romania and their distribution. In the literature there is mentioned also another root-knot nematode species which can be present on potato, namely Meloidogyne hapla. Official surveys are based on taking sample consists of soil and potatoes tubers. For extraction of juvenile nematodes (J_2) from soil samples were used Oostenbrink elutriator and Baermann funnel and for females from potato tubers samples by enzymatic digestion of potato peels. The identification of Meloidogyne species was done by morphological and molecular methods. It was the first record of M. hapla on Solanum tuberosum in Romania.

Key words*: Meloidogyne hapla, potato tubers, PCR, Sibiu, soil.*

HARMFUL IMPACT OF BROWN MARMORATED STINK BUGS IN AGRICULTURAL AND HORTICULTURAL CROPS IN TIMIS COUNTY AND ATTEMPTS TO CONTROL THEM

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Abstract

Brown marmorated stink bugs (Halyomorpha halys) (Hemiptera: Pentatomidae) is a harmful insect that entered Romania for several years. Its polyphagous is accentuated and in the continuous expansion of the host plants, whether agricultural or horticultural and deciduous forest. Through the present work we have proposed to see what is the current state of the pest in 5 OPs in Timis County related to density, updated range of host plants but also to try to keep populations under control so as to avoid damage. So, for 4 years (2020-2023) from May to October we made observations in various types of areas (field crops, private gardens, parks and fruit orchards). As results, we found high and medium frequency in private gardens with mixed plants but also in orchards, while in field crops, they had a lower frequency. In August, the most specimens were seen. After testing 2 products (a classic insecticide and an bio-insecticide), the classic one proved to be more effective, but taking into account the effects of pollution environment, it is recommended to apply the bio-insecticide first, however both must be used to maximize effectiveness.

Key words*: Brown Marmorated Stink Bugs, pest, polyphagous, control.*

NEW INSIGHTS INTO THE REMEDIATION OF POLLUTED SOILS USING ENDOPHYTIC FUNGI

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Abstract

Soil pollution is a growing global concern and one of the most challenging environmental issues today, involving the human sector as well. Innovative soil remediation strategies are needed to conserve the natural resources of the environment. Endophytes are present in all plants species, living symbiotically in a continuum dynamic mutualism. Among multiple changing roles, safeguarding the host in terms of increasing resistance to abiotic factors has been widely demonstrated. Following these physiological changes, host plants have beneficial potential in degrading pollutants from contaminated soils. Enzymes produced by host plants along with endophytes may also, degrade macromolecule compounds into small molecules or convert more toxic substances into less toxic substances to increase their adaptability. Phytoremediation technology with endophyte fungi is an ecological alternative strategy that has been documented as a promising technology for remedying contaminated soils. This review article aims to piece together the physiological, chemical and genetical mechanisms employed in phytoremediation techniques mediated by endophytic fungi and highlight the importance of the plant-microbiome ecology.

Key words*: endophytic fungi, hydrocarbon degradation, soil, bioremediation.*

INCIDENCE OF *Nezara viridula* L. ATTACK ON SOME HOST PLANTS

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Abstract

Nezara viridula L. is a cosmopolitan, invasive species with a highly polyphagous. Some host plants are used as a food source and others for reproduction and food. The species attacks all aerial parts of herbaceous plants, but also the green leaves, the growth tips and the harvest of fruit trees and bushes. They are recorded considerable damages at the fruiting stage. This paper presents the attack of Nezara viridula L. species on several host plants (tomato, pepper, broccoli, peach, raspberry, rose, mallow, artichoke) by assessing the anatomical, morphological and organoleptic changes. Through optical microscopy studies, some changes are highlighted in the pericarp, mesocarp and vacuolar juice of affected pepper fruits, compared to healthy ones. The analyzed fruits show significant defects in shape, color, smell and taste which are confirmed by optical microscopy studies. That means these fruits are unsuitable for consumption, marketing and storage.

Key words*: Nezara viridula L., invasive species, host plants, polyphagous, microscopy studies.*

MICROBIAL COMMUNITY ASSOCIATED WITH SPICES

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Abstract

Spices can harbour a wide variety of microorganisms. Fungi and bacteria can contaminate spices during different stages of production, processing and storage, having a negative impact on the quality and safety of spices, and leading to economic losses for producers and potential health risks for consumers. Our study detected and identified the microbial community associated with some spices that have been chosen based on their availability on the Romanian market and their popularity in use. Our results highlights a microbial community represented by fungi and bacteria. Bacterial colonies had the highest incidence in most tested variants. The fungal community was represented by isolates belonging to the genera Alternaria, Aspergillus, Aureobasidium, Epicoccum, Penicillium, Sordaria, Trichoderma and Rhizopus. Knowledge of spices microbiota can provide useful informations on their appropriate preservation practices to ensure product quality.

Key words*: microbial community, Romanian market, spices.*

THE EFFECT OF THE USE OF COMPOST AS A FERTILIZER MATERIAL FOR THE CROP OF LETTUCE (*Lactuca sativa* L.)

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Abstract

The increase in the amount of biodegradable waste that has occurred in the last decades is worrying and composting is a sustainable practice for managing these types of waste. Compost is generally used to build soil quality, water-holding capacity of the soil, and to encourage vigorous plant root system development. This article presents a study that included four types of compost produced from different biodegradable wastes, namely: wood ash + wheat straw; food scraps + eggshells; poultry litter + wheat straw and poultry litter + food scraps. An experiment was organized in the greenhouse, in pots, where lettuce (Lactuca sativa L.) seedlings were planted using soil-compost mixtures as follows: 30% compost + 70% soil; 50% compost + 50% soil; 70% compost + 30% soil. A control with 100% soil was also made. In this paper, the effects of the compost used as fertilizing material are presented in relation with the macronutrients (N; P; K; Ca; Mg) content of the lettuce plant and the pigments in the lettuce leaves (chlorophyll a, chlorophyll b and carotenoid pigments).

Key words*: compost, organic fertilizers, sustainable agriculture, lettuce, chlorophyll pigments*

POLLINATOR DIVERSITY IN RAPESEED CROPS OF SOUTH ROMANIA

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Abstract

The study on pollinators diversity in rapeseed crops was carried out in the spring season of 2024, in four sites located in South Romania. Rapeseed (Brassica napus L. ssp. oleifera (DC.) Metzg.) is an important oil crop in Romania reaching approximately one third of the total area of oilseed crops. The obtained data show that the observed pollinators belonged to four orders (i.e., Hymenoptera, Diptera, Lepidoptera, and Coleoptera), but Hymenoptera insects were the most numerous pollinators. The result revealed that the major floral visitors of the Hymenoptera order belonged to Apidae family. Undoubtedly, the honey bee (Apis mellifera) was the most important visitors (approx. 60%) followed by some species of solitary bees and bumblebees. The solitary bees ranked a secondary place, although it is known they make a significant contribution to increasing agricultural production. A high number of non-syrphid flies were also observed on flowers in rapeseed crops.

Key words*: pollinators, diversity, honey bee, rapeseed.*

POLYCYCLIC AROMATIC HYDROCARBONS OCCURRENCE IN CEREAL BASED-PRODUCTS - A REVIEW

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Abstract

Polycyclic aromatic hydrocarbons (PAHs) are environmental contaminants known to have toxic properties, carcinogenic and mutagenic potential, cereals and derivative products being the most important sources of PAH exposure to humans as a result of the high intake of this kind of products. The aim of this study was to investigate the occurrence of PAH in cereals and cereal-based products and the effect of different factors on the content of these compounds. The factors that influence the PAH content of cereal-based products were the raw material used in the recipe, the category of processed product, the baking parameters (time and temperature), the type of fuel used. The maximum level for benzo(a)pyrene (BaP) and sum of BaP, benzo(a)anthracene (BaA), benzo(b)fluoranthene (BbF), and chrysene (ChR) in processed cereal-based food and baby foods for infants and young children was established by regulation no. 835/2011. This study can provide an overview of the PAH content of different cereal-based products commercialized on the market.

Key words*: benzo(a)pyrene, bread, cereals, contamination, PAH.*

APPROACHES TO THE ASSESSMENT OF SOME HABITATS OF COMMUNITY IMPORTANCE IN ROMANIA

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Abstract

All European member states must assess the conservation status of the habitats targeted by Habitats Directive 92/43/EEC based on the information on their status and trends and the main pressures and threats affecting them. Our paper presents the assessment of the Romanian community importance habitats (excepting forests) for all five biogeographical regions of Romania on coherence with the member states and with a special emphasis on the Sites of Community Importance (SCIs) of Natura 2000 network. The conservation status of the habitats is determined based on assessment on the parameters and their future prospects. The assessment of the scope and influence of the threat is realized for the evaluation of future prospects.

Key words*: Habitats Directive 92/43/EEC, community importance habitats, Romania, characteristics of habitats.*

RESEARCH ON THE BIODEGRADABILITY AND ECOTOXICITY OF SOME BIOHYDROGELS

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Abstract

In order to address pressing issues such as persistent drought conditions or limited water availability, researchers have extensively examined hydrogels, which serve as reservoirs for water retention. They have the capacity to store a substantial amount of water and gradually release it in a controlled manner. Biodegradability stands as a main requirement for these polymeric materials, as they can be employed in the field of agriculture and may present a sustainable mechanism. Additionally, hydrogels must exhibit a lack of ecotoxicity, ensuring that no harmful substances are released into the environment following the biodegradation process. The aim of this study was to test 8 different formulations of hydrogels based on acrylic acid, carboxymethyl cellulose and sodium alginate regarding their biodegradability rate and their ecotoxicity potential. After 200 days the tested samples showed a greater rate of biodegradation for the samples containing a higher amount of sodium alginate. The ecotoxicity of the tested biohydrogels, was assessed through the germination rate and rootlet length of the radish seeds measurements. The germination process has been positively influenced by some samples while most of them demonstrated similar behavior with the control.

Key words*: bidegradation, biohydrogel, ecotoxicity.*

TENDENCIES IN WET ZONES VEGETATION EVOLUTION UNDER ANTHROPIC DISTURBANCES IN THE ROMANIAN BANAT

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Abstract

Wet zones have always been of great importance to humanity. The historical province of the Banat was known as a huge expanse of swamps in the past, but the current map of the region (its Romanian part) is fundamentally different, as a result of hydro-relief works. Our study is a synthesis about the evolution of the vegetation of some wet zones. Observations refer to a significant period of time. We processed and compared several hundred species and phytosociological rélevés from many location. Correlations were made between the nucleus of common species, the compared groups, the dendrogram with the grouping of the rélevés, the diversity profile of the parameters. From the processing of the data, it appears that there are significant losses in the current structure and composition of the vegetation. These are caused by a series of factors such as: reduction of the areas occupied by wet habitats, hydro-relief works, climate changes, expansion of invasive species, fragmentation, other agricultural activities.

Key words*: Romanian Banat, wet zones, vegetation, anthropic disturbance.*

COMPARISON OF SOME EXTRACTION TECHNIQUES FOR THE DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) FROM OILSEEDS BY GC-MS/MS

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Abstract

Polycyclic aromatic hydrocarbons (PAHs) constitute a class of organic pollutants with potential risk to human health and can contaminate the oilseeds crops during the growth period and/or during the drying/roasting processes. In order to determine the 4 PAHs regulated (Commission Regulation (EU) No 835/2011) in sunflower seeds by GC-MS/MS, two preparation techniques were evaluated: QuEChERS extraction with modifications and saponification with liquid-liquid extraction. Different factors were studied to isolate PAHs: type of solvent/salt, quantity of reagents/solvents, stirring mode, etc. Acetonitrile extracts were purified by freeze-combined with d-SPE QuEChERS. The comparison of the preparation techniques was evaluated in terms of recovery (50-120%) and co-extract residue values (≤ 2 mg/mL). QuEChERS extraction was selected as the optimal variant, obtaining the lowest co-extract residue values (≤ 0.5 mg/mL) and recoveries between 94.62-102.41%. This methodology was also verified on other samples: sunflower seeds with different fat content, sunflower seed core, pumpkin seeds, flaxseeds, rapeseeds, sesame etc. No PAHs were detected in the analysed samples.

Key words*: gas chromatography, oleaginous seeds, polycyclic aromatic hydrocarbons, QuEChERS extraction, sunflower seeds.*

AN INVESTIGATION OF THE EFFECTS OF TRACTOR TYRE WIDTH ON SOIL COMPACTION AND CROP DAMAGE

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Abstract

Soil compaction is a prevailing problem in the UK agricultural industry. This investigation focuses on the effect of tractor tyre width on a temporary grass crop used for both grazing and silage conservation. The tyres used were 650/75 R38 on the rear and 600/70 R28 on the front, with wider tyres 900/70 R42 on the rear and 710/55 R30 on the front axles for comparison. Measurements identified the areas affected by the tyres, included the degree of soil compaction and damage to the crop. The results proved the wider the tyre, although creating a wider track, compacted a lower volume of soil when compared to the narrower tyre. The narrower tyre width compacted the soil to a greater depth where compaction is more difficult to relieve without disturbing the soil structure.

Key words*: soil compaction, soil structure, tyre width, crop damage.*

STUDIES ON THE DISTRIBUTION, ECOLOGY AND PHYTOSOCIOLOGY OF *Ligularia sibirica* L. POPULATIONS IN THE CĂPĂȚÂNII MOUNTAINS, ROMANIA

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Abstract

Ligularia sibirica (L.) Cass. popularly called Siberian Leopard Plant is a species of community interest with a small area in the mountainous region of southwestern Romania. This rare species of Eurasian origin is found in Appendices II and IV of the Habitats Directive and the IUCN Red List of Threatened Species. L. sibirica was cited until the start of these studies from 2 locations in the Capățănii Mountains: the basin of the Luncavăț river and the Buila Mountain, being mentioned as a single population with very few individuals. The populations identified in the studied territory are not stable and not well preserved. The populations in that area have a relatively small number of individuals, their size and state of preservation being closely related to soil moisture, nitrogen availability, temperature and lighting are the ecological factors that influence the morphological characteristics of L. sibirica populations.

Key words*: Ligularia sibirica, populations, corology, ecology, plant communities, Căpățânii Mountains.*

CHOROLOGY, ECOLOGY AND PHYTOSOCIOLOGY OF THE *Iris variegata* L. IN FOREST HABITATS FROM THE SOUTH OF OLTENIA, ROMANIA

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Abstract

Iris variegata L. (I. lepida Heuffel) (Iridaceae), is usually in the area from the oak forest zone to the beech floor, through meadows, thickets and forest clearings, in open forests, at the edges of forests. It can be easily recognized by its flowers with yellow inner perianth segments and yellow-white outer perianth segments mottled with brown to purple. This species is cited from few places in Oltenia. Following field research in the forest habitats of southern Oltenia, important populations of this species were identified. Such populations were identified in the lower Jiului basin, in the forest of the Segarcea and Perișor Forestry Districts. The species is found especially in the forests of the Quercus cerris and Q. frainetto, in the natural habitat - 91M0 Pannonian-Balkan oak - Oak forest.

Key words*: Iris variegata, populations, corology, ecology, plant communities, habitats.*

PLANTING PERIOD - IMPORTANT SEQUENCE IN ESTABLISHING THE CULTIVATION TECHNOLOGY IN *Primula officinalis* Hill. SPECIES

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Abstract

The introduction into the system of sustainable agriculture is an alternative to the harvesting of medicinal plants from the spontaneous flora, ensuring the conservation of natural resources. By including in phytotherapy the active principles of the organs of this species, a qualitative leap was made. The aim was to determine the optimal planting period of the species Primula officinalis, in a experience lasting 4 years, in order to introduce it into culture. The best emergence in the following years, the plant being a perennial, had the version planted with seedlings on 28.03.2017, with an average of 7 plants, and the lowest emergence was recorded in the version planted on 10.04.2017. Analysing the influence of the planting date on the average height of the plants, it was observed that the V1 variant planted on 20.10.2016 has the highest values, with an average of 47.33 cm, the V2 variant planted on 11.11.2016 has a significant increase of 4, 00 cm compared to the control, variants V4, V5 and V6 registering negative differences. The favourable planting period proved to be autumn, in October and November, when the highest values were recorded.

Key words*: biology, planting date, Primula officinalis, technology.*

CHANGES IN A PROTECTED, OLD-GROWTH *Abies alba* - *Fagus sylvatica* FOREST IN THE ROMANIAN CARPATHIANS FOR 37 YEARS

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Abstract

The vegetation of an old mixed beech and fir forest from the foothills of the Bucegi Mountains, in the South Carpathians, Romania, was first surveyed in 1972-1973 and secondly in 2008-2009 in 121 sample plots from a representative area displaying a heterogeneous structure, the oldest trees being over 250 years. The research sought to assess the changes in the structure of tree populations and herbaceous layers after 37 years, and the relationships between the characteristic and dominant species. The results show that the Piatra Arsă forest has a diversified structure and is rich in terms of species and habitat diversity. Certain structural changes in the forest may be related to climate change, resulting in an increased proportion of beech at the expense of fir. Except for the shift in tree species dominance after 37 years under conservation, the Piatra Arsă forest displayed rather small structural changes (shifts of the micro-habitats), which may be attributable to natural fluctuations characterizing a natural old-growth forest.

Key words*: mixed fir-beech stand, species composition, stand structure, uneven old-growth forest.*

NITROGEN MINERALIZATION DYNAMICS DURING THE MATURITY STAGE OF LAVENDER WASTE COMPOST

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Abstract

The interest of farmers in the lavender crop has increased over the years and the industry around this species is more diverse nowadays, therefore the waste generated by this sector has increased too. The importance of a better management of this organic waste and the need to integrate the biomass resulted from lavender cultivation and processing through circular economy were the purposes of this research. Lavender waste collected from several farms from the South of Romania and sheep manure were composted at the farm level. The physicochemical properties and the phytotoxicity of the resulted compost were analysed. The pH of the compost had values between 8.19 and 8.31, the dry matter values ranged from 52.28% to 62.35%, the total organic carbon values were between 12.45% and 17.45%, and the total nitrogen values ranged from 1.45% to 2.05%. Other indexes were studied as well with satisfying results. The compost reached the cooling stage after 3 months. During the maturity stage, we evaluated the nitrogen mineralization dynamics. The results show new scientific perspectives and open research opportunities.

Key words: *compost, compost maturity, lavender, nitrogen mineralization dynamics.*

CONTEMPORARY INFLUENCE OF EDUCATIONAL APPROACHES ON AGRICULTURAL PRACTICES

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Abstract

The agricultural sector is undergoing dynamic transformations in response to evolving societal needs, technological advancements, and environmental challenges. Educational methodologies play a pivotal role in shaping the competence, innovation, and sustainability of agricultural practices. This abstract examines the contemporary impact of educational methods on agriculture in today`s landscape. By scrutinizing diverse pedagogical approaches such as experiential learning, technology integration, interdisciplinary studies, and adaptive teaching models, this abstract delves into their influence on fostering a new generation of agriculturists equipped with multifaceted skills. These approaches not only facilitate knowledge acquisition but also emphasize critical thinking, problem-solving abilities, and adaptability essential traits for addressing modern agricultural complexities.

Key words*: agriculture, methods, educational, approaches, practices.*

DIVERSE MULTISPECIES INTERCROPPING OF ANNUAL PLANTS FOR ORGANIC FARMERS IN SOUTH-EAST ROMANIA

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Abstract

Cropping system diversification is a key factor in developing more sustainable crops and increase food security. A two-year field experiment was conducted at South-East part of Romania, to emphasize the right plant types, both legumes and non-legumes which can be used in intercropping system for organic agriculture. Intercropping pattern with two (Peas + Camelina; Peas + Flax; Peas + Oats; Flax + Oats; Spring Wheat + Camelina and Spring Wheat + Flax) and three species (Peas + Camelina + Spring Wheat; Peas + Flax + Spring wheat; Peas + Flax + Oats; Peas + Camelina + Oats) was used. Sole cropping of peas, camelina, flax, oats and spring wheat were also used. Two sowing rates were tested, at 50% and 100% of the recommended amount of seed. Results showed that averaged across years and intercropping patterns, yields were significantly more increased in mixtures crops compared to sole cropping ones. Through the land equalization ratio (LER) with values greater than 1, the mixtures of crops (of two or three species) that use environmental resources more efficiently and productively were identified.

Key words*: participatory research, crop mixtures, legumes, cereals, field pea, oat, flax, camelina.*

PHYSIOLOGICAL, BIOCHEMICAL AND AGROPRODUCTIVE CHARACTERISTICS OF HEMP MICROGREENS IN DIFFERENT GROWING ENVIRONMENTS

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Abstract

Microgreens represent a healthy alternative in nutrition, due to their high nutritional value and unique sensory characteristics. The light, the temperature or the density influences the photosynthetic and metabolic activity of microgreens, having a beneficial effect on their nutritional quality. In 2023, an experiment was carried out with microgreens from a hemp variety at IULS Iasi. This explored two growing environments, controlled versus uncontrolled (growth chamber versus window) and seven different seeding densities ranging from 40 to 280 microgreens/100 cm^2. The results revealed that the variant with 280 microgreens/100 cm^2 in the growth chamber recorded the highest fresh matter of 12.864 g/100 cm^2, while the variant with 40 microgreens/100 cm^2 in the growth chamber presented the highest content of chlorophyll pigments (13.1 CCI). The highest value of vitamin C (58.0 mg/100 g product) was found in D160 variant and the highest content in total soluble solids (4.33°Bx) belongs to the D200 variant, both from the growth chamber. Results underline the importance of selecting appropriate growth conditions and seeding densities for optimizing the qualitative and quantitative properties of hemp microgreens.

Key words*: microgreens, hemp, growth chamber, density, qualitative properties.*

THE QUALITATIVE CHARACTERIZATION OF POLYFLORAL HONEY AND THE INFLUENCE OF THERMAL PROCESSING ON HYDROXYMETHYLFURFURAL CONTENT

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Abstract

Due to the low pH, water activity and high sugar content, honey is one of the healthiest food products. Few biological hazards are associated with the product, due to its composition. The hydroxymethylfurfural (HMF) content is recognized as a parameter that affects the freshness of honey. The content tends to increase during processing or due to long storage. The aim of this paper is to assess the physico-chemical quality of polyfloral honey from Alba County, Romania. The research was carried out on a sample of honey whose initial HMF values was 2.1 mg HMF/kg honey. The simulation of honey processing was carried out at temperatures between 30 and 100°C, and the treatment time varied between 30 and 300 min. The statistical correlation between the thermal treatment applied to the honey and time, calculated from the results obtained, represents an argument for a unique direction of hydroxymethylfurfural content.

Key words*: honey bee, HMF, processing, HACCP, statistics.*

NETTLE BREAD, A POTENTIAL FUNCTIONAL PRODUCT

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Abstract

Stinging nettle (Urtica dioica) plants are considered plant superfood with medicinal properties. Stinging nettle plant can be found worldwide and were used to combat a wide range of diseases like: seasonal allergies, respiratory problems, arthritis, pain, anemia and lethargy, inflammations etc.), as textile or food since thousands of years. There are no informations regarding since when nettle started to be introduced in bread, but there are written food receipts since Roman times. The aim of this study is to present the possibility of using nettle powder (1, 5, 10%) of the total flour quantity, to improve bread taste and quality. Young nettle leaves were collected from a nonpolluted area (Bazos, Timis), dried under controlled environment, then powdered and stored at room temperature in stainless steel container. The bread with and without nettle powder (Control) was analyzed regarding moisture content, mineral composition using XRF analyzer, total antioxidant capacity and total polyphenol content. The results were statistically evaluated. By comparing plain white bread and bread enriched with nettle powder, it's observed the increase of mineral content, total phenolics and antioxidant activity.

Key words*: antioxidants, mathematical models, minerals, Urtica dioica.*

ARID CLIMATE IMPROVEMENT IN THE LOW PLAIN ARANCA WITH FRUIT TREE AND FOREST SHELTER - BELTS

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Abstract

The village territory Beba Veche is placed within the Low Plain Aranca in the western part of Romania of 9300 ha. The aridity of climate has been intensified because of wood cutting, and of an ample hydrotechnics and land improvement works. In present time there are 5-6 droughty years from ten years. The dominant soil types are Chernozems (44%) and Vertisols (37%). The shelter - belt must be composed of forest species but also from shrubs and fruit trees, like: Quercus, Fraxinus e., Robinia p., Alnus g., Cydonia o., Cerasus v., Malus d., Pirus s., Prunnus d.; Sorbus n., Corylus a., Hippophae r. The seedlings will be plant on 4 rows, with 2 m between rows and 1.5 m on the rows. The necessary of seedlings is about 375,000 seedlings and the costs can be recuperated in about 6-8 years.

Key words*: climate, shelter-belt, vertisols wind.*

STUDIES ON THE DETERMINATION OF IC50 VALUES OF ETHANOLIC AND METHANOLIC EXTRACTS FROM THE SPECIES *Amaranthus retroflexus* L (*Amarantacae*) - SPONTANEOUS FLORA

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Abstract

Antioxidant activity is a vital parameter in assessing the potential health benefits and practical applications of natural products. This study investigates the antioxidant potential of Amaranthus retroflexus L. extracts using the 2,2-diphenyl-1picrylhydrazyl (DPPH) method. The DPPH method, widely employed for its simplicity and reliability, relies on the ability of antioxidants to neutralize the purple-colored DPPH radical, leading to a color change in the solution. By establishing a concentration-response relationship through testing various concentrations of Amaranthus retroflexus L. extracts, a dose-response curve was constructed, pivotal for determining the IC50 value, which represents the concentration capable of scavenging 50% of free radicals. Lower IC50 values indicate stronger antioxidant activity. The findings reveal variations in the inhibitory potential of Amaranthus retroflexus L. extracts, suggesting their potential utility in pharmaceuticals, agriculture, and other industries. This study underscores the significance of exploring natural sources for antioxidant compounds and provides valuable insights into harnessing the antioxidant properties of Amaranthus retroflexus L. for various applications.

Key words*: Amaranthus retroflexus L, half-maximal inhibitory concentration, concentration-response.*

USE OF FUNGICIDES IN AGRICULTURE SECTOR AND FARMERS' AWARENESS ON RELATED EFFECTS TO THEIR APPLICATION

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Abstract

The current study aims to identify the main groups of applied fungicides in agriculture and the farmer's attitudes about their use. Thus, a structured questionnaire was prepared to gather information related to fungicides' application in the Elbasan district of Albania. During the study were identified 27 fungicides and the most applied were those which belong to triazoles group (6 out of 27 or 22.2%). The applied triazoles were penconazole, difenconazole, tebuconazole, propioconazole and febuconazole. The gathered information from questionnaires showed that the farmers were awarded about negative impacts of fungicides on human health and environment. Furthermore, about 84% of farmers were responded that the use of the fungicides especially triazoles increase the yield of the crops, 72% of farmers had declared that triazoles can be applied in many agricultural crops and 56% of farmers were responded that the use of fungicides protects very well the crops from fungal diseases. Although the fungicides have negative impacts on environment and human health, their application on the management of crop diseases still remain an inevitable alternative.

Key words*: fungicides, plant diseases, triazoles group, awareness.*

RESEARCH ON THE BIODIVERSITY OF CARABIDS (ORDER *Coleoptera*, FAMILY *Carabidae*), PREDATORY INSECTS IN SOME AGRICULTURAL ECOSYSTEMS ACCORDING TO THE APPLIED TECHNOLOGY AND IN THE CONTEXT OF NEW CLIMATE CHANGES

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Abstract

Research was done during 2023 on three field crops: wheat, corn and sunflower. The collection of the material was done with the soil traps Barber type, and the collection of biological material was made every two weeks, starting from May to September depending on the culture. We were organized two variants in the experimental stationary, depending on the technologies (treatment scheme applied) to each culture as follows: V1, the field where no chemical treatment was done (ecological variant); V2, the field to which chemical treatments were applied, if necessary to the seeds and during the vegetation period (conventional variant). From the material collected from the Barber soil traps during to the five months, were selected only the carabid species that were then identified. Regarding the analysis and interpretation of the results, two indices of the diversity of the species were also calculated, namely: the Sorensen index and the Spearman index whose values show how similar the cultures compared to each other are, two by two.

Key words*: predatory insects, agricultural ecosystems, climate changes, Barber traps*.

USING RAPD MARKERS TO ESTABLISH DNA FINGERPRINT AND TO STUDY THE GENETIC VARIABILITY DISCRIMINATION BETWEEN TWO ROMANIAN POTATO VARIETIES

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Abstract

In order to optimize the potato breeding program in Romania, molecular research was developed so that we can have the way of expressing the genetic potential of the new breeding creations. This study aimed to establish a unique DNA fingerprint for two new Romanian potato cultivars from NIRDPSB Brasov, using RAPD molecular markers for genetic variability discrimination between them. Amplification was carried out with 17 arbitrary primers, but only 14 produced amplified sequences. OPC 08 produced the most banding patterns. The level of similarity between these two varieties of potato has approximately the same value, suggesting a stronger degree of relationship between varieties. Although the examined varieties have different genetic origins, their shared geographical origin and belonging to the same species, this can explain nearly identical similarity coefficient between them and to use of only two varieties for discrimination of genetic diversity can do a high degree of similarity. Discrimination between varieties was limited by the RAPD technique, we recommend using a large number of varieties or a more precise technique for improved accuracy.

Key words*: breeding, potato, PCR, RAPD, genetic diversity, discrimination.*

DIVERSITY OF PREDATORY CARABID SPECIES (*Coleoptera*, *Carabidae*) FROM CORN CROPS IN NORTHEAST ROMANIA

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Abstract

This research was carried out in 2020-2022, from May to September in each year. The entomological material that is the object of this study was collected from three corn agroecosystems located in three stationary from Iasi County, Romania: Ezăreni, Trifeşti, and Schitu Duca. To achieve the objectives of the research, four variants were used: V1, superficial tillage in the spring and untreated seeds; V2, deep tillage during autumn plowing and untreated seeds; V3, superficial tillage in the spring and treated seeds; and V4, deep tillage during autumn plowing and treated seeds. Biodiversity characterization indexes, namely the biodiversity index, the Shannon diversity index, equity, and the Simpson diversity index, were used to quantify biodiversity in the habitats. Data analysis and interpretation were carried out with the help of the BIODIV application to calculate the main biodiversity indicators. In our opinion, these comparative studies on the Carabidae fauna in relation to current pest control methods are useful in agricultural practice.

Key words*: carabids, pest control, Shannon index, plowing, biodiversity.*

THE BIODIVERSITY OF COLEOPTERO-FAUNA FROM WHEAT CROPS IN THE CONDITIONS OF THE NEW CLIMATE CHANGES AND THE PREMERGING PLANT

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Abstract

The observations were made in a wheat crop located in NE Moldova, Romania. In characterizing the climate in the NE of Moldova, we rely on long-term meteorological observations from the Plant Protection Center. In order to achieve the research objectives, were used three experimental variants:1st variant, wheat after wheat; 2nd variant, wheat after sun flower; 3rd variant, wheat after corn. In wheat crops, 43 harmful species were reported, grouped into 3 categories: species that caused damage with an attack rate of 3-20%, even if chemical treatments were performed, species that produced a sporadic attack, under 1% and species reported only in cereal crops without causing damage. A new concept has emerged, namely integrated control, which can be defined as a form of applied ecology, dividing pest populations, predator and parasite populations on the other in agrobiocenosis.

Key words*: biodiversity, wheat, Barber traps.*

RESEARCH ON THE EFFECTIVENESS OF HYDROGEN PEROXIDE AND AZOXISTROBIN TREATMENTS IN THE ATTACK OF *Fusarium* spp. IN STRAWBERRY CROP

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Abstract

Fusarium spp. *infections in strawberries result in significant damage, including stunting, wilting and plant collapse. The efficacy of a 35% hydrogen peroxide solution and the azoxystrobin substance in controlling Fusarium* spp. *fungi on strawberries in Giurgiu County was investigated during the years 2022-2023, using the Alba strawberry genotype. The treatment variants tested were: control (V1); pre-planting immersion of strawberry stolons in 35% hydrogen peroxide solution and drip application of azoxystrobin during the growing season (V2); application of azoxystrobin substance by dripping during the vegetation period (V3) and pre-planting immersion of strawberry stolons in 35% hydrogen peroxide solution (V4). The results showed that V2 resulted in the lowest degree of attack by Fusarium* spp.*, at 1.27%, followed by (V3), at 3.56%. The highest effectiveness (94.5%) was observed for V2, followed by V3, at 83.46%. Therefore, it is recommended that pre-planting immersion of strawberry stolons in 35% hydrogen peroxide solution and drip application of azoxystrobin during the growing season be considered for the management of Fusarium* spp. *infections in the Alba genotype.*

Key words*: strawberry, Fusarium* spp.*, hydrogen peroxide, azoxystrobin, efficacy.*

THE EFFECT OF ANTIVIRAL TREATMENTS FOR *IN VITRO* POTATO CULTURE ON THE GROWTH AND DEVELOPMENT OF PLANTLETS AND ON THE ELIMINATION OF THE *Potato virus* S

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Abstract

During in vitro potato multiplication process, of three Romanian potato varieties (Sarmis, Foresta and Castrum) infected with Potato Virus S (PVS), detected by ELISA test, an experiment was performed with reference of influence of salicylic acid and antiviral ribavirin over two plantlets parameters: height (cm) and leaves number. The trifactorial experience (2 x 3 x 3), on 3 repetitions had the following factors: experimental factor A- the culture medium used before antiviral treatment, with two graduations: a1 – classical medium (as control) Murashige -Skoog (1962); a2 - MS+ salicylic acid (100 mg/l); experimental factor B – the variety, with three graduations: b1 – Sarmis (as control), b2 – Foresta, b3 – Castrum; experimental factor C - ribavirin concentration: c1 – 0 mg/l (as control); c2 – 50 mg/l; c3 – 100 mg/l. The objective of the study is to eradicate PVS. Using of ribavirin drastically decreased the height of the plantlets and the number of leaves, causing very significant negative differences for the two parameters (for both concentrations).

Key words*: potato, in vitro multiplication, plantlets, chemotherapy, virus elimination.*

BIOMASS QUALITY OF COMFREY, *Symphytum officinale,* AND ITS POTENTIAL APPLICATION IN THE REPUBLIC OF MOLDOVA

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Abstract

The quality of areal biomass of the local ecotype of common comfrey – Symphytum officinale – grown in the experimental plot of the National Botanical Garden (Institute), Chişinău, Republic of Moldova, was evaluated. The results revealed that the nutrient content of the Symphytum officinale whole plants harvested in the flowering period was characterized by the following indices: 186g/kg CP, 129 g/kg ash, 217g/kg CF, 278 g/kg ADF, 449 g/kg NDF, 35 g/kg ADL, 224 g/kg Cel, 171g/kg HC and 160 g/kg TSS with 672 g/kg DDM, RFV = 139, 13.16 MJ/kg DE, 10.80 MJ/kg ME and 6.83 MJ/kg NEl. The prepared comfrey silage had pleasant smell and color, pH = 4.10, 38.2 g/kg lactic acid, 6.4 g/kg acetic acid and butyric acid were not detected. The silage dry matter nutrient content was 17.19 % CP, 2.17% EE, 21.57% CF, 45.88% NFE, 1.82% starch, 0.86% soluble sugars, 13.18% ash, 0.89% Ca and 0.39% P. The biochemical methane potential of comfrey green mass substrate 362 l/kg.

Key words*: biochemical composition, biomethane potential, green mass, nutritive value, silage, Symphytum officinale.*

THE EVALUATION OF THE BIOMASS QUALITY OF TALL OATGRASS, *Arrhenatherum elatius* (L.) Beauv, AND PROSPECTS OF ITS USE IN MOLDOVA

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Abstract

The main objective of this research was to evaluate the quality indices of green mass, hay, silage and straw from the local ecotype of tall oatgrass, Arrhenatherum elatius, grown in monoculture in the experimental plot of NBGI, Chisinau, Republic of Moldova. The results revealed that the harvested green mass contained 25.0-29.8% dry matter. The dry matter of the whole plant contained 80 g/kg CP6yy, 382 g/kg CF, 83 g/kg ash, 411 g/kg ADF, 710 g/kg NDF, 38 g/kg ADL,118 g/kg TSS, 373 g/kg Cel, 299 g/kg HC, with nutritive and energy value 58.2% DMD, 51.3% DOM, 9.29 MJ/kg ME and 5.31 MJ/kg NEl. The biochemical composition, nutritive and energy value of tall oatgrass hay: 77 g/kg CP, 414 g/kg CF, 80 g/kg ash, 436 g/kg ADF, 740 g/kg NDF, 40 g/kg ADL, 98 g/kg TSS, 396 g/kg Cel and 304 g/kg HC, 9.00 MJ/kg ME and 5.02 MJ/kg NEl. The tall oatgrass fermented fodder- silage is characterized by pH = 4.26, 5.9 g/kg acetic acid, 18.3 g/kg lactic acid and free of butyric acid, 88 g/kg CP, 405 g/kg CF, 100 g/kg ash, 420g/kg ADF, 724 g/kg NDF, 26 g/kg ADL, 74 g/kg TSS, 394 g/kg Cel, 304 g/kg HC, with nutritive and energy value 56.5% DMD, 9.19 MJ/kg ME, 5.21 MJ/kg NEl. The tall oatgrass straw contained 50 g/kg CP, 51 g/kg ADL, 85 g/kg TSS, 405 g/kg Cel, 286 g/kg HC. The tall oatgrass substrates used for anaerobic digestion have optimal amount of lignin and hemicellulose, the estimated biochemical methane potential varied from 341 to 361 l/kg VS. The tall oatgrass straw and hay may be used as feedstock for the production by cellulosic ethanol, the estimated theoretical ethanol yield from cell wall carbohydrates averaged 507-509 L/t.

Key words: *Arrhenatherum elatius, biochemical composition, biomass quality indices, forages, substrates for renewable energy production.*

THE IMPORTANCE OF AGROFORESTRY CURTAINS FOR ANTI-EROSION PROTECTION AND INCREASING THE PRODUCTIVITY OF AGRICULTURAL CROPS

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Abstract

The extreme manifestations of the climate in the North Baragan Plain from Romania, with major negative effects on the productive-financial results of agriculture, demand more and more obviously the need to establish protective forest curtains for agricultural crops. FAO appreciates that the forest curtains protecting agricultural land denote the degree of development of a country`s agriculture. The paper shows how forest curtains have an important role in protecting agricultural crops against drought, erosion, and landslides. According to the studies carried out, the effect of forest curtains leads to an average harvest increase of 30-55%. These results represent the effect of the influence exerted by the curtains on the significant reduction of the wind speed in the protected field. Under irrigated conditions, forest curtains increase productive transpiration by 15% and yield by up to 40% compared to fields irrigated but not protected by curtains. Also, water consumption per ton of plant mass produced is reduced by 18%, which means a reduction in the irrigation rate, thus lower costs.

Key words*: forest curtains, anti-erosion, productivity, agricultural crops.*

PATHOGENIC MYCOBIOTA OF ORNAMENTAL PLANTS FROM GREEN AREA IN THE CITY OF BUCHAREST, ROMANIA

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Abstract

The paper presents the pathogenic mycobiota associated with ornamental deciduous trees and shrubs as well as flowering plants grown in the green spaces of the city of Bucharest. The observations were carried out in 2020-2023 in the Herastrau Park, the Bazilescu Park, the Dendrological Park and the Botanical Garden on the USAMVcampus and adjoining streets. Ornamental plants are attacked by various pathogenic species of fungi from Ascomycota and Basidiomycota phyla. During the study, symptoms produced by 47 species of fungal pathogens, belonging to the phylum Ascomycota, included in 11 orders (Erysiphales, Rhytismatales, Glomerellales, Helotiales, Diaporthales, Capnodiales, Taphrinales, Mycosphaerellales, Venturiales, Myringiales, Pleosporales) were observed. From the Basidiomycota phylum, 10 species belonging to 4 orders (Pucciniales, Agaricales, Entylomatales, Polyporales) were identified. Fungal species were identified based on symptoms induced in plants and on morphological characteristics of pathogens.

Key words*: ornamental plants, pathogenic mycobiota, Romania, urban green spaces.*

ENVIRONMENTAL ADVANTAGES OF THE USE OF BIOFERTILIZERS IN THE AGROECOSYSTEM - A REVIEW

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Abstract

The agricultural industry is becoming a viable component of a healthy ecosystem. This paper aims to present the environmental advantages of the use of biofertilizers in the agroecosystem. The paper discusses some of the types of biofertilizers that are based on biological nitrogen fixation, PGPR, EM, and their benefits to the soil environment and growing crops. There is now a need to adopt a more environmentally friendly approach by applying biofertilizers to aid better nutrient uptake by plants, to stimulate their growth, and increase the population of beneficial microorganisms in the rhizosphere, thereby increasing crop yields, and stabilizing soil fertility, thus ensuring a healthy environment. The application of biofertilizers has an impact on the formation of larger plant biomass, as it increases the mass and improves the number of fruits per plant, increases the standard yield, and improves the quality of the production. Scientific developments in different parts of Europe, America, Africa and Australia present the efficiency of biofertilizers in crops that are typical for these regions - fruits, vegetables, cereals, essential oil crops, etc.

Key words*: agroecosystem, biofertilizers, organic farming, PGPR.*

RESEARCH ON THE ATTACK OF MONILIOSIS ON PLUM, LOCATION SOIMARI, PRAHOVA COUNTY, IN THE PERIOD 2017-2019

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Abstract

The aim of our research was to establish the eficacy of the treatment scheme used in the research area for the control of specific plum pathogens and for the attack of moniliosis. The analyzed genotypes were the plum varieties Stanley, Anna Spath and Gras românesc. The research was carried out in the period 2017-2019. The treatment scheme included cupric product (2%), with the application period in the vegetative rest stage and treatments in vegetation with the fungicide Topsin WGD70 (0.2%), Luna experience 400SC (0.05%) and Signum FG (0.5%). The attack of moniliosis on the shoots was less than on the fruits in all investigated varieties. The effectiveness of the treatments on the attack of moniliosis on shoots was 73.5% for the Stanley variety and 75% on fruits for the Gras românesc variety in 2019.

Key words*: plum, moniliosis, efficacy.*

COTTON FIBER PHYSIOLOGY AND QUALITY IN RESPONSE TO LIMITED WATERING CONDITIONS

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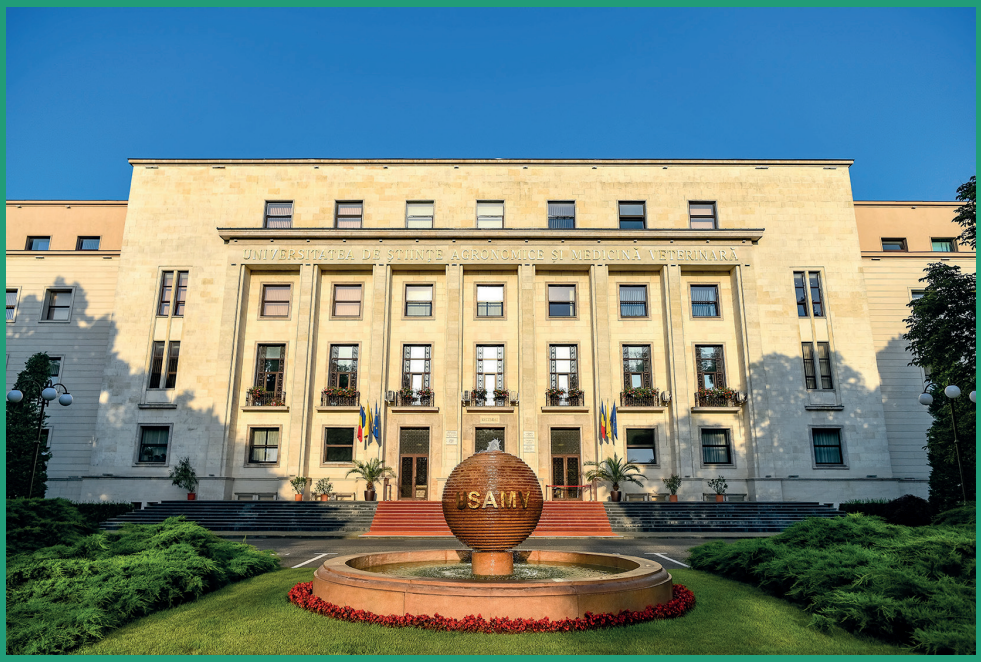
Abstract

Climate change poses a significant threat to crop production systems reliant on irrigation due to limited water resources. Cotton, being a major irrigated crop, is particularly vulnerable. Thus, optimizing water usage and cultivating with restricted irrigation are crucial for sustainable cotton production. Numerous studies have illustrated the adverse impact of reduced irrigation on cotton yield. However, conflicting findings exist regarding the effects of limited water applications on the fiber quality and physiology of cotton, which holds substantial economic importance. In this comprehensive review, we present the outcomes of our extensive, long-term investigations on cotton-water relations, supplemented by a synthesis of relevant literature. Our analysis focuses on the implications of constrained water conditions on fiber quality in cotton, emphasizing micronair, fiber strength, length and uniformity index values, and their correlation with cellulose biosynthesis processes.

Key words*: cotton, fiber quality, fiber physiology, water*.



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