



UNIVERSITY OF AGRONOMIC SCIENCES
AND VETERINARY MEDICINE OF BUCHAREST

FACULTY OF AGRICULTURE



170
years

International Conference

"Agriculture for Life, Life for Agriculture"

BOOK OF ABSTRACTS

SECTION 1

AGRONOMY

2022
BUCHAREST

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SOIL SCIENCES

THE ASSESSMENT OF SALINITY-AFFECTED LANDS IN SOUTHERN IRAQ USING SATELLITE IMAGERY

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Abstract

This study aimed to monitor, map and assess the salinity of land in southern Iraq. Where the country suffers greatly from land degradation and desertification problems, especially in the central and southern parts. This study was conducted to monitor the manifestations of salinity in the Najmi area located within the administrative boundaries of the Muthanna Governorate, which has an area of (2066 hectares) and lies between longitudes 44°21'0" to 44°31'0" East and latitude circles 30°11'0" to 32°27'0" North with the help of remote sensing technology through the use of satellite images from the Landsat 8 satellite with field observations. A map of soil units was prepared using Erdas software, Arc GIS for processing, management and analysis of raster and subject data sets. Soil samples were taken from each site for physical and chemical analysis, and the study is summarized as follows: the results indicated when using the spectral index represented by the standard difference index of vegetation cover (NDVI), whose value ranged between (0.47-0.30). It was found that the study area suffers from a lack of vegetation cover by (64%); as for the salinity index values, they ranged between (-0.30-0.49) and therefore the study area suffers from a chemical deterioration represented in the salinity of the soil estimated at (69%); where the values of the dry lands index ranged between (1.37-0.73), and the desertified lands within the study area by (45%); as for the land degradation index, its value ranged from (0.00 to 99.60), and the percentage of degraded lands was estimated at (60%) of the total study lands.

Key words: salinity, remote sensing, GIS, deterioration index.

**RESEARCH THE VARIATION OF EXCHANGE
CALCIUM ALONG THE DEPTH OF THE SOIL PROFILE
AFTER THE APPLICATION OF AMELIORANTS**

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Abstract

The effectiveness of ameliorants applied into acidic soils depends on their neutralizing power, which is determined by the calcium carbonate content and their fineness. The choice of ameliorant is a complex task, because it must be found this one which has a high neutralizing effect on easily mobile exchange aluminium, as in parallel to penetrate deeper in the soil. The use of a precipitate, as both a slow-release phosphorus fertilizer and a chemical ameliorant to neutralize acidity was theoretically and practically justified in soils with slightly to moderately acidic reaction and temperate deficiency in terms of easily mobile exchange bases in the soil. The use of hydrated lime as a chemical ameliorant in acid soils led to a relatively fast, long lasting and effective neutralization of exchange acid positions in the soil.

Key words: acid soils, calcium, hydrated lime, precipitate.

QUALITATIVE EVALUATION OF AGRICULTURAL LAND BY METHODS BASED ON GIS TECHNIQUES. LENAUHEIM CASE STUDY, TIMIS COUNTY, ROMANIA

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Abstract

This study assessed the quality of agricultural land in the area of Lenauheim, Timis County, Romania. Analog maps (1:10,000 scale) processed by GIS techniques (vectorization, digitization) were used. In relation to the 6 indicators taken into account, the studied area was characterized: Indicator 4C - Classes of average annual precipitation corrected in relation to the slope and permeability, 2 classes were found (0575 and 0650); Indicator 14 - Degrees of soil gleic status, 5 classes were found with high value for class 2 - low soil gleic level, 37.52%; Indicator 23A - Soil textural classes, 5 textural classes were found, between sand - clay and clay, with a high share of the medium clay class (42 - clay sand-clay, 92.01%); Indicator 39 - Depth classes of the groundwater level, 5 classes of groundwater were found (class 2 - shallow depth 2.01-3.00 m, 49.54%); Indicator 44 - Classes of the degree of soil compaction, 4 classes of compaction level were found (class +5 - low compacted (1-10%), 75.51%); Indicator 144 - humus reserve class (in layer 0-50 cm), 6 classes were found (class 225 - very high humus reserve 201-250 t/ha, 81.60%).

Key words: GIS techniques, quality classes, soil diversity, soil quality indices, spatial variability.

**ASSESSMENT OF THE GENETIC CONDITION
OF THE ORDINARY CHERNOZEM IN THE AREA
OF THE STEP OF THE SOUTH PLAIN, IN NATURAL
AND AGRICULTURAL REGIME**

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Abstract

Chernozems have been and will continue to be the main base of agricultural production. The statements of the founder of soil science, Dokuchaev V.V., that chernozems are and will be the breadwinner and the main breadbasket of mankind, remain truly modern. Fertile chernozem is the main base for agricultural and crop production. Soil scientists consider it the main granary of mankind, the king of soils). The main purpose of the research is the comparative analysis of the genetic peculiarities of chernozems evolved in natural and arable regime, the appreciation of the indices modified by the agropedogenetic process in the Steppe Area of the Southern Plain of the Republic of Moldova. In the laboratory it was determined: the hygroscopic water content, the density of the solid phase of the soil; particle size and microaggregate composition; hygroscopicity coefficient; humus content; carbonate content; soluble salt content; current reaction (pH); the content of exchangeable cations, etc. A detailed study of morphogenetic properties showed that chernozems under natural vegetation have: a powerful, well-developed soil profile; dark, almost black color, gradually weakening with depth; a well-defined granular structure in most of the humus strata; weakly compacted composition, gradually increasing in the lower horizons; the absence of noticeable signs of eluvial-illuvial differentiation of the soil profile; uneven, lingual boundary of the transition of the humus horizon into the parent rock; the presence of a carbonate horizon, confined, as a rule, to the lower boundary of the humus stratum and characterized by various forms of carbonate neoformations. The thickness of the natural soil profiles (profile 13) and arable soil (profile 14) up to the parent rock varies from 160 cm to 151 cm accordingly and is certified as strong deep. The soil corresponds to the non-carbonate class, the carbonates being absent in horizon A. The maximum content of carbonates is registered in the BC horizon and constitutes 11.9% in the natural one and 10.7% in the arable one.

Key words: *ordinary chernozem, genetic condition, natural and agricultural regime, Steppe Area of the Southern Plain.*

RESEARCH ON THE CHEMICAL PROPERTIES OF THE SOIL ACCORDING TO SOME AGRICULTURAL PRACTICES APPLIED TO THE SORGUM GRAIN CROP

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Abstract

Sorghum, due to its high drought resistance, has become more common in many parts of the world. The article presents the results of the changes generated, by the two factors studied (Factor A - sowing density with three graduations and Factor B - mineral fertilization, with nitrogen and phosphorus with five graduations) and by their interaction, in some soil characteristics from an experimental field organized by S.C.D.A Secuieni, where grain sorghum was cultivated. In order to assess the influence of fertilization and plant density, 45 soil samples were collected from the experimental field and analyzed. From the analysis of laboratory tests and statistical data processing, results statistically significant changes soil reaction, manganese and mobile iron contents under the influence of the interaction of the two experimental factors studied: sowing density and level of fertilization. The other soil quality indicators have no changed statistically significant under the influence of the tested technological factors however, showing slight increasing trends of the N, P, K contents in soil as a result of the applied fertilization treatments.

Key words: grain sorghum, soil, plant density, fertilization, chemical characteristics.

SOME ASPECTS OF THE FOREST SOILS GENESIS FROM THE FOREST-STEPPE OF THE REPUBLIC OF MOLDOVA

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Abstract

The genesis of contemporary soils, formed under the vegetation of deciduous forests, grey and brown soils, as well as their evolution over time as a result of long-lasting climatic oscillations and anthropogenic impact, are treated differently; some of their peculiarities in different climatic subzones of the Republic of Moldova are not always taken into account when developing their classification. Taking into account the recommendations of the World Reference Base of Soils to name high-ranking soil taxonomic units (at the type level) in one word, in the proposed classification system, forest soils have now been renamed as: xero forestry chernozems, greyzems, brownzems. Moldova is located at the intersection of three biogeographical areas whose natural conditions have a decisive impact on the evolution of all components of the environment, including soils. The anthropic use of forest soils in arable lands causes unprecedented changes in landscapes, ecosystems and environment, and the current climatic situation corresponds to the formation of chernozems throughout Moldova.

Key words: xero forestry chernozems, climate change, pedogenesis, forest steppe.

EVALUATION OF THE NITROGEN REGIME OF CHERNOZEM LEACHED UNDER THE ACTION OF DIFFERENT DOSES OF TURKEY WASTE APPLICATION

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Abstract

As a result of field experiments on the experimental field of Penza State Agrarian University (Russia, Penza region, Mokshansky district), it was revealed that with the annual introduction of different doses of litter turkey manure, an increase in the content of alkaline hydrolysable nitrogen in the soil is observed, although by the end of the growing season its content decreases, which associated with the consumption of its mineral compounds by crops. Manure doses from 12 to 36 t/ha increased the content of alkaline hydrolysable nitrogen in the soil from 26.6-29.9 mg/kg at a dose of 12 t/ha to 40.0-53.9 mg/kg of soil at a dose of 36 t/ha. With the annual use of manure, a gradual increase in the content of nitrate nitrogen in the soil is observed. By the end of the growing season, its content in the soil decreased according to the variants, although its content at doses of 24 and 36 t/ha was characterized by high and very high. This indicates that at high doses of manure, nitrate nitrogen is not completely absorbed by crops and its amount is excessive. With an increase in the dose of semi-rotted manure more than 12 t/ha with a high content of ammonia nitrogen compounds, its increase is observed at the beginning of the growing season, which can affect the formation of the yield of cultivated crops.

Key words: leached chernozem, turkey manure, alkaline hydrolysable nitrogen, ammonia nitrogen, nitrate nitrogen.

REVIEW OF METHODS FOR REMEDIATION OF POLLUTED SOILS IN URBAN AREAS

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Abstract

Urban soils are strongly affected by both natural factors: wind, water, freeze-thaw processes, heat, but also by human activity. Soil pollution caused by human activities is often associated with modernization, industrialization, metal extraction activities, oil extraction, inadequate waste storage and pesticide application. Soil pollution is one of the major effects of human technological progress. The impact of soil pollution is not limited to the soil and its organisms, but affects every sector, to humans: human health, plant growth, air pollution, reduced soil fertility, changes in soil structure, impact on ecosystem and biodiversity, contamination of water sources. For this reason, the phenomenon of soil pollution needs to be remedied. This article aims to evaluate the specialized articles and highlight the methods used to remedy polluted soils in urban areas. Remedial methods can be phytoremediation or zooremediation. The remedy can be done ex-situ and in-situ. Soils in urban areas have not received adequate attention and data on this subject are scarce so far, although constraints on soil quality in congested urban areas are acute.

Key words: *methods, pollution, remediation, urban soils.*

SOME ASPECTS AS A RESULT OF THE EVALUATION OF HUMUS CONTENT IN ERODED SOILS

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Abstract

Visible soil erosion processes began to develop in the territory of Moldova around the second half of the 19th century. For a long time, their quantitative indicators of its spatial spread were not due to the lack of such cartographic data. After the early 1950^s, soil mapping in agricultural units and administrative districts. Fragmented relief is one of the indispensable conditions for the development of slope processes, including erosion processes. Anthropogenic impact plays an important role in increasing the areas affected by erosion. The purpose of this paper is to examine the content and distribution of humus in eroded soils in the Republic of Moldova to assess their fertility. As a result of the evaluation of the humus losses on the three degrees of erosion, it was found that, for chernozems, they correspond approximately to the row: 20, 40 and 60%. Some trans-boundary passages are observed in carbonate chernozems - being the least resistant to erosion (28, 48 and 69%) and an insignificant variation are characteristic of typical chernozems and to a lesser extent leached (17, 39, 60 and 16, 38, 64%), but in soils with a high erodibility these figures of humus losses, almost equal. Brown soils are related to erosion on average for chernozems approximately 20, 40, 65%. We can state that, exclusively, it presents the gray soils in which the degree of erosion, weak and moderate, is distinguished by lower humus losses. If we refer to the whole, then the series of 20, 40 and 60% humus losses in the eroded soils compared to the standard, we are quantitatively characterized by their real degradation effect, quite terrible, caused by erosion. But from a practical point of view it is essential, because these figures characterize the real humus degradation of the underlying soil layer (50-100 cm), which has a significance for assessing their fertility especially for perennial crops, which develops a deep root system.

Key words: *humus content and losses, soil erosion process, soil type and subtype.*

TRENDS OF SIGNIFICANT VARIABILITY OF CLIMATE CHANGE IN THE VILLAGE OF NEGREA IN THE LAST 120 YEARS

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Abstract

Climate change has a profound impact on the availability of resources and agricultural activities. Over the past decade, the country has experienced a number of extreme events, such as droughts and major floods, along with incremental effects caused by rising average temperatures and uneven rainfall throughout the year, which has had a negative impact on the country's economy. Welfare and health of the population. National and international investments in climate observation, research and modelling over the last decades have led to considerable progress in experimental and applied climate predictions and projections. The systematic application of existing climate knowledge in practical solutions requires a review of the way in which climate research is conducted. The main purpose of the investigations carried out in the village of Negrea, is to highlight the climatic oscillations that influence the soil production capacity. The pedological researches in order to assess the change in the characteristics of the arable layer of the researched soil were carried out from 2013 to 2021. Agrometeorological observations from the last 120 offered the possibility to systematize the influence of climate change on the study region. The string of researched data is of particular importance for highlighting and evaluating the real amplification of multiannual climate change. In this regard, improving methods of analysis and forecasting of agroclimatic processes and resources, meteorological parameters and crop yields, taking into account climate change, is currently an urgent scientific issue. In order to adapt agricultural production to climate change, it is necessary to comprehensively study the nature and trends of changes in meteorological parameters, their impact on the growing season and crop yields.

Key words: *agroecosystem function, analyse agrometeorological parameters, inadequate anthropogenic activity, soil.*

PECULIARITIES OF ALLUVIAL SOILS FORMATION FROM THE LOWER BOTNA RIVER MEADOW

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Abstract

The lower Botna meadow is located on the territory of Causeni district, 6 km south of the Botna river into the Dniester meadow, and characterized by the same absolute altitudes as the Dniester meadow. As a result of overflow waters, the Lower Botna meadow, a permanent swamp territory was formed with an area of about 2500 ha. Dams were built in the Dniester meadow in the 1950s, and the Botna meadow is no longer flooded by the floods of the Dniester. The swamp was drained, the groundwater level dropped to 1.5-2.5 m. The dry land has been used in agriculture for more than 60 years. At present, the soil cover of this territory, according to the WBR-14 classification, is formed by deep humic clayey alluvial soils with extremely deep humiferous profile. The humus content greater than 1.00% to a depth of 2 m and content of mobile phosphorus is 10-12 mg/100 g soil on the entire humifer profile. These endemic soils are described in Moldova for the first time and, due to the high content of humus (4.5-5.0%) and mobile phosphorus (12 mg/100 g), they are an extremely good object for the implementation in the organic farming.

Key words: meadow, humus, Botna, mobile phosphorus, flood.

PRELIMINARY RESULTS REGARDING THE INFLUENCE OF SOME NUTRIENT SUBSTRATES ON THE FRUITS QUALITY IN BLACKBERRY

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Abstract

Blackberries are an important commercial fruit crop, widely grown in all temperate regions of the world. The blackberries contain significant amounts of polyphenol antioxidants such as anthocyanin pigments linked to potential health protection against several human diseases. In Romania, it is not cultivated on large scale. The studied plantation was established in the spring of 2020, and the results presented refer to the fruits harvested in 2021. The crop combines different nutritive substrates, that were applied to the soil, as: manure, forest compost, semi-fermented compost and spent mushroom substrate (SMS). The experiences were set up in the field within SCDP Băneasa the experimental farm Moara Domnească, Afumați. This paper considers a classic blackberry culture (variety: Triple Crown). The research was based on both the monitoring of the physico-chemical characteristics of the soil and the monitoring of the biometric indicators of the fruits. This paper presents preliminary results of research conducted in order to study the possible influence of nutrient substrates on the quality of blackberries fruits.

Key words: blackberry cultivation, biometric indicators, preliminary results, physico-chemical characteristics.

ASPECTS REGARDING THE SHELTERBELT'S ESTABLISHMENT IN BARAGAN PLAIN

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Abstract

The Romanian Academy owns large areas of agricultural land located in the Bărăgan Plain, more precisely in the counties of Călărași and Ialomița, under the administration of the “Patrimoniul” Foundation (FP). In the context of current climate changes challenges, as global warming and its negative effects, the Romanian Academy took action both by organizing scientific debates, in order to raise awareness and establish a common action plan, but also by taking direct and effective measures, to be followed as good practice examples. One of these measures is the program for the establishment of a network of shelterbelts on the agricultural lands owned by the Academy. The program is running in the period 2014-2024 and starting with 2017, the planting action was carried out, managing to plant around 155 ha of shelterbelt until 2021, that were maintained accordingly to each location needs, with the appropriate plant protection measures. After five years of experience in carrying out the program of establishing the shelterbelts, viable solutions that can be applied in the future were defined: mechanization of works by using modern planting equipment, as it was the Forest seedlings planting equipment EPF 1, and the Hand Drilling Machine for seedlings replacement; the use of a high quality plant material, as oak seedlings grown in seedling trays for the replacement of the dead plants, achieving very good percentages of rooting), the application of pre-emergent herbicides, which delayed the weeds infestation in newly established plantations and which are reactivated at the first rain, eliminating in some cases the hoeing or mechanical weed control but also the use of foliar fertilizers based on macroelements, amino acids and microelements, which regulate the water stress during the summer period of the seedlings and grant significant annual growth.

Key words: shelterbelts, climate change, environmental measures.

EVOLUTION OF SOIL ECOSYSTEM SERVICES UNDER DIFFERENT CROPPING SYSTEMS

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Abstract

Soil can provide essential ecosystem services that include the supply of food, feed, raw materials and biofuels. It also has an important regulatory role (carbon sequestration, water purification, reduction of contaminants, pest control, climate, nutrient cycle and biological habitat regulation etc.). The simultaneous provision of these multiple services is the result of complex interactions between different aboveground and belowground communities across ecosystems. When a system is not well managed, persistent losses in the ecosystem services can occur. For example, land use changes affect the structure, function and efficiency of ecosystems, thereby impacting the value of the ecosystem services. Also, various agricultural management practices lead to increased food production, but at the same time affect the ecosystem functions. In this context, the main objectives of this study are to evaluate the evolution of the soil ecosystem services under different cropping systems such as certain crop species, monoculture or various types of crop rotation, cover crops, organic, mineral or integrated fertilization, soil tillage etc., and to understand the interrelation between soil and ecosystem services.

Key words: soil, ecosystem services, cropping systems, sustainability.

STUDY ON THE EFFECTS OF FERTILIZATION ON THE ABUNDANCE OF SOIL MICROBIAL COMMUNITY, ITS COMPOSITION AND ANTIFUNGAL EFFICACY

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Abstract

Soil microbial community is of high importance in preserving soil functions and its ecosystem goods and services. Within field experiences, regarding agricultural sustainability and the resilience of agro-ecosystems, a study was conducted to evaluate the evolution and abundance of the soil microbial community under the influence of environmental and agro-technical factors. For this purpose, periodic determinations of the microbial community on the depth of 0-20 and 0-50 cm were made in the plots cultivated with wheat, maize, soybean and a mixture of grasses and perennial legumes. In the experimental field, organic fertilizer materials (manure compost in doses of: 15, 30 and 60 t/ha) and synthetic fertilizers (complex fertilizer in formula 20.20.0, in doses which varied with the specific consumption of crops and the amount of manure compost) were applied. At the same time, in the laboratory, biometric determinations were made regarding the antifungal efficacy of soil microorganisms after 5 days from incubation. The results of microbiological analyses showed that the microbial population from soil inhibits the in vitro development of the pathogen tested.

Key words: soil microbial community, antifungal efficacy, sustainability, agroecosystem resilience.

EFFECTS OF CLIMATIC CONDITIONS, ORGANIC AMENDMENTS AND PLANT CULTIVATION SYSTEMS ON SOIL WATER CONTENT

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Abstract

The availability of water in the soil is essential both for the activity of soil organisms and for the growth and development of cultivated plants and soil tillage. It can also affect the sustainability of agricultural production and the resilience of agro-ecosystems. This paper present the results of a study conducted between October 2021 and September 2022 in an experimental field set up at the Moara Domneasca Teaching and Research Station of the UASVM in Bucharest, Romania. The study is part of a research topic aimed to evaluate the sustainability of agricultural production and the resilience of agri-ecosystems in the context of global climate change. The soil on which the experimental research is carried out is of red preluvosoil type, and the ecological area is Silvesteppe. In order to achieve the study objectives, monthly measurements regarding temperature and precipitation were performed and determinations were made regarding the soil water regime. Starting with March 2022, determinations of soil water parameters were made and their evolution was followed under the effect of the contribution of organic matter (manure compost) and of agricultural crops (wheat, maize, soybean and mixtures of perennial herbs).

Key words: *organic amendments, soil water parameters, plant cultivation system, red preluvosoil, agroecosystem resilience.*

EFFICIENCY OF HERBICIDES IN THE TECHNOLOGY OF CULTURATION OF *Miscanthus giganteus*

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Abstract

*Among the elements of *Miscanthus giganteus* cultivation technology, the most important link is the protection of plants from weeds. Weed component control is necessary in the most critical periods of plant development. For *Miscanthus giganteus*, mainly plots are allocated on low-fertility previously uncultivated lands with high weediness. In this regard, it became necessary to study the methods of weed control in the *Miscanthus giganteus* agroecosystem and their effect on the yield of plantations in the second year of life. Research to examine the aftereffect of herbicides on the formation of the productivity of *Miscanthus giganteus* was carried out in 2016 ... 2018 on the experimental site of Penza State Agrarian University (Russia) on light gray forest sandy loamy soil. The most favorable weather conditions were in 2016. With optimal thermal conditions and sufficient precipitation, by the end of the growing season, the plants reached a height of 239.0 ... 300.0 cm with the number of stems 12.0 ... 22.0 pcs/plant. The maximum yield of *Miscanthus giganteus* dry mass of 11.35 t/ha was obtained by applying the herbicide based on metsulfuron-methyl against the background of glyphosate. The return of frosts in May 2017 to minus 1.8°C led to the death of regrown plants and the number of stems after overwintering decreased to 4...8 pcs/m², against 18...38 pcs/m in 2016. The highest stem density of 24 pcs/m² on average over three years was noted in the agroecosystem, where in the year of laying the plantation of *Miscanthus giganteus*, against the background of glyphosate-containing herbicide, they were treated with preparations based on metsulfuron-methyl and 2.4D + florasulam.*

Key words: *Miscanthus giganteus*, weed vegetation, herbicides.

MODERN BIOTECHNOLOGIES - THE USE OF VERMICOMPOST IN HORTICULTURE

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Abstract

Vermicompost or earthworm humus is a new generation, organic fertilizer, produced with the help of earthworms. It is a concentrated, mineral-organic fertilizer. Earthworm humus obtained from vermicompost is the best fertilizer, as it contains high concentrations of beneficial bacteria and other microorganisms, many biologically-active stimulants for plants, vitamins, amino acids, fulvic and humic acids, added during the digestive process of the earthworm. Vermicompost is one of the fertilizers accepted in the EU for organic farming. The research has been carried out since 2020 in Matca commune, Galați County and focused on the production of vermicompost and its testing on different crops. The experimental variants scheme contains 7 variants with 3 repetitions: Control, Control treated with Cropmax, solid vermicompost - 2 tonnes/ha applied before transplantation, solid vermicompost - 3 tonnes/ha applied before transplantation, liquid vermicompost applied at foliar level in 3 l/ha dose at 14 days, liquid vermicompost applied at foliar level in 5 l/ha dose at 14 days, solid vermicompost - 3 tonnes/ha applied before transplantation and liquid vermicompost applied at foliar level in a 5 l/ha dose at 14 days. For this experiment, the test plant was tomato. From the estimated results, at a density of 30,000 plants/hectare, it was shown that the highest quantity of tomatoes per hectare was obtained in variant V7 (118.33 tonnes/ha; 116.94 tonnes/ha; 123 tonnes/ha), followed, in second, place by variant V3 (112.71 tonnes/ha; 112.5 tonnes/ha; 113.61 tonnes/ha).

Key words: vermicompost, earthworms, organic fertilizer, soil, tomatoes.

**INFLUENCE OF ORGANOMINERAL FERTILIZER BASED
ON FERMENTED POULTRY WASTE ON THE PHYSICO-
CHEMICAL PARAMETERS OF AGRICULTURAL SOILS**

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Abstract

The paper discusses aspects of the influence of organo-mineral fertilizer, which is poultry waste fermented with the help of a complex of microorganisms, on the structure of the soil. The technology for the preparation of organo-mineral fertilizer is complex and involves cascade fermentation of spent litter masses, their integration with mineral components under conditions of correction of the environmental reaction. This ensures the minimization of losses of biogenic elements (nitrogen, phosphorus, sulfur, and others) in the process of destruction. This approach, on the one hand, reduces the volume of emissions of gas fractions into the atmosphere, and, on the other hand, determines the transition of biogenic elements into mobile forms available for plants in the fertilizer composition. A reliable positive effect of the developed fertilizer on the chemical composition of the soil and its characteristics such as air and water permeability. The use of organo-mineral fertilizer on leached chernozem contributes to the preservation and increase of humus reserves, enrichment of the soil with its mobile components. A change in the characteristics of the physical state of the arable soil layer is shown, which manifested itself in soil decompaction, an increase in the proportion of structural components of an agro-valuable size and the number of water-stable aggregates. The application of fertilizer provides the best agro-physical properties of the soil by reducing the bulk density to 0.25 g/cm³, increasing ACF by 4.5% and VA by 10.6% compared to the unfertilized background.

Key words: poultry waste, waste bioconversion, organo-mineral fertilizers, soil structure.

VALIDATION PROCEDURE FOR TOTAL SULPHUR DETERMINATION IN COMPLEX FERTILIZER MATRICES USED IN ORGANIC FARMING

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Abstract

Sulphur plays a vital role in plant nutrition. Its deficiency can have severe effects on crops, being essential in many biological processes. For an optimal supply it is necessary to know the content of elements of both the soil and the inputs used in agriculture. With the conversion from conventional to organic farming, an increasing number of analyses are needed on both the soil, the used inputs, and the obtained products. In general, sulphur determination methods are tedious and time consuming. This study proposes a dry combustion method for sulphur determination, which can gain ground due to the speed and ease of application. This elemental analysis method is sensitive and accurate, and can be applied for the determination of total S content in many types of sample matrices, including fertilisers. Different validation parameters were measured to ensure that the method can be used successfully and the procedure can be standardized, fully validated and nationally accepted.

Key words: *sulphur, method validation, dry combustion, CHNS, organic inputs.*

EXPERIMENTAL ASPECTS REGARDING THE FEEDING BEHAVIOUR OF THE EARTHWORM SPECIES *Eisenia fetida* – QUICK TEST OF FOOD LOCATION AND SELECTION

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Abstract

This research aimed to study in a laboratory experiment some aspects regarding the feeding behaviour of the earthworm Eisenia fetida (Savigny, 1826): food location and selection, time towards food, time to access food. The experiment has been carried out as a quick test: earthworm released and placed at 15 cm distance away from a food source consisting of two adjacent substrates in order to observe the ability to locate food and to select a certain substrate of the food source: soil and respectively, soil mixed with earthworm food commercially purchased. The results of this experiment showed that earthworms Eisenia fetida possess the ability to locate the organic food source used within the experiment. A proportion of 90% of tested earthworms were able to locate the food source, and 70% of earthworms were able to choose a specific food substrate from two available. A proportion of 30% of earthworms reached the food source in the first 1-2 minutes after exposure, 20% during 2-3 minutes, 30% after 4-5 minutes, and 10% after 6-7 minutes of exposure. The statistical interpretations of the achieved results (Chi-square Goodness-of-fit-test) showed that earthworms Eisenia fetida are able to rapidly identify the organic food sources and chose between food sources, and these are not random behaviours.

Key words: earthworm, food location, food choice, food access, feeding behaviour.

METHODS OF CROP ADAPTATION TO UNFAVORABLE AGROPHYSICAL PARAMETERS OF THE ARABLE SOIL LAYER

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Abstract

Under current conditions of climate change and intensive anthropogenic pressure on soils, it is extremely important for the agro-industrial complex of Ukraine to increase the productivity of crops. In recent years, there has been an increase in air temperature, unstable soil moisture in important phases of plant growth, reduced water permeability and moisture availability to plants, compaction, destruction of agronomically valuable structure, which necessitated finding ways aimed at strengthening the biological capabilities of crops and their adaptation to unfavorable soil and physical conditions. The results of laboratory and field research to test different ways of adapting crops to unfavorable agrophysical parameters of the arable soil layer, based on enhancing the growth of the root system and improving its physiological activity through: agrotechnical activities, selection of adaptive varieties of different intensity types and application of mineral fertilizers. It is proved that the use of the developed methods improves the germination, growth and development of crops, increases the productivity of their root system and promotes sustainable yields of crops.

Key words: *agrophysical parameters, arable layer, crops, methods of adaptation.*

NEW WORKING BODIES OF SEEDERS FOR SOWING GRAIN CROPS USING ENVIRONMENTAL FRIENDLY TECHNOLOGIES

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Abstract

An analysis of the works devoted to the theory of the working process of sowing seeds of grain crops shows that the sowing machines are one of the most important working parts of the seeder, which, during their work, must ensure not only a continuous and uniform flow of seeds, but also the necessary stability of the established seeding rate, as well as the possibility of sowing seeds of various crops, the minimum injury of seed. The article is devoted to improving the quality indicators of sowing seeds with seeders for sowing grain crops using environmentally friendly technologies equipped with new coil-screw sowing machines with coils, the grooves of which are turned along a helix at an angle of 20 degrees, as well as a sowing machine with an increased volume of coil grooves, obtained correlations and graphic dependencies between the uneven distribution of seeds along the length of the row, on the forward speed of the sowing units equipped with seeders with the studied sowing machines.

Key words: *seeds, seeder, sowing machine, coil grooves, sowing technology, environmentally friendly.*

PEDO-GENETICAL FACTORS IMPLICATED IN SOIL DEGRADATION (LOWER TIMIS RIVER BASIN AREA)

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Abstract

This paper is an overview of pedo-genetical factors implicated in soil degradation from lower Timiș River basin area. The microrelief forms, the groundwater depth in soil profile and the nature of parental rocks is some of the principals factors who dictate the process of soil formation and their direction of development. The analysis of the limiting factors refers to their enumeration by synthesizing the ones the land plots for arable, the study and then the analysis of each one in relation to the manifestation at different points of the studied area, respectively. The purpose of this analysis is to provide the beneficiary with a global picture of the phenomena within the elemental unity of the pedological landscape that would result in the overall strategy on a set of sustainable ameliorative or cultural measures. Among the fundamental features of soil that have a relatively more determinant function are: salinisation, sodisation, acidity, humus reserve, CaCO₃ content, properties who influenced the growth and birth of plants in direct relation to the mode of manifestation and the intensity of the phenomena.

Key words: *fine texture, compactness, excess moisture.*

SOIL BIODIVERSITY MODELLING ITS HABITAT AND CREATING PEDOFEATURES FOR SOIL CLASSIFICATION

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Abstract

Soils “are alive” due to the high activity of their biota. But, when named soils in different classifications the biological activity is more or less ignore. This paper brings biodiversity in the centre of the soil genesis and evolution, and emphasized its activity that modelling the habitat and consequently generating pedofeatures specific to each soil. The researches had been performed on two Greyzemic Phaeozems. Their main morphological characteristic is the presence of the „uncoated silt and sand grains on structural faces in the lower half of a mollic horizon” (WRB-SR-2014). The micromorphological observation located the areas with the uncoated silt and sand grains in the old macrofauna coprolites, integrated into the soil groundmass. The macrofauna also brings from the deeper horizons, soil material (more clayey and less humic) compensating in this way plasma eluviation. On the general background of pedolandscape characteristics (relatively mobile soil plasma containing fulvic acids - in Ame horizon exclusively; clayey loamy texture; and climatic conditions) the soil biodiversity modelling its habitat and created specific pedofeatures helpful for soil classification.

Key words: *biodiversity habitat, micromorphology, Greyzemic Phaeozem, macrofauna.*

HUMUS BALANCE AND NUTRIENT REGIME OF IRRIGATED SOIL UNDER DIFFERENT SYSTEMS OF BASIC TILLAGE AND FERTILIZER

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Abstract

The article presents an analysis of the results of experimental research in a stationary field experiment to establish the peculiarities of the formation of humus reserves and nutrient regime in the arable layer of dark chestnut soil under the influence of different fertilizer systems and basic tillage. The purpose of research: to establish patterns of conversion of crop by-products of crop rotation into humus and the main elements of mineral nutrition of plants by organic and two organic-mineral fertilizer systems against the background of five systems of main cultivation in 4-field row crop rotation irrigation system in the area of the Ingulets irrigation system. The most favorable conditions for accumulation of leaf mass of crop rotation crops, the formation of a positive balance of humus with an average annual growth of 2.02 t/ha provided organic-mineral fertilizer system using by-products of crop rotations and doses of mineral fertilizers $N_{120}P_{60}$ against the background of differentiated main cultivation with one slit to a depth of 38-40 cm per rotation.

Key words: row crop rotation, main tillage, fertilizers, humus, post-harvest residues.

SUNFLOWER GRAIN YIELD AT DIFFERENT CONDITIONS OF ROW SPACING AND PLANT DENSITY

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Abstract

Sunflower is a major oil crop whose oil is very important in human nutrition as well as for a range of other uses. Grain yield is determined by the plant genetics and it is conditioned by a series of factors among which are counting as important ones the row spacing and plant density. Therefore, find the optimum row spacing and plant density according to cultivated sunflower hybrid and to growing conditions are of interest for sunflower growers. The objective of this paper is to present the results obtained with respect to the sunflower grain yield at different conditions of row spacing and plant density. In this regard, research was performed at four sunflower hybrids under different row spacing (70, 60 and 50 cm) and plant densities (50.000, 60.000 and 70.000 plants/ha). Research was located in four locations in South and East of Romania in three years (2019, 2020 and 2021), these being implemented under field conditions.

Key words: sunflower, hybrids, grain yield, row spacing, plant density.

A REVIEW CONCERNING THE EFFECTS OF CYCLODEXTRINS ON HYDROCARBONS BIODEGRADATION IN SOIL

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Abstract

Organic chemicals as hydrocarbons provided by crude oil represent serious environmental and health risk. For the remediation of contaminated soil different physical, chemical and biological technologies can be applied. The most promising remediation technologies are based on biodegradation. Bioremediation is an inexpensive, safe and environmental friendly technology. The end product of bioremediation is the harmless, decontaminated soil. Bioremediation of hydrocarbon polluted soils can be improved by the increase of hydrocarbon availability. In present review, it is discussed various effects of cyclodextrins on hydrocarbons biodegradation, bioremediation strategies, mechanisms involved in hydrocarbons biodegradation, factors and some technologies in bioremediation approaches.

Key words: *biodegradation, hydrocarbons, cyclodextrins, soil.*

EVOLUTION OF SOIL PHOSPHORUS CONTENT IN LONG-TERM EXPERIMENTS

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Abstract

Researches carried out in the long-term experimental fields of the agricultural research stations from Valu lui Traian, Turda and Lovrin (experiments started in 1967) and Teleorman and Secuieni (started in 1976 and 1975) highlighted that phosphorus fertilization in doses of 40, 80, 120, and 160 kg/ha led to statistically assured increases for wheat and maize production and to an increase in the level of soil supply with available phosphorus. Currently, in Romania 65.41% of the country's agricultural area are characterised by small, very small and extremely low values of soil available phosphorus content. The trend is worsening due to the low level of using phosphorus fertilizers (on average, between 2012-2019, 13 kg P/ha were applied, the deficit being 26.46 kg/ha). Therefore, it is required a minimum dose of phosphorus of 80 kg/ha, while over 120 kg P/ha are needed to ensure a better level of soil phosphorus content. Higher doses ensure not only higher yields but also better use of nitrogen-based fertilizers or nitrogen and potassium-based fertilizers. In all long-term experiments (39-51 years) high doses of phosphorus (over 120 kg P/ha) led to an increase in soil phosphorus stock at a very high level of supply in all experimental stations. Every 100 kg P/ha increases annually the soil phosphorus content with 0.59-1.90 mg/kg. Long-term (39-51 years) fertilization with phosphorus, regardless of dose (up to 200 kg P/ha) did not lead to statistically assured increases of heavy metals (Cd, Cu, Pb, Zn, Mn) content in soil.

Key words: long-term experiences, phosphorus, wheat, maize.

MITIGATION OF SOIL COMPACTION IN SUGARBEET HARVESTING AND SLURRY APPLICATION BY INCREASING TIRE PRINT AND COVER CROPPING

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Abstract

The paper aimed to present results of two field experiments, where the effect of increased contact area between soil and tire (tire print) and the effect of cover crop on soil compaction was analysed in the Eastern part of Austria. One field experiment investigated the effect of chassis in a six-row sugarbeet harvester (two-axle, three-axle) and soil condition (wet, dry). The second experiment analysed the effect of tire inflation pressure in a slurry tanker (high: 300 kPa, low: 100 kPa) and field coverage (with and without covercrop) on track depth and soil penetration resistance. The results showed, that dry soil conditions in sugarbeet harvesting do not affect the soil penetration resistance and the bulk density negatively. The increase of the tire print area in a three-axle chassis reduced the risk of soil compaction. Lowering of the tire inflation pressure in the slurry tanker increased the tire print and reduced tire track depth in the field and soil penetration resistance. Cover crops created deeper track depths after traffic, which is explained by the loosening of cover crop roots.

Key words: *sugarbeet tanker harvester, slurry tanker, tire inflation pressure, soil penetration resistance, track depth.*

DYNAMIC PREGL-DUMAS TECHNIQUE APPLIED IN NITROGEN DETERMINATION FROM INPUTS USED IN ORGANIC AGRICULTURE

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Abstract

Nitrogen is one of the most important components of fertilizers. Quantifying nitrogen, along with other elements, is an essential operation for calculating the efficiency of these inputs. Because Romanian regulations don't provide any methodology for determining nitrogen from inputs used in organic agriculture, each laboratory uses its own method for these determinations. This study presents a fast and efficient dry combustion method of determining the total nitrogen from organic inputs, using a CHNS elemental analyser (Eurovector EA 3000). This Automated Pregl-Dumas technique is a very good alternative to the classic Kjeldahl method, which has several drawbacks: it does not quantify nitrogen from nitrates (although fertilizers contain a large amount of nitrogen in this form), needs a longer time for the sample to be analysed, it is not environmental friendly, and has lower accuracy of the results. To ensure the quality of the results, the necessary parameters for the validation of this method were calculated according to international guidelines, and the acceptance criteria of results were verified based on certified reference materials.

Key words: *nitrogen, method validation, dry combustion, organic inputs.*

THE SUITABILITY OF SOUTHEASTERN AREAS OF ROMANIA FOR THE ESTABLISHMENT OF SHELTERBELTS

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Abstract

Shelterbelts proved to be important structures that provide water preservation and wind protection for humans, their activities, and crops but they also promote biodiversity, by providing a diversity of habitats for wildlife, contributing to a natural balance of harmful and useful species, and promoting biological control of pests. Shelterbelts were used since the 17th century, but their extensive use began in the 19th century, following numerous scientific studies that proved their beneficial effects on soil and environment. As climatic and soil conditions are very specific for different regions, the impact of these factors on plants used to build the shelterbelts must be carefully analyzed prior to shelterbelts installation. The southern and southeastern plains of Romania are the regions most affected by climate change, especially drought. Because the area is outspread, with a very diverse soil cover, classified in different soil classes as cernisols (typical chernozem), luvisols (preluvosol), hydrisols (gleiosol), protisols (alluvial), etc., soil surveys are mandatory. In the present paper we try to highlight the importance of determining the soil suitability for the establishment of shelterbelts, especially for those agricultural lands prone to frequent droughts, as those in steppe areas of the Roman Plain. Soil profiles were opened, and surveys were performed, the soil being characterized morphologically and physico-chemically. For each type of soil, the soils were divided according to the main criteria for grouping the lands according to the forest suitability as: soil volume, soil thickness up to compact rock, skeleton content, texture, compaction, salinization / alkalization, humus content, slope category, surface and depth erosion, landslides, groundwater level, etc. The current study may be a model for the suitability of land in lowland areas frequently affected by drought, with similar physical and geographical conditions.

Key words: soil suitability, shelterbelts, climate change, southeastern plain.

CONSTRUCTION AND THEORETICAL JUSTIFICATION OF THE DRILLING RESISTANCE OF THE CUTTER FOR PRODUCTION OF ECOLOGICAL PRODUCTS OF SMALL SEED CROPS

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Abstract

Modern technologies for the cultivation of small-seed crops impose increased requirements on the sowing operation, the quality of which is largely determined by the design of the coulters used. The developed design of the coulters for sowing small-seed crops, which qualitatively prepares the planting furrow by leveling and compacting the surface of the bottom of the furrow. The stable distribution of small-seeded crops during their sowing significantly affects their productivity, since this forms the feeding area. Compliance with agricultural requirements for the uniform distribution of seed material is a priority task in the design of coulters and closing bodies of seeders. The use of skid coulters makes it possible to use their single-row installation, which, together with protection against damage when leveling and compacting the bottom of the planting furrow in one structural unit, makes it possible to reduce the metal content of the coulters and increase its compactness. When determining the parameters of the coulters, taking into account the condition of stability of its movement when sowing small-seed crops, a theoretical substantiation of its traction resistance was carried out.

Key words: soil, small-seeded crops, construction, coulters, resistance, speed.

RESEARCH ON THE INFLUENCE OF SLAG FROM THE STEEL INDUSTRY ON THE REDDISH PRELUVOSOIL IN WHEAT CULTIVATION

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Abstract

Materials from the steel industry can be successfully used in agriculture, mainly due to their high content in Calcium and other nutrients. In order to follow up on the influence of these materials, an experiment was carried out in 2021, at Moara Domnească, in the Muntenia region, Romania, on a reddish preluvosoil cultivated with wheat. The effects of two types of materials from the steel industry on the acidity of the soil, on the content of heavy metals found in the soil and on their translocation in wheat plants was analyzed. Research has shown that by applying maximum doses of 5 tonnes/ha, these materials increase the soil's pH reaction and the agricultural production, without the risk of heavy metals translocating in wheat plants.

Key words: *amelioration, wheat production, heavy metal, soil fertility, steel slag.*

EVALUATION OF BIOCHAR APPLICATION ON SOIL NUTRIENTS

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Abstract

Field experiments with different levels of application of BC and manure were conducted, according to developed methodology based on literature data. Six variants have been developed: 1) V1- control; 2) V2 - with manure (4t/ ha⁻¹); 3) V3 - with biochar (500kg/ ha⁻¹); 4) V4 - manure (4t/ ha⁻¹) + biochar (250kg/ ha⁻¹); 5) V5 - manure (4t/ ha⁻¹) + biochar (500kg/ ha⁻¹); 6) V6 - manure (4t/ ha⁻¹) + biochar (750kg/ ha⁻¹) under optimum irrigation. For each of the variants were examined the following indicators in dynamics – climate condition, pH, NPK in soil after harvesting of each crops. The dynamics of yields for zucchini, broccoli, broad bean and leek were evaluate, and the biometric data was collected. The aim was to study the effect of imported carbonized plant residues on the content of essential nutrients in the soil.

Key words: biochar, manure, soil, nutrition, vegetable.

ROLE OF EDTA IN LEAD MOBILIZATION AND ITS UPTAKE BY MAIZE GROWN ON AN ARTIFICIAL Pb-POLLUTED SOIL

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Abstract

Soil pollution with heavy metals is a serious issue worldwide. Metal pollution has serious implications for the human health and environment. Phytoremediation is considered an economical and environmentally friendly method of exploiting plants to extract contaminants from soil. The purpose of this paper is to study the maize seedling, growing and behaviour in a soil polluted with heavy metals. Maize is known from literature as lead accumulators in artificially polluted soil with 1000, 2000 and 3000 mg/kg Pb of soil and in the presence of different treatments with EDTA as the mobilization agent. This means that the treatment for phytoextraction (Pb concentration, EDTA concentration) is expressed in the biomass. From the statistical calculation it results that in the variant with 1000 mg Pb/kg soil + ratio EDTA/Pb = 0.5 have no significant decrease in leaf weight. In conclusion, EDTA application does not influence hyperaccumulation. The toxicity of 3000 mg Pb/kg is too high and the plant does not tolerate this toxicity. Another ligand/lead ratio has to be chosen and other solutions are sought to stimulate plant growth and increase the accumulation of metals in the plant.

Key words: soil, pollution, lead, maize.

LIMITATION OF THE PRODUCTION CAPACITY OF AGRICULTURAL LAND IN RADUCANENI COMMUNE, IASI COUNTY

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Abstract

The efficient exploitation of agricultural lands and the obtaining of high productions depend on the biological material and the applied technology and, to a large extent, on the factors of environment, soil, climate, relief and hydrology. Soil fertility is affected to a greater or lesser extent by one or more restrictions, caused by natural factors and / or anthropogenic agricultural and industrial actions, which can often act in a negative way in a negative way. Research has shown that soil fertility in the Raducaneni territorial administrative unit is affected by the following limiting factors: surface erosion, deep erosion, landslides, gleyzation, stagnogleyization, salinization and alkalization. If on the sloping lands the significant restrictive factors are the soil erosion and landslides, on the flat lands, from the River Jijia Meadow, the productive capacity of the agricultural lands is strongly diminished by gleyzation, salinization and alkalization.

Key words: *limiting factors, soil erosion, gleyzation, salinization, arable land.*

SOIL OLD AGE

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Abstract

The old and stable landscapes reach a balance with the environmental conditions and have a special beauty, acquired during their long process of formation. Likewise, the very old soils have a special beauty and a unique development of the pedogenetic horizons. This beauty and uniqueness highlighted the paper, by the aim of the researches of an Alosol (SRTS-2012; Alisol - WRB-SR-2014) located on an old and stable terrace relief, researches that starting from the morphological level and reaching the more detailed level of micromorphology. The Alosol had, at least in its upper part, the appearance of a Dystricambosol, due to the high acidity and the destruction processes that penetrated deep into the Bt horizon. The main characteristics that emphasised the oldness of the studied Alosol were the: depleted, textural, and amorphous pedofeatures (whose composition, colour and location reflect their age). The most spectacular was the network (with perfect angles at 90° and greenish-gray reduction colours) expressed more clearly in the Bt₂W horizon. The melioration of such an old soil should be very expensive, the reforestation being the most suitable.

Key words: soil age, Alisol, Alosol, micromorphology, pedofeatures.

GENETIC PARTICULARS OF LEVIGATED CHERNOZEM IN THE NORTHERN MOLDOVA PLATEAU AREA

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Abstract

Nature gives the farmer a variety of soils in terms of agronomic fertility, depending on the type of natural vegetation. Different ways of soil formation and their fertility begin to merge into a single channel under agrocenoses due to the impact of cultivated plants on the soil and with the same direction of the biological cycle of substances. The results of research on the genetic peculiarities of leached chernozem in the Northern Plateau Area of Moldova are reported in this article. The authors describe the quality indicators of the researched soils and indicate the variety of physical, physico-chemical and chemical parameters. These soils cover an area of over 380 thousand ha. According to field research, the thickness of the humus profile is 93 cm, which is characterized as strong and deep. The results of laboratory analyzes indicate a humus content in the profile of arable leached chernozems varies from 3.90% in the Ahp horizon to the moderately humiferous class and decreases to 0.49% in the Ck horizon. Also, values of bulk density, texture, carbonates, pH, composition of exchangeable cations on the profile of the researched soil, etc. are determined. Leached chernozems are formed in the conditions of the mesophytic steppes of the forest-steppe zone. The profile is generally molic, leached, that is, completely devoid of carbonates (AmBm/l). Usually, the effervescence starts a little below the lower limit of the B horizon.

Key words: genetic features, leached chernozem, Moldovan Northern Plateau Area.

THE REMANENT EFFECT OF THE AGRICULTURAL USE OF URBAN SLUDGE COMPOST UPON THE SOIL PROPERTIES AND WHEAT CROP

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Abstract

The compost obtained from sludge from wastewater treatment being an important source of macro and micronutrients, can be used in agriculture, because it reduces the production costs and improves the soil quality by providing nutrients and organic matter necessary for modern, ecological agriculture, in the conditions to improve the capacity to retain moisture in the soil, also reducing the pressure on the environment generated by the storage of this waste. The compost used in the experiments is suitable for use in agriculture without risks of environmental and soil pollution, in compliance with the rules in force. The obtained results show that by applying the compost produced at SEAU Mioveni, even in the variants where the highest doses (60 t/ha) were applied, there are no significant changes in the chemical properties of the soil, especially the content of heavy metals. The values determined in the soil after applying the compost to all the experienced variants are far below the maximum allowed values for the concentrations of heavy metals in the soils. Also, analyzing the results regarding the risk of translocation of different chemical elements in the wheat grains, it can be seen that, in general, all indicators register values well below the limits from which zootoxicity phenomena can occur. No increases in heavy metal contents in the wheat grains are observed as the doses of used compost increased.

Key words: *compost, remanence effect, wheat, soil.*

EDAPHIC FAUNA AS AN INDICATOR OF DEGRADATION PROCESSES IN PODZOLIC CHERNOZEM

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Abstract

The edaphic fauna of the podzolic chernozem in the northern zone of the Republic of Moldova has been investigated. Invertebrates' testing was carried out from semi-profiles around the main profile at a distance of 5-10 m by manual sampling of soil layers to the depth of soil fauna occurrence. The highest values of invertebrates' abundance (84.8 %) were registered in the upper horizon and litter in the natural chernozem. Number of invertebrates constituted 352.0 ex m⁻² and Lumbricidae family - 277.3 ex m⁻², biomass - 89.5 and 68.5 g m⁻² respectively. The natural chernozem contained 10 families of invertebrates and its trophic pyramids were stable. Saprophagous of Aporectodea rosea, Aporectodea caliginosa and Lumbricus terrestris predominate in the composition of the edaphic fauna. Species of Calosoma inquisitor, Lebia cruxmino, Carabus coriaceus, Lilioceris merdigera, Clubiona stagnatilis, Lucanus cereus, Lithobius forficatus and Melolontha melolontha have also been identified. Degradation of the faunal complex in the arable chernozem has been manifested in a decrease of abundance, biodiversity and disruption of trophic connections.

Key words: *edaphic fauna, biodiversity, podzolic chernozem, degradation, natural and agricultural ecosystem.*

MICROBIAL BIOMASS IN CHERNOZEMS OF NATURAL AND AGRICULTURAL ECOSYSTEMS

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Abstract

Microbial biomass in calcareous, leached and podzolic chernozems has been studied in connection with the evaluation of soil degradation processes as a result of a long-term arable use. Experimental sites located in the southern and northern zone of the Republic of Moldova have been tested in August and September 2021. Microbial biomass sampling was carried out in 6 profiles per soil horizons to a depth of 150 - 240 cm. The highest values of microorganisms' abundance were registered in the upper horizon in chernozems of the natural ecosystem. Microbial biomass content constituted 535.0-1168.6 $\mu\text{g C g}^{-1}$ soil and was much more than in arable chernozems. Microbiological indices in soil profiles decreased with the depth. Microbial biomass reserves in chernozems in the 0-100 cm layer has been reducing from natural chernozems (4925.2-11816.4 kg ha⁻¹) to old-arable chernozems (2547.3-6659.2 kg ha⁻¹). The microbial biomass was connected with humus content. Correlation coefficients constitute 0.94. The binding effect between microbial biomass and humus content decreases from natural chernozems ($R^2 = 0.94$) to arable ones ($R^2 = 0.64$).

Key words: *microbial biomass, chernozem, degradation, natural and agricultural ecosystem.*

EFFECTS OF FERTILIZATION WITH ALCOHOLIC BEVERAGE PRODUCTION WASTE ON HUMUS AND BIOPHILIC ELEMENT BALANCE IN CAMBIC CHERNOZOME

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Abstract

As a result of any human activity an enormous amount of waste accumulates. Unused for various reasons (psychological, economic, legal, technological, etc.), they cause an ecological imbalance in nature, disrupting the normal functioning of the soil, the atmosphere and water resources. At the same time, they contain considerable quantities of elements necessary for plant nutrition and soil fertilization. In the current conditions when the application of industrial fertilizers has fallen to minimal levels, the widespread use of organic waste is of particular importance for Moldovan agriculture. An extensive study, recently carried out in the Institute of Pedology, Agrochemistry and Soil Protection "Nicolae Dimo", shows that the use of waste from the production of alcoholic beverages (wine lees, vinasse, grains borage) applied to various crops, provides a specific income between 90-900 lei/tonne. One euro invested in the use of these wastes is recouped with 1.3-3.7 lei. Expenditure is fully recouped, with yield increases in 1-2 years for field and vine crops. With all the benefits listed and the increasing needs during the growing season, waste from the production of alcoholic beverages is practically not used, but left unused, causing mess, dirt and health problems. The above-mentioned wastes were tested in two long-term field experiments at the technological-experimental station "Codru" located in Codru commune, Chisinau municipality.

Wine lees and vinasse are discharged from wine production units, and grain borage from enterprises producing ethyl alcohol. Research has confirmed that wine waste increases the content of humified organic matter by 0.16-0.41%, mobile phosphorus by 0.41-1.12 mg/100 g of soil and exchangeable potassium by 11-15 mg/100 g of soil. Yields per hectare when wine waste is applied are 11-13 t/ha. Grape yield increase is 1.0-3.2 t/ha (10-31%). Application of cereal borage increases soil organic matter by 0.12-0.21% (3000-6500 kg/ha), mobile phosphorus by 0.31-0.54 mg/100 g (6-11 kg/ha) and exchangeable potassium by 4-9 mg/100 g soil (80-180 kg/ha). The yield increase when using cereal borage is 40-60%. The beneficial influence of fertilization with waste from alcoholic beverage production on humus and biophilic elements (NPK) is also demonstrated by calculating the balance of these indicators.

Key words: *chernozem, wastes, wine lees, vinasse, grain mashes, humus, biophilic element, balance, cambic chernozem.*

LONG -TERM NITROGEN AND PHOSPHORUS FERTILIZATION EFFECTS ON SOIL PROPERTIES

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Abstract

More and more attention is being paid to assessing the effect of long-term fertilization considering global warming to ensure sustainable soil fertility management. The aim of this study is to evaluate the soil properties under mineral fertilization in long-term experimental fields. These experiments were carried out in the experimental fields of SCDA Livada. In order to evaluate the effect of fertilization, with progressive doses of nitrogen and phosphorus, with 5 graduations, there were taken and analysed 75 soil samples. Following the statistical processing of the data obtained, it was observed that nitrogen and phosphorus fertilization significantly influenced soil properties. Based on these results it could be established the optimal doses of fertilizers that should be applied on soil in order to improve the quality of soil in terms of environmental protection. Also, these results contribute to contemporary knowledge regarding sustainable land use.

Key words: *fertilization, soil properties, experimental field.*

RESEARCH THE AMELIORATIVE EFFECT OF PRECIPITATE ON pH VALUES ACCORDING TO THE PROFILE OF GENETICALLY ACID SOILS

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Abstract

In the present study, the effect of the precipitate as a chemical ameliorant on the changes of the values of the pH indicator along the depth of the soil profile was studied. Its interaction with the soil was also associated with the release of Ca^{2+} , which was due to its prophylactic chemical-ameliorative effect in acidic soils. The movement of the precipitate along the depth of the soil profile and in general the migration of this compound into the soil volume was very limited, both with respect to the phosphate and the calcium component. Better penetration into the deep soil horizons was observed at constant humidity close to utmost field moisture content and at soils with a high rate of natural water filtration.

Key words: acid soils, pH, precipitate, soil profile.

SOIL SOLUTION IS A KEY FACTOR OF SOIL NUTRITION

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Abstract

It is highlighted the dynamics features and the importance of soil solution in plant nutrition in the main genetically contrasted soil kinds of Ukraine. It is shown that soil solution is the most sensitive indicator of plant nutrition and changes in reaction and in concentration of nutrient elements in it make quick impact on plant growth. Optimal concentration of phosphorus and potassium ions in soil solution was revealed in set of vegetation experiments with oat and barley. Soils with high buffer mobilization capacity can compensate the deficit of a large part of these ions while mineral nutrition of plants is ongoing. In contrast, soil solution becomes poor on biogenic elements in soils with low buffer capacity. Processes of immobilization and mobilization of biogenic elements are regulated by bio-organo-mineral complex, which specifies a dynamics pattern of the fertility element concentration in soil solution. This pattern is described by buffer curve in relation to the curve of bufferless substrate. The more distance between these curves the higher buffer capacity in investigated soil.

Key words: *buffer ability, models of fertility.*

METHODOLOGY FOR COMPLEX AMELIORATIVE EFFECT ON THE ACID-ALKALINE BALANCES IN THE SOILS

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Abstract

For several years have developed and tested specific methods for soil sampling and interpretation of the results regarding the assessment of soil heterogeneity in the vineyard terroir. The heterogeneity of the soil in terms of the indicators characterizing the harmful acidity in the soil must be taken into account not only in the area horizontally, but also in the vertical direction - i.e. the change in the depth of the soil profile. The role of acid-alkaline balance due to the structure of soil acidity is a complex soil component of the terroir. In terms of its relative influence, it is comparable to the importance of the chemical composition of the soil as it determines the dynamics of its components in the soil-plant system.

Key words: *acid-alkaline balance, liming model, soil sampling model.*

MITIGATION OF SOIL COMPACTION BY APPLYING DIFFERENT TILLAGE SYSTEMS

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Abstract

The objective of our work is to present the results of a short-term study in which four different tillage types were tested in order to mitigate soil compaction. The experiment was conducted on a clay-loam soil located in Draganesti-Vlasca Agricultural Research Station in the year of 2018. The tillage variants tested were mouldboard ploughing, subsoiling and chiseling and the control variant was disking. Within each of the tested variants soil physical and chemical properties were determined in laboratory (e.g. saturated hydraulic conductivity, water stable aggregates, bulk density, penetration resistance, soil organic carbon and pH). The obtained results showed that the bulk density values were lower both in topsoil and subsoil in the variant with subsoiling tillage while in the control variant (2 times disking) the bulk density values were higher. The similar tendency was recorded for penetration resistance values. As for the water stable aggregates and saturated hydraulic conductivity, high values were also obtained in the variant where subsoiling was applied, whereas in the variants with mouldboard ploughing and chiseling similar values were obtained. Again, the control variant had the lowest values for both water stable aggregates and saturated hydraulic conductivity. The soil chemical properties did not vary significantly between the tested variants. The soil organic carbon varied between 2.06 and 2.34%, while the soil pH ranged between 5.99 and 6.63. The experimental study showed promising results for mitigating soil compaction by applying subsoiling. The most sensitive soil property to compaction due to tillage was found to be saturated hydraulic conductivity. Soil chemical properties were not affected by different soil tillages.

Key words: soil compaction, subsoiling, bulk density, tillage.

INCREASING IRRIGATION EFFICIENCY AND SOIL PROTECTION BY REUSING EXCESS WATER USING THE CLOSED DRAINAGE TECHNIQUE

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Abstract

Elaborating this paper, the authors took into account previous research that highlighted the following: Romania falls into the category of countries with modest exploitable water resources; over 85% of the arable land arranged with irrigation works is fragmented in small plots; soil water deficit is the most important risk factor in agriculture. Watering efficiency depends on the watering method; sprinkling is the main watering method; the concept of water monitoring provides for the complex recovery, and quantitative and qualitative control of water sources; sustainable use of irrigation water requires watering at the optimum time, depending on the optimal real evapotranspiration ($ET_{Roptim} = K_t \times E_v$). It is necessary to know the physical evaporation of water, E_v and the monthly value of the indicator K_t , as an average over a series of at least 30 years, for a certain plant. The proposed method captures the irrigation water, so that once the water has passed the root zone it gets absorbed and stored in a modular underground tank. The excess water collected in the modular basin will be reused when the soil and plant sensors will signal the presence of the humidity deficit.

Key words: soil, irrigation, draining.

SOIL-SAVING TECHNOLOGIES AND THEIR INFLUENCE ON AGROPHYSICAL AND COLLOID-CHEMICAL PARAMETERS OF CHERNOZEM

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Abstract

According to the criteria of destructuring and compaction of agricultural soils, it is possible to establish and improve a set of agricultural measures that will increase their productivity and reduce the cost of growing crops to producers in agricultural enterprises. The structure helps to inhibit the mineralization of organic matter, which is better stored in agronomically valuable units with limited air supply. The more agronomically valuable of structure units, the higher the manifestation of physical factors of soil fertility. Physical condition is one of the most important factors for determining the conditions of growth and development of plants and the value of their productivity, as it determines the formation of water-air and thermal regime of the soil. We offer method of expert assessment of soils according to the criteria of destructuring and compaction of soils in which are in agricultural use.

Key words: *soil-saving technologies, agrophysical parameters, colloid-chemical parameters, chernozem.*

CROP SCIENCES

PARTIAL RESULTS REGARDING SOME WINTER WHEAT GENOTYPES CREATED AT ARDS TURDA AND TESTED IN THE PEDOCLIMATIC CONDITIONS OF NIRDPSB BRAȘOV

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Abstract

Wheat is not just any plant, it represents the food security of millions of people, being foremost and irreplaceable in many geographical areas. To NIRDPSB Brasov between 2020-2021 was created an experimental field with 25 winter wheat genotypes from ARDS Turda. The culture was randomized with three replicates, totaling 75 experimental variants. The research aimed to study the resistance of genotypes to thermic and hydric stress. Resistance to the attack of pathogens and behavior in terms of production/ha, TKW, hectolitre weight and humidity were also analyzed. Regarding the production on the first place was the line T.51-17 with an average production of 6557 kg/ha and on the last place was the line T.21-16, with an average production of 3752 kg/ha. The Andrada variety (control) with a productivity of 6003 kg/ha, the lines T.45-18, T.52-18 and the Dumitra variety with yields of 5682 kg/ha, 5590 kg/ha and 5474 kg/ha respectively were also noted.

Key words: climatic conditions, disease resistance, genotypes, production, winter wheat.

**AMELIORATIVE EFFECTS OF *Calotropis procera*
AMENDED SOIL ON *Fusarium* WILT DISEASE,
ENHANCEMENT IN GROWTH AND NUTRITIONAL
QUALITIES IN PEA (*Pisum sativum*)**

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Abstract

Commercial fungicides are effective to control fungal pathogens in agriculture but all are associated with ill effects. In multi-years pot and field trials, we investigated the disease suppressing efficacy of *Calotropis procera* against *Fusarium oxysporum*, the causal agent of wilt disease in pea. *C. procera* reduced negative effects of disease and resulted in 41.1 and 52.8% increase in shoot dry weight besides 94.8 and 84% improvement in root dry weight of pea plant, during years 1 & 2, respectively, in pot bioassays. Similarly, *C. procera* amendment increased 25.5% and 17.4% green pod yield under field conditions, in years 1 & 2, respectively. Incorporation of *C. procera* mulches in pea also improved proteins up to 64% and carbohydrates content up to 37.2%. Moreover, iron, calcium and potassium also showed an increased concentration in response to *C. procera* addition. The present study concluded that *C. procera* mulches can be used to manage *Fusarium* wilt disease and to improve nutritional traits of pea.

Key words: nutritional, calotropis, fusarium, pisum, wilt.

EFFECTS OF APPLICATION OF VERMICOMPOST AND EXTRACT OF VERMICOMPOST IN MAIZE CULTURE IN THE EARLY STAGES OF DEVELOPMENT

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Abstract

Romania is one of the largest maize producers in the European Union. It is a crop that can be very profitable if certain requirements related to the cultivation and care of the crop. The aim of the present study was to evaluate the effect of vermicompost and vermicompost extract, on seed germination and root development of maize seedlings. Effective concentration range and the degree of stimulation varied significantly between the treatments. The obtained results show that the dose of 1 litter of vermicompost extract at 20 l / water positively influences the seed germination. Regarding the development of the roots, the dose of 1l extract of vermicompost at 5l / water recorded the best results. Regarding the use of vermicompost, the best results in terms of seed germination were the best for the incorporation into the soil of doses of 10 and 20 to/ha. The best results were obtained using the amount of 20 tons of vermicompost/ha, the corn roots having a much stronger and more developed root system compared to the other variants.

Key words: *vermicompost, extract of vermicompost, biofertilizer.*

**CHANGES IN CROP YIELD AND QUALITY
OF CROP PRODUCTS AGAINST THE EFFECTS
OF SEWAGE SLUDGE FROM URBAN WASTEWATER
AND THEIR COMBINATIONS
WITH ZEOLITE-CONTAINING AGRO-ORE**

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Abstract

The most important task of agriculture at the present stage of its development is to increase the production of high-quality crop products. In this regard, the development of technological methods for the use of local raw materials in order to increase the yield and quality of crop products is relevant. The purpose of the research was to study the aftereffect of urban sewage sludge and their combinations with zeolite-containing agro-ore on crop yields and the quality of crop production in the conditions of the forest-steppe of the Middle Volga region. It has been established that the complex aftereffect of increased norms of urban sewage sludge (160 and 180 t/ha) and zeolite-containing agricultural ore increased the yield of Jackpot peas in 2019 by 1.12-1.14 t/ha, or by 48.9-49.8%, protein content in pea grain by 2.3-2.7%,

Key words: *sewage sludge, zeolite-containing agro-ore, productivity, gluten, protein.*

MEASURING OF YIELD AND OTHER TRAITS OF WINTER PEAS VARIETIES ON DIFFERENT PLANTING DATES

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Abstract

The objective of this study was to analyze at NARDI Fundulea (44°26'N latitude, 68 m altitude) the influence of time of planting on yield and other traits at winter peas, as support of the appropriate technological decision. A split plot layout with in randomized block design, with three replications has been applied in this study. Four dates of planting were considered as main plots, respectively: October 11, 2019 / October 21. 2020 (autumn) and February 19, 2020/March 03, 2021 (spring), while three replication subplots include twelve winter peas varieties and breeding lines (Lavinia F, Ghittia F, 13008MT28-1, 13020MT, 12018MT1, 12023MT1-1, 13002MT, 12038MT2, 13008MT42-2, 12025MT4, 13020MT1-2, 12004MT2). According to the analyzed variables such plant height, seed yield, TGW and protein content, results suggest that planting in autumn leads to a higher performance of the both TGW and Yield capacity (4838 kg/ha), as compared to the spring one, in this case being registered an yield of 1796 kg/ha.

Key words: winter peas, grain yield, protein content, plant height.

YIELD RESPONSE OF TWO *Camelina sativa* VARIETIES UNDER DIFFERENT FERTILIZATION IN WESTERN PART OF ROMANIA

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Abstract

Due to the recent changes of the climatic conditions, new crops emerged and were taken into consideration by farmers all around the world. One such crop is Camelina sativa from the Brassicaceae botanical family which gained its attention due to the high oil content and balanced fatty acid ratio. In Romania, being a non-traditional crop, Camelina lacks a specific cultivation technology adapted to local pedo-climatic conditions. Although Camelina is not a pretentious crop, the yield response to fertilization is significant and that's what this paper covers. The experimental field was situated in the western part of Romania and we followed the yield response of two Camelina varieties under different fertilization schemes. The obtained results ensure the statistical significance of the positive yield variation of Camelina under different fertilization.

Key words: camelina, crop, fertilization, technology.

AGRO-ECOLOGICAL ZONING OF SUNFLOWER HYBRIDS IN PENZA REGION, RUSSIA

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Abstract

The paper presents the materials obtained as a result of the environmental assessment of sunflower hybrids. This rating is used for recommendations for optimal cultivation regions and active introduction of sunflower varieties and hybrids into production. As a rule, environmental assessment is carried out on the basis of the parameters of environmental plasticity and stability. The aim of the research was the agro-ecological zoning of the following sunflower hybrids NK Roki (Syngenta) – St; NK Kondi (Syngenta); NK Brio (Syngenta); Sumiko (Syngenta); ES Amis (Euralis); ES Florimis (Euralis); P64LE25 (Pioneer); P64LE20 (Pioneer); P64LE99 (Pioneer) in the conditions of the Penza region. The soil of the experimental plot is leached chernozem, heavy loamy in terms of granulometric composition. Humus content - 6%, nitrogen 82-86 mg per 1 kg soil, phosphorus - 80-110 mg and potassium 110-140 mg per 1 kg soil, pH-6.0-6.2. The predecessor of sunflower is spring wheat, after its harvesting, disk stubble plowing was carried out, then autumn plowing was carried out to a depth of 28-30 cm. The weather conditions during the research were different. The amount of precipitation during the growing season ranged from 92.3 mm up to 217.1 mm, and the sum of positive temperatures (above +10°C) ranged from 2115.9°C (HTC = 1.0) to 2365.1°C (HTC = 0.39). The duration of the growing season is 119-135 days, field germination ranges from 90.1% to 92.7%. The sparseness of sunflower crops is 1.7-5.2%. The highest yield was recorded in the hybrid NK Roki-St (2.48 t/ha), and the lowest in the hybrid P64LE25 (2.35 t/ha). Oil content in sunflower hybrids ranged from 49.9% to 50.7%, with a profitability level of 42.7% (hybrid NK Rocki-St) to 29.1% (hybrid P64LE25).

Key words: sunflower, hybrids, agro-ecological zoning, productivity, oil content.

CYTO-PALYNOLOGICAL OBSERVATIONS ON SOME PEA (*Pisum sativum*) GENOTYPES

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Abstract

*The biological function of pollen grains in plants is to transfer the genetic material from the male to the female reproductive organ. Pollen viability has a particular importance because it allows knowing the value of a genotype as a pollinator in various interfertile combinations or artificial hybridization. Pea (*Pisum sativum*) has an impressive nutritional profile and is considered to be an essential food for the proper functioning of the human body, especially since it is an important source of protein. The purpose of this study was to evaluate the viability of pollen grains to some pea genotypes and the percentage of pollen germination on artificial substrate (in distilled water). The anthers were harvested in the advanced flower bud phase from four pea genotypes experimented at SCDA Caracal, University of Craiova. The results obtained showed a high viability of pollen grains in all four peas genotypes tested, with values between 95.36-98.55%. On the other hand, it was found that on the artificial medium, after 24 hours the germination percentage was reduced (39.25%), only a small part of the pollen tubes presenting the entire content expelled. This suggests that the rainfalls during peas flowering can negatively affect the germination of pollen grains, by diluting the stigmatic liquid. Regarding the length of the pollen tubes after 24 hours, it was found that, on the artificial medium, the values recorded were higher than on the stigma, the elongation rate having a more accentuated rate at the beginning of germination, after which there is a gradual decrease of this rate.*

Key words: pea, cyto-palynology, pollen grains, viability, germination.

BOTANICAL COMPOSITION AND NUTRITIONAL VALUE OF FODDER FROM OF SPECIES AND VARIETIES PERENNIAL MEADOW GRASSES

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Abstract

The botanical and chemical composition with perennial forage grasses in the conditions of the Central Balkan Mountain was analyzed, where Festuca arundinacea (98.3%) had the highest share in spring, while Bromus inermis in summer grass stand (94.8%). Meadow fescue and Italian ryegrass (cv.K-13) had the slightest share in the first and second regrowth, respectively. The perennial meadow grasses are of good quality and high DM content. Bromus inermis (DM-911.7 and CP-145.2 g kg⁻¹) and Dactylis glomerata (DM-910.1 and CP-138.7 g kg⁻¹) had the highest values of DM and CP. The aboveground mass of Lolium perenne had the least amount of DM (901.1 g kg⁻¹), but with a good content of CP (131.7 g kg⁻¹). The dry matter and CP in the biomass of Lolium multiflorum varied from 905.5 to 905.8 g kg⁻¹ and from 96.0 to 110.1 g kg⁻¹, respectively, with CP concentration prevailing by 14.7% in the feed mass of cv.K-29t compared to cv.K-13. Festuca pratensis formed biomass with a higher CP content (by 3.1%) and CFr (by 10.6%) compared to Festuca arundinacea. A high correlation was found ($r = 0.92$) between the amount of DM and the percentage share of the species. Crude protein content correlated positively with the amount of CF ($r = 0.77$), calcium ($r = 0.76$), GE ($r = 0.84$) and FUG ($r = 0.89$).

Key words: botanical composition, quality, crude protein.

**THE APPLICATION OF TECHNOLOGICAL ELEMENTS
IN THE CULTIVATION AND USE OF SEVERAL FORMS
OF *Nigella damascena* L. IN THE REPUBLIC OF MOLDOVA**

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Abstract

Nowadays, non-traditional edible oils of sesame, flax, mustard, chia etc. are widely used in various industries. Among them, the oil extracted from the seeds of Nigella damascena species, which possesses unique medicinal properties, is in great demand. In our research, we applied methods of individual selection and chose several forms, which differ from the “Azuriu” cultivar registered in the Catalogue of Plant Varieties and the initial population. One of the selected forms (ND-4) was characterised by higher seed and oil productivity, good adaptability, adequate response to the technological elements applied in Comparative Testing of Varieties, and then it was proposed to the farm that had requested the seeds, where the necessary tests were done. The given form (ND-4), being stable in terms of production of raw material, will be submitted for registration in the Catalogue of Plant Varieties of the Republic of Moldova.

Key words: *seeds, breeding, fatty oil, food, germination, test weight (weight of 1000 seeds), production.*

PRODUCTION OF HIGH-QUALITY SEED POTATOES IN PROTECTED AREA FOR TRUE SEED PROGENIES, WHO SHOWED TOLERANCE TO *IN VITRO* INDUCED WATER STRESS

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Abstract

Given the current climate context, the main objective of this study was to identify genotypes tolerant to water stress in true potato seed populations. The research was initiated by inoculating of true potato seeds on culture medium, regenerating viable plantlets and testing their tolerance to in vitro induced water stress. Three from nine tested genotypes obtained the best results in terms of tolerance to water stress induced in vitro. ELISA testing revealed that the three genotypes (GIL 19-03-07, ZIL 19-02-43 and GIL 19-03-29) are virus-free. In vitro true seed derived plantlets owning a very high health status were transplanted, after acclimatization, in protected area in order to produce top quality, disease-free seed potato material. Several planting variants were used in terms of biological material used, number of plants/pot and location. After minitubers were harvested, it was analyzed how the planting variants influenced number, size and weight of the minitubers obtained in the protected area. This study aimed to obtain an alternative planting material with a high phytosanitary quality and drought tolerance, to supplement the seed potato required by the market.

Key words: *in vitro* plantlets, minituber, potato, true potato seed, water stress.

RESEARCH ON MICROFLORA ASSOCIATED WITH ALFALFA SEEDS (*IN VITRO*)

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Abstract

The aim of the research was to identify fungi and the presence of other microorganisms on alfalfa seeds. The genetic material was represented by seeds of the Dobrogea genotype. We worked with three variants in three repetitions, untreated seeds (control variant), seeds passed through sterile water and disinfected seeds with 70% ethanol solution variant, under controlled conditions. Observations were made on microorganisms present on alfalfa seeds, under controlled conditions. The incidence of fungal microorganisms that developed on the culture medium, PDA (potato-dextrose-agar) was determined. Among the fungi, pathogens were detected: Fusarium spp., Alternaria spp., Cladosporium herbarum, Aspergillus spp., Penicillium spp. The highest incidence in the case of fungi was calculated in Fusarium spp. and Aspergillus spp. In the sterile water variant ($F = 22.2\%$). Penicillium spp and Fusarium spp pathogens were present in all variants studied.

Key words: alfalafa, pathogens, seeds, incidence.

RESEARCH REGARDING THE INFLUENCE OF SOME HERBICIDES ON THE STRUCTURE OF SEGETAL FLORA AND NODOSITIES IN CHICKPEAS CULTURE, AT A.R.D.S. TELEORMAN

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Abstract

Chickpeas are a small plant with slow growth rates, the passage of phenophases falls within time intervals, which can be influenced by soil and climate conditions. The research took place in the years 2019-2020, at A.R.D.S. Teleorman, being studied the combinations and associations of herbicides applied to chickpea culture. The experiment was placed on a fertile chernozem vertic soil with good fertility (more than 3,1% humus, clay content more than 42% on the horizon 0-24 cm, pH-> 5,9), using the Burnas chickpea variety. The forerunner was autumn wheat. Chickpea plants are very easily competed by weeds within the first days of emergence. The influence of weeding in the first 2-3 weeks after emergence has an influence on production even if the culture can be kept clean later on. To achieve good effectiveness in weed control in chickpeas culture, herbicides must be applied correctly taking into account their mechanism of action and control spectrum. Biometric determinations performed on nodes highlight the difference in bacterialization between the experimental variants and productivity elements of the chickpea plant.

Key words: chickpeas, *Cicer arietinum* L., herbicides, weeds, control, efficacy, nodulation.

ANALYSIS OF THE RANGE OF PESTS AND THEIR EFFECT ON MAIZE PLANTS GROWING IN THE ORGANIC SYSTEM

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Abstract

Organically grown corn has attracted the attention of producers and traders and is increasingly in demand on the world market. With the expansion of this type of crop in which the use of pesticides is not allowed, the species of harmful insects have also multiplied. In this paper we set out to evaluate two lots of corn in western Romania, one with organic corn after 3 years of practice and another in the first year. Thus, we found that in the lot of 3 years under the organic system, the range of species was much more comprehensive and the population level of each species higher than in the lot in the first year. The active stages (as the case may be, of adults, larvae or nymphs) of the species of hemipteran, coleopteran and lepidopteran, which were the most frequent in the lots under observation, affected both the aerial and the underground part of the plants. The damages produced in the lot with 3 years affected the plants in vegetation (from the plant emergence until the maturity of the cob) in percentages of 17-18% as opposed to the damages from the lot in the first year in which the damages were of 5-7%. It is obvious that the longer the culture is on the same substrate, the more the pests become and produce damage with definite repercussions.

Key words: corn, organic system, pests, range, damage.

**RESEARCH REGARDING THE CONTAMINATION
WITH *Fusarium* spp. OF THE WHEAT GRAINS FROM
THE VARIETY *Triticum aestivum* ssp. *spelta*
BEFORE AND AFTER THE TREATMENT
WITH BIO-FUNGICIDE - CASE STUDY**

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Abstract

In the last 20 years, the demand for spelt wheat has increased rapidly and was anticipated that it will continue to increase with a rate of about 5% annually. The demand is determined by the consumers perceptions and by the scientific proofs that highlight that spelt wheat has a higher nutritional value compared with common wheat. The purpose of this research was to determinate the Fusarium spp. contamination level of the spelt wheat grains treated with bio-fungicide in comparison with the non-treated variants. The biological material used in this research was the spelt winter wheat variety Rokosz. The obtained results after the incubation of the samples show the presence of the fungus Fusarium spp. in the spelt wheat grains from all the variants. The contamination index determined was 73% in the non-treated variant and 80% in the treated one. The insignificant difference was considered to be influenced by the fact that spelt wheat grains are covered with hull, that being the reason why the bio-fungicide doesn't adhere to the seed surface.

Key words: *Fusarium sp., Triticum spelta, bio-fungicide, spelt wheat, fungal contamination.*

INFLUENCE OF SUNFLOWER SATURATION ON PRODUCTIVITY OF SHORT-TERM CROP ROTATIONS

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Abstract

The place of sunflower in crop rotation is determined by its special requirements for the frequency of return to the previous place of cultivation. Without this requirement, there are insufficient guarantees to obtain a high yield of this crop. For efficient sunflower cultivation, crop rotations with a small set of crops and a short rotation period are recommended. Studies on the possibility of increasing the share of sunflower in crop rotations of short-term crop rotations and determining the impact on the productivity of the entire crop rotation were conducted in the Left Bank Forest-Steppe of Ukraine. It is established that increasing the saturation of sunflower in crop rotation leads to a decrease in its yield and productivity of the entire crop rotation.

Key words: *sunflower, short-term crop rotations, yield, productivity.*

PRODUCTIVITY OF DUO SYSTEM AND CONVENTIONAL GRAIN MAIZE (*Zea mays* L.) BY INFLUENCE OF SOME HERBICIDES AND HERBICIDE TANK MIXTURES

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Abstract

The research was conducted during 2018-2020 on pellic vertisol soil type. Under investigation was cycloxydim-tolerant grain maize hybrid Trilogi duo (Zea mays L.), FAO 350. A total of 22 variants were investigated. They included untreated control, 7 soil-applied herbicides by conventional technology: Sulcotrack (sulcotrione + terbuthylazine), Successor TX (petoxamide + terbuthylazine), Acris (dimethenamid-P + terbuthylazine), Deflexo mix (S-metolachlor + terbuthylazine), Click duo (terbuthylazine + pendimethalin), Bismarck KS (clomazone + pendimethalin), Pledge 50 VP (flumioxazine); 6 foliar-applied herbicides by conventional technology: Sovereign OD (nicosulfuron + sulcotrione), Mistral plus (dicamba + nicosulfuron), Spandis (prosulfuron + dicamba + nicosulfuron), Arigo WG (mesotrione + nicosulfuron + rimsulfuron), Collage 64 OD (thiophensulfuron-methyl + nicosulfuron), Capreno SC (tembotrione + thiencarbazone-methyl); 8 herbicide tank mixtures by Duo system technology: Starane gold + Focus ultra (fluroxypyr + florasulam + cycloxydim), Kabadex extra + Focus ultra (mesotrione + florasulam + cycloxydim), Callisto plus + Focus ultra (mesotrione + dicamba + cycloxydim), Magneto top 464 SL + Focus ultra (2.4-D + dicamba + cycloxydim), Peak 75 WG + Focus ultra (prosulfuron + cycloxydim), Permit + Focus ultra (halosulfuron-methyl + cycloxydim), Bentador + Focus ultra (bentazone + cycloxydim), Onyx + Focus ultra (pyridate + cycloxydim). The highest grain yields are obtained by use of herbicide tank mixtures by technology Duo system Kabadex extra + Focus ultra, Callisto plus + Focus ultra, Magneto top + Focus ultra, Starane gold + Focus ultra and Permit + Focus ultra. High grain yields are also obtained by use of foliar herbicides by conventional technology Spandis, Arigo and Mistral plus. The use of soil-applied herbicides Sulcotrack, Successor, Acris, Deflexo mix, Click duo, Bismarck and Pledge in maize crops leads to lower grain yields due to their inefficacy against perennial graminaceous and broadleaved weeds and against the annual broadleaved weed Xanthium strumarium L. Increase in grain yield is due to the greatest degree of increase in indexes grains number per cob, grain weight per cob and 1000 grains weight.

Key words: grain maize, herbicides, herbicide tank mixtures, seed yield, structural elements.

THE GENETIC DISTANCE OF ADVANCED LINES COMMON WINTER WHEAT BY IMPORTANT ECONOMIC TRAITS

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Abstract

The study was conducted in the period 2019-2021 on the experimental field of IRGR "K. Malkov" Sadovo. Twenty advanced breeding lines and four common winter wheat varieties were studied according to important economic traits. Grain yield, plant height, thousand grain weight and test weight were reported. To assess the genetic similarity and distance between the different genotypes, cluster analysis and analysis of the main components were applied. Based on the results of the cluster analysis, the studied genotypes were divided into five large cluster groups. The applied analysis of the main components shows that the components PC 1 and PC 2 explain 67.9% of the total variation of all traits by genotypes. The line MX 270/86 and the Enola variety, located in the most distant parts of the coordinate system, can be mentioned as a source of strong variation and genetic difference.

Key words: common winter wheat, breeding lines, genetic distance, cluster analysis, PC analysis.

A COMPARATIVE STUDY OF THE FEEDING EFFECT WITH HAY FROM VARIOUS ALFALFA VARIETIES IN FATTENING LAMBS

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Abstract

The main aim was to establish some differences in productivity, nutritional value but also in the efficiency in obtaining performances in growing and fattening animals. The following alfalfa varieties were studied: Pioneer PR55 V48, Sandra, Valahia (4AG08), Dobrogea (4AG07), and Dimitra. Five plots were established for the cultivation of alfalfa with an area of 1 hectare each on a farm in Balotesti village following the evolution of plant growth parameters and their chemical composition, especially in year 2, at the 2nd harvest. The green mass obtained was preserved in the form of hay. The animal experiment was organized on a sheep farm in Dambovită County where fattening young sheep from Turcana × Suffolk half-breed were fed with hay for a period of 3 months. Concerning the alfalfa hay, the dry matter ranged between 848 and 861 g, organic matter between 759 and 782 g, and crude protein 65 and 76 g, respectively. Gross energy was similar for all varieties ranging around 18 MJ. Considering the fattening performances, the average daily gain recorded by the fattening lambs, during the experiment ranged between 171.4 and 181.2 g/day. We recommend the use of hay from the Romanian varieties in fattening lamb diets, which demonstrated similar characteristics to the valuable foreign ones.

Key words: *Medicago sativa L., dry matter, gross energy, crude protein, fattening lambs, gain.*

**GENOTYPE × ENVIRONMENT INTERACTION
AND GRAIN YIELD STABILITY IN DURUM
WHEAT GENOTYPES**

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Abstract

The aim of this study was to establish the genotype by environment interaction for grain yield and the phenotypic stability of 27 durum wheat genotypes. The study was conducted on the experimental field of the Field Crops Institute - Chirpan. The studied genotypes were set in a randomized block design in four replications with replication size of 15 m². The trait yield for 27 varieties has been observed during a three-year period (2015-2017). The local growing technology for durum wheat was applied. Analysis of variance, stability analysis and cluster analysis were used. Significant influence of genotype, environment(year) and genotype by environment interactions on the grain yield was established. The environment(year) has the greatest influence on the expression of grain yield. According to the simultaneous assessment for high yield and stability by Kang, genotypes were ranked as follows: D-8159, D-8148, Reyadur, Saya, D-8032, D-8031, D-8036, D-8040 and D-8091. From the obtained results it is possible to create a strategy for increasing the yield of durum wheat and create new stable varieties.

Key words: durum wheat, genetic distance, genotype by environment, grain yield, phenotypic stability.

ESTABLISHMENT OF PHENOTYPIC CORRELATIONS AND GENETIC DISTANCE IN A DIALLEL CROSS OF DURUM WHEAT

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Abstract

The aim of this research is to study phenotypic correlations and establishing the genetic distance between parents and their hybrids by cluster analysis. Experiments were conducted in three consecutive years in the experimental field of the Field Crops Institute - Chirpan, Bulgaria. The trials were performed in a randomized block design in three replications. Nine quantitative traits were observed, seven related to productivity and two related to grain quality. Significant differences between genotypes were established for all studied traits. The traits grains number per spike and grains weight per spike had a high positive correlation. This relationship was of great importance in determining the right strategy for leading a selection for productivity. At the first level the cluster analysis revealed two clusters genetically distant from each other. The bigger cluster was divided into two clusters with significant distance. Three clusters with a significant distance between them were observed. Parents and their hybrids fall into different clusters, indicating that hybrid combinations are genetically distant from their parents.

Key words: diallel cross, durum wheat, genetic distance, cluster analysis, correlations.

IMPROVING THE PRODUCTIVITY AND QUALITY OF RYE PRODUCTION, BY APPLYING FOLIAR FERTILIZERS WITH A HIGH CONTENT OF MICROELEMENTS, IN SANDY SOIL CONDITIONS

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Abstract

*The research was carried out in the period 2019-2021 on the autumn rye crop, located in the conditions of sandy soils in southern Oltenia, Romania and aimed at involving foliar fertilizers with a high content of microelements on plant productivity and quality of grain production. The obtained results showed that the highest production of rye grains, of 3566.25 kg / ha, was achieved by foliar fertilization with the product Basfoliar 36 Extra, applied in a dose of 8 l / ha, on an agrofund of $N_{150}P_{80}K_{80}$, in the phase forming the first internode of the plant. Grain production was significantly positively correlated with the number of grains in the ear ($r = 0.859^{**}$) and with the weight of one thousand grains ($r = 9.914^{**}$). From the point of view of grain quality, foliar fertilization with Polyactiv Mn product, applied in a dose of 2.5 l/ha, on the $N_{150}P_{80}K_{80}$ agrofund (Crude Protein = 13.23%; Gluten = 28.48%; Zeleny index = 48.67 ml), foliar fertilizer that increased rye production by 524.35 kg/ha, significant difference from non-fertilized foliar.*

Key words: fertilization, rye, productivity, quality.

AGRONOMIC PERFORMANCE OF SOME WHEAT VARIETIES UNDER CONVENTIONAL AND ORGANIC FIELD CONDITIONS

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Abstract

In this study we tested an assortment of eight Romanian wheat varieties in conventional and organic field conditions at Agricultural Research and Development Station Șimnic, Craiova. The results for the yield showed that the varieties exhibited a significant interaction only with the organic field conditions. In these conditions of the organic field, the Litera variety was significantly inferior to the control (Glosa variety) in terms of yield. Overall, the varieties grown under organic field conditions had a lower yield (-42.6%), with a lower thousand grains weight (-6.8%) and a lower hectoliter weight (-1.6%) compared to conventional field conditions. The varieties of wheat that showed minimal loss under organic field conditions were Glosa for yield; Glosa and Ursita for thousand grains weight, and Ursita and Zamfira for hectoliter weight, hence these varieties could be used as parents for organic breeding programs in this region. Only in conventional field conditions, the correlation between yield and hectoliter weight was significant, 64.5% of the yield variability being associated with the variability of this character.

Key words: conventional, organic, hectoliter weight, thousand grains weight, yield, wheat.

EVALUATION OF MAIZE HYBRIDS FOR GRAIN YIELD AND QUALITY TRAITS UNDER FIELD CONDITIONS FROM SOUTHWESTERN ROMANIA

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Abstract

This paper presents the effects of the experimental year and the hybrid (genotype) on the grain yield, protein and oil contents of Romanian commercial maize hybrids. Field trials were conducted at Agricultural Research and Development Station Șimnic located in southwestern Romania, during three successive years (2016, 2017 and 2018). The average grain yield for all hybrids tested was 7.53 t/ha. The 2018 yields were significantly higher than the 2016 and 2017 yields. The F376 hybrid achieved the highest average grain yield and oil content but the lowest protein content. The very dry year 2017 was the best year for the synthesis of protein and oil in maize grains. The average protein content for all hybrids tested was 14.5% and the average oil content was 5.1%. Oituz and F423 hybrids achieved the highest average protein content compared to other hybrids tested. The Oituz hybrid also achieved the highest average oil content (except the F376 hybrid). The combined three years of data revealed that grain yield was significantly negatively correlated with the protein and oil contents.

Key words: maize, oil content, protein content, yield.

EFFECT OF THE ORGANIC AND BIODYNAMIC FERTILIZATION ON THE PRODUCTIVITY OF SUGAR, FODDER AND TABLE BEETS

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Abstract

The use of organic fertilizers in the ecological production of sugar, fodder and table beets increases significantly the volumes of organic raw material for production of forages and food. The influence of variants of treatment with the organic fertilizers Free N 100, Raim Zolfo, Heliosulfure, and the biodynamic preparations 500 and Fladen, on the productivity and dry matter content of the sugar beet variety Diex, fodder beet variety Sasha and Radost table beet variety has been tested on the Experimental ecology field (carbonate black earth) of AI-Shumen during the period 2019-2020. The test was conducted using the long plots method in 4 repetitions with 8.2 sq. meters area of the experimental plot, in crop rotation of wheat-beet-sorghum, without any use of conventional pesticides and fertilizers. The productivities of the treated with biological preparations variants exceed that of the control in the more favorable for the development of the crops 2019, as well as in the extremely dry for the vegetation 2020.

Key words: organic fertilizers, biodynamic preparations, sugar, fodder, table, beet.

VISUALISATION OF PLANT PROTECTION PRODUCTS PROPERTIES VIA TABLEAU DESKTOP SOFTWARE

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Abstract

The paper present visualization techniques of properties of plant protection products via Tableau Data Visualization software for the purposes of safe and effective selection of pesticides towards different abiotic, biotic and antropogenic conditions. Although one plant protection product has many and different properties which determine its application, via Tableau was able all of these properties to be presented (showed) in the only one visualization, which make the process of selection of the right plant protection product extremely fast, easy and effective. Tableau Desktop is interactive data visualization software which is based on spreadsheets and relational databases. During the recent years this software founded in 2003 from Christian Chabot, Pat Hanrahan and Chris Stolte, researchers at the Department of Computer Science at Stanford University, became one of the most popular solution in the world from this type, used widely in all human areas for creation of high level graph-type data visualizations via easy to be used graphical user interface. In 2008 Tableau received award for "Best Business Intelligence Solution" by the Software and Information Industry Association.

Key words: data visualization, Tableau Desktop Software, plant protection products, agriculture, pest management.

**NEW DATA CONCERNING THE EVOLUTION
OF THE EUROPEAN SUNFLOWER MOTH
(*Homoeosoma nebulellum* Den. & Schiff.) IN SUNFLOWER
CROPS IN THE SOUTH-EAST OF ROMANIA**

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Abstract

*The European sunflower moth [*Homoeosoma nebulellum* (Den. & Schiff.)] is a pest that can sometimes significantly damage sunflower crops in the south and southeast of Romania. Many studies reveal that the pest attack on cultivated crops, including sunflower, can be higher because of global warming. Also, global warming can have consequences in increasing the pest generation's number in one year or the area in northern latitudes. This study has monitored the fly of the European sunflower moth in sunflower crops from NARDI Fundulea, Calărași County, southeast of Romania, between 2019 and 2021. It has used Delta traps with atraNeb pheromones, produced at "Raluca Ripan" Institute for Research in Chemistry, Cluj Napoca, Romania. The evolution of the European sunflower moth in sunflower crops at NARDI Fundulea differed in this three-year study. The monitoring of this pest in sunflower crops reveals that first captures were recorded at the beginning of May in 2019 and 2021 and the end of April in 2020. In climatic conditions of the year 2019, at NARDI Fundulea, it has recorded three fly peaks of this pest on 28 May, 26 July, and 19 August. In 2020 the maximum fly peak was registered on 9 June, and a secondary lower peak on 2 September. Similar to 2019, in 2021, it registered three fly peaks on 11 June, 19 August, and 13 September. Higher captures recorded at NARDI Fundulea in September 2019 and 2021 weren't reported in Romanian literature before and are possible consequences of global warming, but further studies are necessary to elucidate these aspects.*

Key words: sunflower, moth, fly peak, monitoring.

**RESEARCHES CONCERNING THE EFFECTIVENESS OF
THE MAIZE LEAF WEEVIL CONTROL
(*Tanymecus dilaticollis* Gyll), IN THE COMMERCIAL FARM
CONDITIONS, FROM THE SOUTH-EAST OF ROMANIA**

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Abstract

Maize leaf weevil (*Tanymecus dilaticollis* Gyll) is one of Romania's most harmful pests of maize crops. The purpose of this study is to evaluate the effectiveness of the different control methods of the maize leaf weevil in conditions of the high pest pressure from a commercial farm, located in one of the most favorable areas for this weevils species, in the southeast of Romania (Mihail Kogălniceanu, Ialomița County). This study has tested foliar treatment with acetamiprid and lambda-cyhalothrin active ingredients, seeds treatment with imidacloprid and cyantraniliprole active ingredients, and granules application with the lambda-cyhalothrin active ingredient. In the spring of 2021, at the experimental site, it has registered a high pest density (15-20 weevils/m²). As a result of the weather's unfavorable conditions for weevils activity on the ground, the pest attack was moderate when maize was in early vegetation stages. At the control (untreated) variant, most of the maize plants had leaves chaffed in the proportion of 50-75%, but the majority of the plants survived after the attack. In this study, lower weevils attack has registered in the case of the variants with seeds treated with imidacloprid and cyantraniliprole active ingredients. From all experimental variants, higher maize yield was recorded in the case of the variant with seeds treated with imidacloprid active ingredient (12501 kg/ha). This study, effectuated in conditions of high pest pressure, in commercial farm conditions, demonstrates that seed treatment with systemic insecticides adequately protects the maize plants in early vegetation stages (BBCH 10-BBCH 14) against maize leaf weevil attack.

Key words: maize, weevil, farm conditions, control.

**STUDY ON THE PRODUCTION COMPONENTS
AND THE YIELD OF SOME VARIETIES AND LINES
OF WHEAT FROM THE NATIONAL LIST
IN THE PEDO-CLIMATIC CONDITIONS FROM
S.C.D.A. ALBOTA, IN THE PERIOD 2020-2021**

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Abstract

Wheat occupies the second largest area after corn in Romania, being grown in a wide variety of soil and climate conditions. Therefore, it is necessary to ensure good quality biological material, able to respond to the adversity of biotic and abiotic factors and to achieve sustainable production. Within the Agricultural Research-Development Station (SCDA) Albota numerous studies are carried out on the behavior of a wide range of varieties and lines from the national list, aiming to obtain varieties with high capacity to adapt to environmental factors that characterize the adjacent area, especially in the conditions of global warming. In this paper we will present some of the results of a study on production components and yield of line A4-10, obtained at SCDA Albota, compared to a number of 24 lines and varieties from the national list, which come from other institutes and research stations of Romania.

Key words: *climatic changes, environment, production component, sustainability, wheat varieties.*

RESULTS REGARDING THE EFFECT OF MICROGRANULATE FERTILIZERS IN HYBRID SEED MAIZE PRODUCTION

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Abstract

Maize is the cereal with the highest research and development budgets in the world, due to its high ecological distribution from the U.S.A. to China and Africa, and to its vital role in human and animal feed. In the farms specialised in maize hybrid seeds production, there is a need to have increasing yields of hybrid seeds in view to be more efficient. But, having higher yields of hybrid seed cannot happen without the development of new fertilization strategies by farmers that multiply the seeds. Microgranulate fertilizers have been gaining an increasingly important role in these strategies due to the need to have a good development of the plants in the early growth stages. In this respect, our research aimed to study the effect of different microgranulate fertilizers on the yielding components and hybrid seed yield as well as on the overall development of the maize plants through their growth stages. The obtained results showed the following key aspects regarding the effects of microgranulate fertilizers: a better emergence of the plants in the field; a superior development of the root system and even better development where phosphorus concentrations used were higher; a better development of the leaves measurable until BBCH-18; no negative effects on nicking at pollination; increased TGW; improvement of yield in conditions of severe drought.

Key words: *maize, microgranulate fertilizers, hybrid seed yield, yielding components.*

THE EVOLUTION OF THE TYPE AND MATURITY GROUP OF MAIZE HYBRIDS REGISTERED IN ROMANIA OVER TIME

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Abstract

Maize is the most grown crop in Romania being used widely in human food and in animal feed. The history of hybrid maize in Romania is impressive starting in 1957 when the first foreign double cross hybrids were cultivated. The first double cross hybrids produced nationally were HD 208 and HD 405 registered in 1962 and 1963 respectively, which lead to their widespread use in only 7 years. The aim of this paper is to present the results and observations of the study of maize hybrids registered in Romania between 1985-2020 regarding the share of hybrid type and maturity groups in the total number of registrations. The study led to the following conclusions: the tendency over time was a reduction close to 0 of double cross hybrids registered; there is a clear direction towards registration of single cross hybrids with higher productivity and heterosis effects closer to 1; there is a massive increase of newly registered hybrids following Romania's entry in E.U. in 2007; there is an increase of the number of new hybrids registered in the intermediate and late FAO groups and a fast decrease in the last 10 years of the ones in extremely early and early groups; there is an increase in late hybrids registration due to the increase of annual average temperature in Romania, which allows an increase in yield without any early freeze risk.

Key words: *maize, hybrid type, hybrid maturity group.*

YIELD AND GRAIN QUALITY OF SOFT WINTER WHEAT DEPENDING ON THE FERTILIZATION IN THE NORTHERN STEPPE OF UKRAINE

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Abstract

The results of the long-term researches on determination of the influence of mineral fertilizers on the soft winter wheat yield and grain quality after black fallow and after spring barley in the conditions of Northern Steppe of Ukraine are presented. According to the research in 2012-2014 it is established that application of spring-summer nitrogenous top-dressing at sowing after black fallow provided (according to the quality indicators set regulated by the current national standard for wheat DSTU 3768: 2019) formation of grain of the second class of quality at winter wheat varieties Lytanivka, Zamozhnist, Antonivka and Rozkishna and for the most part the first class - at variety Sonechko by the yielding capacity within 6.19-6.60; 6.25-6.74; 5.60-6.08; 5.89-6.37 and 5.38-5.71 t/ha respectively. The expediency of double top dressing of winter wheat sowings after spring barley is scientifically proved: ammonium nitrate in dose N_{30} early in the spring on frozen-melted soil and in the end of tillering stage of plants, that provided the obtainment of yielding capacity of 4.70-5.28 t/ha with grain quality of the second and third class in the favorable moisture years. Studies conducted in 2016-2018 found that the highest yields in varieties Kokhanka, Missiya Odeska and in Pylypivka grown after black fallow were formed by plant feeding with ammonium nitrate locally in the late tillering phase, dose of 60 kg/ha, active substance. In this feeding mode increase in yield compared with the control (without feeding) was, depending on variety, 0.58-0.64 t/ha. The highest yield (7.23 t/ha) was formed by Pylypivka variety. When growing winter wheat after spring barley, the increase in grain yield, compared with the control (without feeding) in variety Kokhanka, on average for three years depending on feeding option, was 0.48-1.20 t/ha; in Missiya Odeska - 0.36-1.15; and in Pylypivka - 0.51-1.16 t/ha. The highest increase in yield was provided by the application of nitrogen fertilizer (a dose of 60 kg/ha) on frozen-melted soil and in two terms: spreading N_{60} on frozen-melted soil and local application of N_{30} at the end of tillering. The Kokhanka variety yield under these feeding mode was 5.31 and 5.46 t/ha, respectively, Missiya Odeska - 4.78 and 5.03 t/ha, and Pylypivka - 5.47 and 5.62 t/ha. The highest grain yield (5.62 t/ha) was formed by winter wheat variety Pylypivka with application of ammonium nitrate N_{60} on frozen-melted soil and local application of N_{30} at the end of tillering. Experimental data analysis and generalization showed that application of nitrogen fertilizers in spring-summer growing season after both predecessors, as a rule, facilitated improved grain quality, namely: grain nature, vitreousity, protein and crude gluten content, flour sedimentation.

Key words: winter wheat, variety, mineral fertilizers, predecessor, yield, grain quality.

EFFICACY OF SOME HERBICIDES ON WEED GROWTH AND YIELD OF POTATO IN CLIMATIC CONDITIONS OF BARSA COUNTY

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Abstract

*Weed control is an important factor for a successful potato crop. The objectives of current study were to assess the effect of herbicides and their rates of application on weeds and the crop. Test results come from a field experiment conducted between 2020–2021 to the National Institute of Research and Development for Potato and Sugar Beet Brasov, Romania. Two factors were tested: factor I - potato variety: Brasovia; factor II - five herbicides to control weeds and a control one variant (V1: Control; V2: clomazone+pendimethalin 2.0 l/ha; V3: clomazone+pendimethalin 1.8 l/ha; V4: Sencor 0.9 l/ha; V5: Proman 3 l/ha; V6: Challenge 4 l/ha). The experiment was laid out in randomized complete block design with three replications. Herbicides were applied as preemergence. The weed community included *Chenopodium album*, *Amaranthus* spp., *Echinochloa crus-galli*, *Abutilon theophrasti*, *Polygonum* spp., *Fallopia convolvulus*. In both years the reported effectiveness for all registered weeds was good and very good, over 85-90% of the control and all variants treated by herbicides significantly influenced the increase in potato yield in comparison with the control variants.*

Key words: *efficacy, herbicide, potato, weed control, yield.*

COMPARATIVE RESEARCH WITH SEVERAL DH MUTANT/RECOMBINANT WHEAT LINES CULTIVATED UNDER THE SOUTH ROMANIA CONDITIONS

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Abstract

This research was carried out in 2017-2019 period under the soil-climate conditions of Agricultural Research and Development Station - ARDS Caracal and included several DH mutant/recombinant winter wheat lines. The experiment was set up after randomized blocks method in three replications. The main goal of the research was to identify new competitive winter wheat lines with improved resistance for the new specific conditions of the South Romania. During the research observations, determinations and measurements concerning morphological, productivity and quality characters were made. The analysis of the average data indicated that DH mutant/recombinant winter wheat lines can easily adapt to the cultivation conditions from experimented areal. Regarding productivity, experimented material presented superiority in terms compared with the average of known varieties used as control. The obtained results also showed genetic value of some mutant/recombinant wheat lines, which in addition to productivity present high quality.

Key words: *Triticum aestivum L., DH mutant/recombinant lines, yield, quality.*

YIELD OF CRUDE PROTEIN AND RATE OF ACCUMULATION IN THE DRY MATTER IN A NATURAL GRASS ASSOCIATION USED IN PASTURE AND HAYMAKING REGIME IN THE CONDITIONS OF THE CENTRAL BALKAN MOUNTAIN

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Abstract

*The experiment was conducted on a natural meadow type *Chrysopogon gryllus* - *Agrostis capillaris*, widespread in the mountainous regions of Bulgaria. Two regimes of use (PR-pasture and HR-haymaking) of grassland in the following variants concerning the harvesting period were studied: PR1 (Control: 31 May - 09 June); PR2 (10 June - 19 June); PR3 (20 June - 29 June) and HR1 (Control: 30 June - 9 July 9); HR2 (10 July - 19 July); HR3 (20 July - 31 July). It was found that the method and period of harvest in the natural mountain association affects the increase in yield and crude protein content. In the pasture and haymaking regime of use, the growth rate of the indicators was the highest, respectively, the highest crude protein production was registered during the harvesting period on 10-19 June (67.42%) and 20-30 July (129.16%), while the highest crude protein content was registered on 20-29 June (55.07%) and 20-30 July (69.95%). The highest increase in dry matter yield was registered in the second decade of June (10-20) for pasture use (14.42%) and at the end of July (20-31) for haymaking (35.77%).*

Key words: *natural grassland, *Chrysopogon gryllus* - *Agrostis capillaris*, pasture and haymaking regime of use, crude protein yield.*

NEW SOYBEAN VARIETIES VARIABILITY BY PLANTS MORPHOLOGY FROM ECOLOGICAL WHITE LUVIC SOIL CONDITIONS

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Abstract

Recent studies have shown that the analysis of morphological traits in soybeans could provide new directions in the breeding process. Having a rich genetic diversity, the plant manifest itself in close connection with the concrete conditions in the crop environment. In the present study, two early soybean varieties were compared: Cristina TD and Onix, which are recommended by their performance in farm conditions. In both varieties, some new directions have been found, these being recently improved, namely through improved morphological characters. In the comparison between the two varieties, the plants had a height of 69 cm in Cristina TD and 65 cm in Onix. In the same order the weight of the average plant was 24 g to 27 g, with a number of about 4 branches. The number of pods on a plant was 31 (Cristina TD) to 40 (Onix), weighing 12 g and 15 g. The number of beans on an average plant was 67 to 85, weighing 6.9 g at 8.5 g, the number of grains in a pod was approximately equal to 2.13-2.15. the grain had the length in favor of the Cristina TD variety, 7.1 mm to 6.7 mm for Onix, and the grain thickness ranged between 5.3 and 5.5 mm. The mass of one thousand grains exceeded 100 g in Cristina TD (104.5 g) and was below 100 g in Onix (98.4 g). The number of grains and their weight were positively correlated with the other characters in both varieties, while the mass of one thousand grains depended more on the weight of the grains and their thickness in the Cristina TD variety. The study of the morphological characters of the two new soybeans varieties demonstrated a good adaptability in the conditions of the white luvisol from the south of the territory.

Key words: branches, grains, pods, soybeans, variability.

THE EFFECTIVENESS OF TREATMENTS IN THE CONTROL OF WHEAT DISEASES, MOARA DOMNEASCĂ LOCATION, ILFOV COUNTY

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Abstract

*Our research aimed to determine the effectiveness of treatments in the control of wheat diseases between 2015-2019 at the Moara Domnească Didactic Resort, Ilfov County located in South Romania. Based on the data on monitoring the attack in the control and treated variants, the effectiveness of the treatments applied in the vegetation was determined. Observations were made on Glosa and Boema varieties in 2015-2017 and on Katou, Pitbul and Jaguar varieties in 2017-2019, for the pathogens *Blumeria graminis* f.sp. *tritici*, *Zymoseptoria tritici*, *Septoria* spp., (FA), *Fusarium* spp. and *Puccinia recondita*. The effectiveness of the applied treatments was 90.7% in powdery mildew control (Boema variety, 2015/2016), 90% in septoriossis control (Jaguar variety, 2018/2019, 73% Boema variety 2016/2017), 66.6% in fusariosis control (Boema variety, 2016/2017), 73.3% in brown rust control (Jaguar variety, 2028/20190).*

Key words: *wheat, pathogens, variety, degree of attack, effectiveness.*

**THE USE OF AMMONIUM SULPHATE HAS
AN ADJUVANT EFFECT ON THE PRODUCTIVITY
OF OILSEED RAPE (*Brassica napus* L.)**

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Abstract

*Oilseed rape (*Brassica napus* L.) is the second most common oil crop grown in the world, after soybean. The aim of the study was to investigate the adjuvant effect of leaf treatment with ammonium sulphate together with a plant growth regulator (PGR) on the seed yield and quality of canola, cv. DK Implement CL. The experiment was set up in the region of Plovdiv, Bulgaria in the period October 2020 - June 2021. The test variants included: 1 - untreated control, 2 - Plant growth regulator (1 l/ha) + Ammonium sulphate (1 l/ha), 3 - Plant growth regulator (1.5 l/ha) + Ammonium sulphate (2 l/ha), 4 - Plant growth regulator (1 l/ha), 5 - Plant growth regulator (1.5 l/ha), 6 - Tilmor (1.2 l/ha), and 7 - Carax (1.5 l/ha). It was established that the application of ammonium sulphate has a positive effect on the plant growth, grain yield, oil and moisture content, and 1000 kernel weight.*

Key words: adjuvant, ammonium sulphate, *Brassica napus*, oil content, rapeseed yield.

THE EFFECT OF THE CARBOXYL FATTY ACIDS AS A BIOLOGICAL CONTROL PRODUCT AGAINST *Brassicogethes aeneus* F. ON CANOLA

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Abstract

The pollen beetle Brassicogethes aeneus F. (Coleoptera: Nitidulidae) is a major pest of oilseed rape and shows increasing resistance to commonly used insecticides. The aim of the study was to determine the effective dose of potassium salts of carboxyl fatty acids against the pest and to compare their efficacy with two pyrethroid products commonly used in conventional agriculture. The experiment was conducted on the field in the region of Plovdiv, Bulgaria in 2021. Two applications were made in an interval of 7 days between them. The treatment list contained untreated control, potassium salts of carboxyl fatty acids (in two doses: 2.5 l/ha and 5 l/ha), deltamethrin 0.05 l/ha, and tau-fluvalinate 0.2 l/ha. The results obtained show that the application of potassium salts of carboxyl fatty acids in the dose of 5 l/ha significantly reduces the number of the pollen beetle Brassicogethes aeneus F. and even slightly increases the oilseed rape yield. This substance could be successfully used as a plant protection product against the pollen beetle on oilseed rape as an alternative to the applied pyrethroid products.

Key words: *Brassicogethes aeneus*, canola, carboxyl fatty acids, pest control, pyrethroid.

LABORATORY EVALUATION OF THE SENSITIVITY OF *Fusarium* spp. STRAINS COLONIZING WINTER WHEAT KERNELS TO SELECTED FUNGICIDE GROUPS

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Abstract

The aim of this study was to evaluate the sensitivity of *Fusarium* fungi, isolated from common wheat kernels (winter form), to some fungicide active ingredients, such as azoxystrobin (Amistar 250 SC), thiophanate-methyl (Topsin M 500 SC) and difenoconazole (Score 250 EC). In order to obtain *Fusarium* spp. strains for in vitro tests, 100 wheat kernels of each of the following Polish cultivars: 'Hondia', 'Euforia' and 'Linus', derived from a farm located in the Lubelskie Voivodeship (Poland), were subjected to mycological analysis. The experiments were carried out using glucose-potato agar (PDA – Difco; 39g/1000 ml) in accordance with the methodology applicable in this type of research (Jamiolkowska 2009). In order to assess the sensitivity of *Fusarium* spp. to selected active fungicide ingredients, plate tests were carried out according to the methodology described by Jamiolkowska (2011). Three strains of each *F. poae* (P15/20, P47/20, P32/20), *F. avenaceum* (P4/20, P21/20, P27/20) and *F. sporotrichioides* (P38/20, P41/20, P24/20) were isolated for testing. Fungicide active ingredient concentrations of 0.01% and 0.1% were applied for each fungus strain, with 3 replicates for all experimental combination. Fungal colonies growing on PDA without the addition of active fungicide substance served as the control combination. Colony diameter (cm) was measured on day 2, 4, 6 and 8 of the experiment. On the basis of the results, linear inhibition of fungus growth on the medium with a fungicide was calculated in comparison to control (Jamiolkowska 2011). The tested *Fusarium* spp. strains showed different sensitivity to toxic substances depending on fungus species and strain, as well as active ingredient type. The strains of *F. poae* (mainly P47/21) and *F. avenaceum* (P41/21) showed the greatest sensitivity, mainly to difenoconazole, for which fungal growth inhibition remained high even on day 8 of the experiment (78.6-100.0% growth inhibition relative to control). *F. poae* strain P47/21 did not grow at a 0.1% concentration of difenoconazole, which indicated a fungicidal effect of this toxic substance. Low or no sensitivity to thiophanate-methyl was noted for all *Fusarium* spp. strains, especially *F. poae* strain P32/21 and *F. avenaceum* strains P27/21 and P4/21, where no reaction of the fungus to toxic substances was observed in the first days of the experiment. *Fusarium* spp. was also shown to be mildly susceptible to azoxystrobin, and fungal resistance increased with time. Due to the resistance of the tested *Fusarium* spp. to thiophanate-methyl, it should not be used to protect cereals against *Fusarium* diseases, while azoxystrobin should only be applied as a prevention. Difenoconazole, from the group of triazole fungicides, was the most effective active ingredient for crop protection against *Fusarium* spp. as the test strains still showed high sensitivity/low resistance to this toxic substance. Literature: Jamiolkowska A., 2009. Fungi colonizing stems and leaves of hot pepper plants (*Capsicum annum* L.) cultivated in field. *EJPAU*, vol. 12,2. (www.ejpau.media.pl/volume12/issue2/art-07.html) Jamiolkowska A., 2011. Laboratory effect of azoxystrobin (Amistar 250 SC) and grapefruit extract (Biosept 33 SL) on growth of fungi colonizing zucchini plants. *Acta Sci. Pol., Hortorum Cultus* 10(2): 245-257.

Key words: difenoconazole, thiophanate-methyl, strobilurin, *Fusarium poae*, *Fusarium avenaceum*, *Fusarium sporotrichioides*, fungicides, fungus resistance.

**APPLICATION OF CLUSTER ANALYSIS
AND PRINCIPAL COMPONENT ANALYSIS FOR
THE STUDY OF AGRONOMIC CHARACTERISTICS
OF *Virginia tobacco* HYBRIDS COMBINATION**

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Abstract

Agro-morphological traits of five Virginia tobacco hybrid combinations and standard Virginia 0514 were analyzed. The aim of the study was to group and evaluate hybrid combinations by stem height (SH), leaf number (LN), length of 12th leaf (LL), width of the 12th leaf (WL), days to 50% flowering (D50F), dry leaf yield. Hierarchical cluster analysis and analysis of the main components were applied. The grouping of hybrids in clusters found that Hybrid 27, Hybrid 33 and Hybrid 126 with a common parent component Virginia 385 have larger leave size and higher dry leaf yield, which determines not only their differentiation into a separate cluster, but also their strong distance from the other two hybrids and the Virginia 0514 standard. The Hybrid 126 has the longest growing season. The studied traits were transformed into two factors. The first includes length of 12th leaf and width of the 12th leaf, days to 50% flowering and dry leaf yield and explains 42.8% of the total variance. The second main component consists of plant height and leaf number, explains 32.5%. As a result of the study it was proved that the most effective would be the selection activity, aimed at the selection in the population of the second cluster on the grounds - length and width of the 12th leaf, dry leaf yield and days to 50% flowering.

Key words: *Virginia tobacco, hybrid combinations, morphological traits, dry leaf yield, cluster analysis, Principal Component Analysis (PCA).*

AGROECOLOGICAL ASSESSMENT OF THE INFLUENCE OF MICROBIOLOGICAL FERTILIZER ON OIL FLAX VARIETIES

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Abstract

In a field stationary experiment and laboratory conditions, an assessment was made of the varietal responsiveness of oil flax plants to the effect of the microbiological fertilizer "Baikal EM-1" in the soil and climatic conditions of the Penza region. It has been established that in the technology of growing varieties of oil flax plants, the microbiological fertilizer "Baikal EM-1" used for seed inoculation before sowing + foliar treatment of flax plants in the "Christmas tree" phase + foliar treatment of flax plants in the budding phase, contribute to an increase in germination energy, field germination, as well as increasing the length of the seedling and germinal root. This leads to an increase in plant height in the herringbone phase of 14.2 cm, in the control variant 11.4 cm, in the flowering phase 49.1 cm, which is 10 cm higher than the control variant. Leafiness in the "herringbone" phase was 75.8%, in the control variant 64.8%. The seed yield of the Lirina variety was 19.3 c/ha and straw was 38.63 c/ha, while in flax plants of the Kinelsky 2000 variety, the seed yield was 18.4 c/ha and the straw was 36.8 c/ha.

Key words: oil flax, microbiological fertilizer "Baikal EM-1", grade, productivity and crop structure.

**RESEARCH ON THE EFFECT OF APPLYING
THE SECUIENI METHOD TO THREE VARIETIES
OF MONOECIOUS HEMP, IN TERMS OF PRODUCTION
(SEED, STEMS, FIBER), IN THE PEDOCLIMATIC
CONDITIONS OF A.R.D.S. SECUIENI**

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Abstract

In this paper we present the results regarding the evolution of monoecious hemp crop on the yield of seeds, stems and fiber, by following the Secuieni Method under the pedoclimatic conditions in the Agricultural Research and Development Station Secuieni Neamț (A.R.D.S. Secuieni, Neamț). The experience takes place in the experimental field of the unit, and it is a multifactorial experience, of the type 3 x 2 x 3, in three repetitions: A factor - variety (Denise, Diana, Dacia), B factor - distance between rows (25 cm; 50 cm), C factor - „Secuieni metho” (uncut, one cut, two cuts). On average, during the three years of experimentation, the above factors greatly influenced the seed yield obtained, which varied widely, from 806 kg • ha⁻¹ (Denise x 50 cm x uncut) to 1117 kg • ha⁻¹ (Dacia x 50 cm x two cuttings). Regarding the yield of stems, this also varied quite a lot, from 9219 kg • ha⁻¹ (Denise x 50 cm x two cuttings) up to 12634 kg • ha⁻¹ (Dacia x 50 cm x uncut).

Key words: *yield, method, monoecious hemp, variety.*

EFFECT OF FOLIAR FERTILIZATION ON THE QUALITY PARAMETERS OF WHEAT AND MAIZE CROPS

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Abstract

Wheat (Triticum aestivum L.) and maize (Zea mays L.) are widely consumed cereal crops throughout the world, representing a major staple food. Increased demand of food requires higher crop yields which are dependent of climatic conditions and soil fertility. Hence, for achieving this objective, it is necessary to adopt proper fertilization schemes. The excessive use of chemical fertilizers in agricultural systems poses negative environmental effects and accordingly, use of ecological inputs became a safer alternative. In this context, the aim of the present study was to assess the effect of ecological inputs' application on quality indicators for wheat and maize crops. In the experimental scheme was included foliar fertilization during vegetation period with CODAMIX and ECOAMINOALGA, as one treatment for wheat and two treatments for maize. The obtained results indicated that both applied fertilizers favoured accumulation of protein and starch in cereal seeds at levels higher than those identified for control variant. On the basis of the achieved data, it was found that application of ECOAMINOALGA was more efficient than CODAMIX and stimulated formation of seeds with better quality parameters for both crops subjected to this study.

Key words: *foliar application, maize, proteins, starch, wheat.*

EFFECTIVENESS TESTING OF DIFFERENT ORGANIC FERTILIZERS ON CROP YIELDS UNDER CLIMATIC CONDITIONS OF ARGES COUNTY

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Abstract

Application of organic fertilizers has proven a lot of benefits which converge to better yield parameters and food of high quality. The objectives of our study were to research the efficiency of three fertilizers accepted for organic agriculture (CODAMIX - F1, ECOAMINOALGA - F2 and ECOAMINOALGA PLUS - F3) on four different field crops, to evaluate their effects on yield parameters and to compare the results with those obtained in a previous experimental year. The study was developed in Albota, Argeș County during 2020-2021 and the field crops subjected to this investigation were winter wheat (Trivale variety), sunflower (PG4 hybrid), maize (T.332 hybrid), soybean (Raluca TD variety). The experimental scheme was composed from four plots and four variants (control, F1, F2, F3) for each crop. Organic fertilizers (F1, F2, F3) were applied for all field crops as two foliar treatments during vegetation period. The obtained results evidenced that application of organic fertilizers increased yield parameters and the efficiency of treatments is following the order F3>F2>F1. The results obtained during 2020-2021 are in good agreement with those reported for 2019-2020.

Key words: crop, foliar application, organic fertilizer, yield components.

INFLUENCE OF SOME FOLIAR TREATMENT PRODUCTS ON PRODUCTIVITY IN CORIANDER VARIETIES (*Coriandrum sativum* L.)

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Abstract

The field experiment was carried out in 2020 and 2021 crop years on alluvial-meadow soils, on the land of the village of Voivodinovo - central-south Bulgaria. The experiment was set by the method of fraction parcels in four repetitions, with size of the crop parcel - 15 m², after a precrop - wheat. Three leaf treatment products were examined in the relevant doses: Grow Plant Gel Energy 20-8-60 + 2% MgO + amino acids and algae extract - 25 l/ha; Fulvin 40-22-80 l/ha; Isabion - 30 l/ha and were compared with an untreated control. The tested products were applied in the stage - budding of five coriander varieties: Jantar, Moroccan, Mesten drebnoploden, Thüringen and Marino. The present research work aims at examining the reaction of coriander varieties with relation to the applied leaf treatment products and their influence on the indicators productivity and seed yield. The obtained results showed that the examined leaf treatment products have a positive effect on seed yield, as well as on productivity elements of the following coriander varieties - Jantar, Moroccan, Mesten drebnoploden, Thüringen and Marino. Compared to the control, all varieties treated with Isabion preparation/30 l/ha/ registered the highest seed yield. Seed yield grew from 8.3 to 13.4 % during the crop years. The increase of seed yields after the application of Isabion - 30 l/ha was due to the higher values of the indicators number of seeds and weight of seeds per plant. The leaf treatment products applied on the coriander varieties increase the values of the indicator number of seeds from 11.3 to 18.6%, and weight of seeds from 5.1 to 21.4%, compared to the control.

Key words: coriander, variety, foliar fertilizer, productivity, seed yield.

BROADLEAF WEEDS CONTROL IN WINTER WHEAT

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Abstract

*During the period of 2018/2019-2019/2020, a field plot trial with the winter wheat variety Avenue was carried out. The experiment aimed to determine the efficacy of herbicide products for broadleaf weeds control. The studied products were Biathlon 4 D (tritosulfuron + florasulam) + Dash (adjuvant), Mustang (2.4 D ester + florasulam), and Sekator OD (iodosulfuron + amidosulfuron). The obtained results were compared with the untreated control. The efficacy of the herbicides against the weeds corn chamomile (*Anthemis arvensis* L.), common poppy (*Papaver rhoeas* L.), cleavers (*Galium aparine* L.), wild mustard (*Sinapis arvensis* L.), and forking larkspur (*Consolida regalis* Gray) was evaluated. High herbicide efficacy against all existing weeds was recorded. All evaluated parameters for the treated variants as plant height at the end of the vegetation, absolute and hectoliter seed mass, as well as winter wheat grain yields, had higher values compared to the untreated control.*

Key words: wheat, weeds, herbicides, efficacy.

ROW SPACING AND PLANT DENSITY EFFECT ON YIELD COMPONENTS OF THE SUNFLOWER HEAD

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Abstract

Sunflower is suitable for a wide range of spaces between rows and between plants on the same row, respectively it is suitable to a wide range of plant density according to the cultivated hybrid and growing conditions. Matching the optimum spacing between rows and plants with the growing conditions for the different categories of hybrids is a matter of actual and future concern, this being of great interest for sunflowers growers. In this context, the objective of this paper is to present the results regarding the yield components of the sunflower head (head diameter, number of grains per head, and grain weight per head) obtained at different row spacing and plant density conditions. Researches were performed in field conditions in four locations in South and East of Romania, in three years (2019, 2020 and 2021). In each location and experimental year, a number of four sunflower hybrids were studied at three row spacing (70, 60 and 50 cm) and at three plant densities (50.000, 60.000 and 70.000 plants/ha). The increasing of plant density decreased the values of all values were registered at 70 and 60 cm between rows for head diameter and grain weight/head, while the number of grains per head registered the highest value at 50 cm between rows.

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

NEW GENOTYPES OF SWEET SORGHUM AND THEIR BIOMASS YIELDS IN THE SUSTAINABLE AGRICULTURE SYSTEM

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Abstract

*The challenges of practicing a sustainable farming system include the use of renewable energy sources, fuels from residual crop biomass or biomass produced for this purpose. From the multitude of crops with high energy potential suitable for cultivation in climatic conditions in Romania, sweet sorghum (*Sorghum bicolor* (L.) Moench, var. *Sacharratum*). it proves to be one of the most important species, which is highlighted both by its high capacity to generate high yields, but also by the consistency and quality of fresh biomass production. Due to the stalks whose juice is rich in sugar (12-22% Brix), which can be easily converted into biofuel, either directly by fermentation or indirectly by obtaining alcohol, sweet sorghum is enlarged in culture, with obvious tendencies to increase surfaces on the European continent. The data presented in this paper were obtained from a study conducted on the chernozem soil in the Caracal Plain, in order to identify the ability of new hybrids of sweet sorghum to capitalize the climatic conditions specific to the area and to express their productive potential through high yields of fresh biomass with a high sugar content. The obtained data showed that the most valuable hybrid proved to be SASM 1, with a total biomass production of 88.1 t / ha and a ratio of stem participation to total biomass of 81.3%. The average soluble dry matter content (Brix) determined with the portable field refractometer, in the conditions of 2019 year, was 18.2% for the same hybrid.*

Key words: *sweet sorghum, fresh biomass, yields, Brix content.*

CROP RELATIONSHIP “YIELD - EVAPOTRANSPIRATION” FOR COMMON BEAN

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Abstract

The aim of the study is the crop relation “Yield-Evapotranspiration” (ET) for common beans, based on data obtained by full irrigation and irrigation with reduced irrigation rates. The experiment conducted in the experimental field of Agricultural University of Plovdiv with “Dobrudzhanski 7” variety in the period 2014-2016. The relationship has been studied in two directions - with regard to the summary ET and in terms of ET by phases. Thus the vegetation period of the beans is divided according to the following phases: I - growth, II - flowering, III – productive (pod development and grain filling) and IV – maturing. In both cases, existing formulas (linear, power and multi-power) were used, where the experimental data was processed by the smallest squares method. The relationship “Yield-Seasonal ET” is best represented by two-power formula: $\Delta Y = [1 - (1 - \Delta ET)^N]^M$. The graph is expressed graphically by the S-curve and $R=0.986$ ($N=2.3$ and $M=9.1$). The crop relationship “Yield-ET by phases” is best expressed by the two-power formula at $R=0.921$. The power of the whole vegetation period is $N=1.3$ and in phases is: $m1=0.05$, $m2=0.79$, $m3=0.49$ and $m4=0.28$. This means that the second sub-period is the most sensitive. The first period has very little sensitivity and the third and fourth periods are intermediate.

Key words: irrigation, water deficit, water stress, yield, common bean.

EFFECTS OF BIOSTIMULANTS APPLICATION AT CASTOR BEAN

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Abstract

*Castor bean (*Ricinus communis* L.) is an oil plant of great importance worldwide, but with a low share in the structure of agricultural crops in Romania, with a tendency to grow, due to multiple economic advantages. Improving the effects of abiotic stress is the benefit of using biostimulants, as 60-70% of production losses in agriculture are attributed to abiotic strains. In the years 2019-2021, at ARDS Teleorman in South Romania, the effect of biostimulants applying to castor bean crop was studied, within a multifactorial field experiment of type 2 x 2 x 2, with subdivided plots and 3 replications. The three studied factors were the following: Factor A – biostimulant product, with 2 graduations (a_1 = auxins based product - Kelpac; a_2 = amino acids auxins based product - Amer 6.3; Factor B - application phase, with 2 graduations (b_1 = 4-5 leaves; b_2 = before the appearance of the main raceme; Factor C – application rate, with 2 graduations (c_1 = 1 l/ha; c_2 = 2 l/ha). The application of biostimulants to castor bean crop before the appearance of the main raceme in a rate of 2 l/ha reduces the percentage of broken plants and does not prolong the vegetation period of the plants. The appropriate moment for the application of biostimulants to castor bean crop is before the appearance of the main raceme, this being proven by the increased yield obtained compared to the application in the phase of 4-5 leaves. Increasing the application rate from 1 to 2 l/ha has led to increased yield for both biostimulant products. Amino acid based product resulted in higher yields than auxin based product.*

Key words: castor bean, biostimulants, auxins, amino acids, grain yield.

ROW SPACING AND PLANT DENSITY EFFECTS AT CASTOR BEAN

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Abstract

Castor bean is an important oil plant, which in Romania is cultivated on small areas for scientific, ornamental, industrial and medicinal purposes. Having into consideration the importance of the crop in the past, respectively up to 1989, when Romania was the sixth largest cultivator of castor bean in the world, and having in view the great importance of its oil, it can be said that in Romania the castor bean has a real potential to develop in the future.

Optimizing row spacing and plant density has a significant influence on seed yield. Therefore, our research focused on determining the optimal combination of row spacing and plant density to obtain the best yield under the environmental conditions specific to the South Romania and taking into account the phenotypic expression of the cultivated variety. Researches were performed in field conditions at the Agricultural and Development Research Station Teleorman located in Teleorman County in South Romania, in the years 2019 and 2020 and on cambic chernozem soil conditions. The experiment was placed according to the method of subdivided plots into 3 replications, with the following factors: Factor A - row spacing, with 4 graduations (30, 50, 70 and 90 cm); Factor B - plant density, with 3 graduations (40,000, 60,000 and 80,000 plants/ha); Factor C - castor bean variety, with 2 graduations (Teleorman and Rivlas). The results of the performed research proved that decreasing the row spacing is associated with decreasing of yield, while increasing the plant density is associated with increasing of yield. The Rivlas variety turned out to be more productive than the Teleorman variety.

Key words: castor bean, row spacing, plant density, variety, plant characteristics, yield.

EVALUATION OF SOME SOIL HERBICIDES AND THEIR COMBINATIONS IN MAIZE

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Abstract

In the growing seasons of 2020 and 2021, a field plot trial with the maize hybrid P 9241 (FAO 370) 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 Aspect® T (200 g/l flufenacet + 333 g/l terbuthylazine), Adengo® 465 SC (225 g/l isoxaflutol + 90 g/l thiencarbazone-methyl + 150 g/l cyprosulfamide (antidote)), and Merlin® Flexx SC 480 (240 g/l isoxaflutole + 240 g/l cyprosulfamide (antidote)). The herbicidal products were applied alone and in combinations after sowing before germination of the crop. The natural weed infestation of the experimental field was presented by the following late spring weed species: Setaria viridis L., Digitaria sanguinalis (L.) Scop., Chenopodium album L., Amaranthus retroflexus L., Xanthium strumarium L., Abutilon theophrasti Medic, Datura stramonium L., Solanum nigrum L., and Portulaca oleracea L. The highest herbicidal efficacy, as well as the highest seed yields after the alone application of Adengo® 465 SC, was recorded.

Key words: maize, weeds, herbicides, efficacy.

RESEARCH REGARDING THE ACHIEVEMENT OF THE QUALITATIVE PARAMETERS OF WORK ON SEEDLING PLANTING MACHINES

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Abstract

This paper presents some research on the achievement of qualitative parameters of work by seedling planting machines, especially the position of the seedling from the vertical, the degree of plant damage and planting mistakes, defining parameters for evaluating the planting work. The mechanized planting work is done, in overwhelming proportion, with semi-automatic machines or with automatic machines to a lesser extent. Depending on the constructive and functional solutions and the planting conditions (type and condition of the soil, working speed, and skill of the operator) different degrees of fulfillment of the qualitative working parameters mentioned above are obtained. It turned out that the solution with a planting machine with rotary bucket distributors meets a higher percentage of qualitative working parameters, especially the vertical position at planting and the degree of damage. These types are also found in two constructive variants, namely: with articulated bucket dispenser, which places the seedling in a gutter, opened by a coulter, and with non-articulated bucket dispenser, which places the seedling directly in the soil.

Key words: planted seedlings, quality parameters, efficiency.

SEED COTTON YIELD AND YIELD COMPONENTS AFFECTED BY THE MINERAL FERTILIZATION AND THE WEATHER CONDITIONS

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Abstract

*The aim of the study was to determine the reaction of cotton to different fertilizer rates and combinations under the influence of different weather conditions. In 1966 a long-term stationary fertilizer experience was established at the Field Crop Institute in Chirpan, Bulgaria. The results represent 2019 and 2020 crop years. The experiment was based on two-field crop rotation. Cotton variety Philipopolis was grown with durum wheat, without irrigation. The following doses of nitrogen and phosphorus were applied: 40, 80, 120 and 160 kg ha⁻¹. Potassium fertilizer was used at a rate of 80 kg ha. N₀P₀K₀ was adopted as a control. N₁₆₀P₄₀ had the greatest effect on seed cotton yield and boll weight; N₁₆₀P₈₀ - lint yield and ginning; N₁₆₀P₁₂₀ - plant height; N₁₂₀P₁₂₀ - number of boll per plant and N₄₀P₈₀ - fiber length. The strongest correlation was observed between lint yield and ginning ($P = 0.902^{***}$), and fiber length was negatively related to all traits. Yield and yield components can be strongly influenced by different weather conditions.*

Key words: phosphorus, potassium, nitrogen fertilization, weather conditions.

GRAIN YIELDS OF TRITICALE VARIETIES GROWN UNDER BIOLOGICAL AND CONVENTIONAL AGRICULTURE

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Abstract

Triticale is mainly used as a source of feed and the tendency is to include in people's diet. Information concerning comparison of yields under biological and conventional agriculture is needed. The aim of the research is to evaluate the productivity of triticale varieties depending on the fertilization, under biological and conventional agriculture. Two by two-factorial trials were conducted during the period 2014-2017. The experiments were performed after predecessor sunflower on Pelic Vertisols. Three varieties of triticale were tested, certified organic fertilizer from red Californian worm on biological field and mineral fertilizers containing nitrogen and phosphorus on conventional field were applied. The results showed an increase between 31.3%-52.4% after organic fertilization and between 28.6%-55.4% after mineral fertilization. Concerning variety an increase between 15.8%-23.0% under biological system was established. Under conventional system, 83.0% lower compared to control and 6.9% more was established. A specific reaction of the varieties to the agricultural system was found. The Respect variety achieved the highest productivity under biological system and the Boomerang variety under conventional system. The average grain yield under biological system was 32.6% lower. The effects of year, farming system, variety and fertilization on grain yields were confirmed.

Key words: *biological farming, conventional farming, fertilization, grain yield, triticale.*

THE QUALITY OF MIXTURES OF PERENNIAL GRASSES AND LEGUMES EXPLOITED IN HAY REGIME UNDER CENTRAL OF MOLDOVA CONDITIONS

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Abstract

The study was conducted during 2017-2019, within ARDS Secuieni and aimed to analyse the influence of fertilization and species mixture on fodder quality, as well as the determination of fodder content in crude protein (CP), NDF (neutral detergent fiber), ADF (acid detergent fiber) and calculation of relative forage quality (RFQ). Experimental factors were represented by fertilization (factor A), with four graduations: a1-N0P0; a2-N40P40; a3-N80P40; a4-N80+40P40, and by the mixture of perennial grasses and perennial legumes (factor B), with five graduations: b1 - 20% perennial grasses + 80% legumes; b2 - 65% perennial grasses + 35% legumes; b3 - 70% perennial grasses + 30% legumes; b4 - 70% perennial grasses + 30% legumes; b5 - 80% perennial grasses + 20% legumes. The results showed that the lowest content in crude protein, of 15.24 g/100 g d. s. was achieved in the variant fertilized with N40P40 and the highest value of CP (15.94 g/100 g d. s.) was obtained in the non-fertilized variant (control). The applied fertilizers influenced the crude protein content of each of the studied mixtures, the differences obtained being statistically assured.

Key words: fertilization, perennial grasses, perennial legumes, hay.

WILD ALFALFA IN THE SEMI-NATURAL GRASSLANDS OF CENTRAL NORTHERN BULGARIA

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Abstract

The study was conducted in the Central Northern Bulgaria in order to establish some biological, morphological and qualitative characteristics of wild species of genus Medicago. Medicago arabica (annual species) and Medicago falcata (perennial species) have the highest share in grassland, with significant seasonal productivity and feed quality. Medicago arabica dominates in spring and Medicago falcata in summer. Medicago falcata fodder is the richest in protein (25.32%) and has the most favourable ratio of crude protein and crude fiber. Compared to other short-lived species, Medicago falcata has lower levels of minerals and calcium. The presence of the fast-growing, drought-resistant species Medicago minima and Medicago polymorpha may be associated with the observed spring and late droughts in the study areas. The concentration of crude fiber (38.39%), crude fat (4.94%), acid-detergent lignin (10.98%), calcium (2.97%) and phosphorus (0.33%) is predominant in the biomass of Medicago polymorpha. The dry matter of the species has the lowest in vitro digestibility (80.71%) and hemicellulose concentration (4.61%). Medicago arabica has the lowest content of crude fiber (25.09%) and the highest of crude ash (13.45%), and acid-detergent fiber (27.90%). Compared to Medicago polymorpha (38.39%), the fiber fraction in the composition of the species is 53.0% lower. Medicago minima and Medicago lupulina registered an insignificant difference in the values of the indicators characterizing the fiber components of the cell walls and in vitro digestibility of the dry matter. The species have a low content of ADL (6.24-6.26%) and the highest digestibility of dry matter (84.39-84.41%). Medicago minima has the lowest value for the amount of crude protein (19.86%) and the highest for the content of hemicellulose (11.82%).

Key words: *Medicago spp., morphological characteristics, chemical composition.*

COMPARISON OF CROP ROTATION VS. MONOCULTURE: A SUNFLOWER CASE

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Abstract

*The influence of the crop rotation on sunflower (*Helianthus annuus* L.) yield and yield components is limited. Therefore a study in three consecutive growing seasons of sunflower (2018, 2019, and 2020) was conducted. The trial was performed on the experimental field of the department of “Agriculture and herbology” at the Agricultural University of Plovdiv, Bulgaria. The experiment was performed by the long plots method. Two crop rotations were evaluated: 1. Winter wheat - sunflower and 2. Sunflower - sunflower (monoculture). All evaluated parameters of sunflower as plant height at the end of the vegetation, head diameter, seed yield, seed oil content, as well as the absolute mass of 1000 seeds and hectoliter seed mass were influenced by the preceding crop. The highest results for the rotation of winter wheat - sunflower were reported, while statistically lower results for the sunflower monoculture were found.*

Key words: *sunflower, preceding crop, yield.*

STUDY OF SOME GROWTH AND REPRODUCTIVE ELEMENTS IN THE *Cassia angustifolia* SPECIES

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Abstract

Cassia angustifolia (family Fabaceae), popularly known as Senna, is a valuable plant drug in Ayurveda and modern system of medicine for the treatment of constipation. Cassia prefers sandy, light, well-drained soils. In its areas of origin, it grows in bushes and semi-desert pastures, especially in valleys, floodplains and on the banks of rivers. It is found from sea level to altitudes of 1,300 meters. A field experiment was conducted to the National Institute of Research and Development for Potato and Sugar Beet Brasov to highlighting aspects of biology and technology regarding the introduction of the species into culture in Romania. A two-factor experiment was designed, located according to the method of subdivided plots, in three repetitions of the 3x3x3 type, the length of a variant being 2 m, and the paths with a width of 1 m and 9 rows of plants per plot.

Key words: biology, *Cassia angustifolia*, medicinal plant, senna, technology.

MANAGEMENT OF PESTS AND PATHOGENS IN RYE CROP IN DRY MARGINAL ENVIRONMENT IN SOUTHERN ROMANIA

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Abstract

*Climate change is expected to cause the spread of pathogens and pests in areas where they have not been relevant before, bringing new challenges for cropping systems based on crops diversification by minor cereals. Rye is a minor cereal that contributes to crop species diversity in Central and Eastern Europe, especially in marginal environments unfavourable for wheat production. During 2019-2020, a plant-pest-pathogen interaction profile was observed on Suceveana rye genotype in a randomized complete block design in dry area from Research and Development Station for Plant Culture on Sands Dăbuleni in South of Romania. The best protection against leaf rust was provided by Dithane M 45+Bioinsekt (the 1st assessment=2.98%; the 2nd assessment=4.86%), while the best control against pests was provided by Mimox+Bioinsekt (the 1st assessment=0.83%) and Mimox+ Decis Expert 100 EC (the 2nd assessment=1.03%). For pests and leaf rust control was noticed the synergistic effect of insecticides and fungicides used in the experiment. Negative and significant correlations of attack degrees with grain yield ($r = -0.7886^{**}$, respectively $r = -0.8332^{**}$) were noticed.*

Key words: leaf rust, *Puccinia recondita f.sp. secalis*, pests, pesticides formulation, attack degree.

**YIELDS AND QUALITY OF WHEAT
AND MAIZE CULTURES UNDER THE INFLUENCE
OF MANAGEMENT PRACTICES IN SOUTH AREA
OF ROMANIA**

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Abstract

For wheat and maize the yields and quality are affected by management practices, soil and climate conditions and genetic characteristics. The research was conducted between 2019 and 2021, in the experimental field of NARDI Fundulea and the purpose of this study was to evaluate the effect of agrotechnical measures and climatic conditions on the yield and quality of wheat and corn. The experiment involved four different soil works, using three maize hybrids (Iezer, Mostistea and F423) and three wheat varieties (Glosa, Izvor and Pitar) and three fertilized options. The high productions and good quality of wheat and maize were maximized by applying the factors in associated variants. The results showed that the crops were very significantly affected by the conditions of the year as well as most of the interactions between the factors. The conservative tillages of the soil associated with the fertilization with manure have potentiated the genetic characteristics of the crop plant, raising the final quality of the production by 5-10%, depending on the variant.

Key words: *maize, wheat, yield and quality, management practices.*

EFFECTS OF AGROTECHNICAL MEASURES ON WEED DYNAMICS AND WATER BALANCE IN SOIL FOR DIFFERENT CROPS

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Abstract

In conditions of the modernization of agriculture, knowledge about the weeds can influence the production are required. The researches were performed during the 2018-2021, in the experimental field of NARDI Fundulea and aimed to study the influence of agrotechnical practices on the weeds and water balance in soil. The paper presents the results obtained in long term experiences with fertilizers, soil tillages and crop rotations. The crops showed an infestation with monocotyledonous and dicotyledonous weeds, represented as follows: weed wheat crop 27%, weed maize crop 80%. Weeding sources and the number of weeds are higher in the soils where the manure is administered, it is not herbicided and for the seed in uncultivated land. The dynamics of the soil moisture reserve was correlated with the precipitation regime and the water consumption of the plants. The reporting values for determining the soil moisture were as follows: Field capacity - 4,391 m.c./ha; Withering coefficient - 2,132 m.c./ha. Monthly determinations of soil moisture revealed atypical values of humidity at a depth of 0-75 cm, finding a variable amount of water.

Key words: wheat, maize, weed dynamics, water balance, soil.

PARAMETERS ANALYSIS OF THE *Ostrinia nubilalis* Hbn. ATTACK AT MAIZE CROPS IN THE CONDITIONS OF CENTRAL MOLDOVA

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Abstract

Maize is cultivated on 2,678.5 thousand ha in Romania, and its cultivation on large areas attracts a number of pests that attack various parts of the plant in different developmental phases. One of these dangerous pests is *Ostrinia nubilalis* Hbn., a species that occurs during the growing season of maize and causes production losses by the attack on the stem and cob. The larvae produce various attacks, influenced by climatic conditions, the frequency of attacked plants being between 15.7 and 67.9% in the south-west of the country (Bonea and Dunăreanu, 2021), in the south-east of the country varies between 43.3-79.4% (Georgescu et al., 2015), in the Transylvanian Plain has values between 60.00% and 81.88% (Vălean et al., 2017), in the west of the country the attack is around 41% (Jurca et al., 2009), and in the east of the country by 30.20% (Trotuș et al., 2018). The importance of attacks by *Ostrinia nubilalis* Hbn. at maize led to the initiation of studies in 2019 at the A.R.D.S. Secuieni to determine the influence of technological factors on the parameters of attack (frequency of attack, average number of holes, galleries and larvae and average length of gallery) produced by larvae. For the maize sown in epochs, the optimal epoch, the IIIrd, recorded the lowest values of the parameters: the frequency of the attack was 18.65%, were identified 0.60 holes/plant, 0.39 galleries/plant and 0.38 larvae/plant, and the average length of the galleries was 8.39 cm. The behavior of genotypes at the attack produced by larvae varied within very wide limits, the frequency of the attack was between 36.56% at the early genotype Vibrion and reached 48.50% at the late genotype Olt.

Key words: technological factors, frequency of attack, galleries, larvae, correlation.

RESEARCH ON BARLEY DISEASES IN THE CONVENTIONAL CULTURE AND IN THE CONVERSION PERIOD, MURIGHIOL LOCATION, TULCEA COUNTY

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Abstract

*The aim of our research was to establish the incidence of micromycete attack on barley grown in classical technology and in culture during the conversion period to move to organic farming, in the Murighiol area, Tulcea county, in 2020/2021. The most common micromycetes in barley crops were *P. teres* which causes net blotch of barley, *P. graminea* responsible for barley leaf stripe disease and *Puccinia hordei* agent pathogen of leaf rust on barley. In the case of barley cultivated in a conventional system, the control variant determined a degree of attack of 29.5% for *P. teres*, 6% for *P. graminea* and 11% for *P. hordei*. In the barley variant during the conversion period, the values recorded were 28.5% for *P. teres*, 4.5% for *P. graminea* and 12% for *P. hordei*. The application of treatments to conventionally grown barley was over 50% effective in controlling pathogens and in the barley variant during the conversion period to which the Amer Micro product was applied, there were lower values of the attack of the monitored pathogens, compared to the control variant.*

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

BRASSICAS AS A ROTATION CROP. POTENTIAL AND PERSPECTIVES

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Abstract

Crop rotation has been one of the approaches that has most improved the efficiency of farming systems around the world as it has the potential to improve soil conditions and increase the productivity of the system. Brassica spp. and related plants have received attention in recent years for its potential use as a rotation crop due to their ability to control soilborne pathogens. The production of sulphur compounds called glucosinolates is the main, although not the only, mechanism behind the reduction of soil pathogens by Brassica spp. These compounds break down to produce isothiocyanates that are toxic to many organisms in the soil, in a process known as biofumigation. In this review, the typical characteristics of Brassica spp. which makes them a valuable option as a rotational crop are discussed, as well as examples and the perspective of its use for this purpose.

Key words: *biofumigation, Brassicas, crop rotation, glucosinolates.*

IMPACT OF SILVER NANOPARTICLES ON GERMINATION INDICES, BIOCHEMICAL AND YIELD RELATED ATTRIBUTES OF WHEAT (*Triticum aestivum* L.)

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Abstract

Wheat is major food crop of world but unfortunately its production is decreasing day by day due to over-population therefore it is need of hour to execute modern technologies like nanotechnology to perk up the yield of important food crop. Silver nanoparticles (SNPs) have definite potential to enhance growth and yield of wheat. Diverse concentrations of silver nanoparticles inconsistently affected germination and seedling growth. Use of 20 ppm SNPs predominantly improved germination percentage, germination index, shoot fresh weight, shoot and root dry weight of wheat. Silver nano-particles have significant impact on biochemical traits of wheat. Maximum free proline, total soluble protein, chlorophyll stability index and total soluble sugar were recorded at 40 ppm of SNPs and then started declined when concentration was increased. Enzymatic activities (SOD, POD, CAT and MDA content) of wheat increased by the application of silver nano-particles @ 40 ppm and tend to decline with higher concentrations of SNPs. Green house results reveal that silver nanoparticles enhanced growth and yield of wheat crop plants at lower concentrations (40 ppm of SNPs) while higher concentrations have detrimental effects. Silver nanoparticles can modify plant physiology to greater extent. Silver nanoparticles can be employed to improve germination indices, physiological attributes of plants to enhance resistance and stress tolerance which ultimately result in boosting growth and yield of crop plants.

Key words: *proline, sugars, enzymatic activities, yield, wheat.*

INFLUENCE OF SOWING DATE ON THE MORPHOLOGICAL CHARACTERS AND YIELD COMPONENTS ON SUNFLOWER HYBRIDS

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Abstract

Three sunflower hybrids: F708 (H1), HF 7104 (H2) and FD18E41 (H3) were sown at three different sowing dates (SD): 10 March (SD1), 25 March (SD2) and 10 April (SD3) in order to determine the influence of sowing date on the morphological characters and yield components. Research was performed in the field experiments in Tulcea county in 2020 under rainfed conditions. The highest values for head diameter, plant population, 1000-seed weight, seed yield and hectolitre mass were obtained at SD2. Between the hybrids H3 had the highest yield - 2029.67 kg ha⁻¹. At the interaction between sowing date and hybrid the highest no. of leaves/plant was for SD1H2 (17.8) while the great head diameter was for SD2H1 (16.61 cm). H1 and H2 had their high yield at SD2 (2288 kg ha⁻¹ and 1799.3 kg ha⁻¹) while H3 at SD3 (2566.3 kg ha⁻¹).

Key words: sowing date, sunflower, hybrids, yield components.

BIODIVERSITY AND ADAPTABILITY OF SOME AGRICULTURAL PLANTS USED AS TECHNOLOGICAL ELEMENTS IN THE PRACTICE OF THE DRY-FARMING WORK SYSTEM IN SOUTHEAST AREA OF ROMANIA

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Abstract

Global warming has become a problem in many areas. The orientation of farmers towards an agriculture adapted to drought conditions, which uses dry-farming systems, allows the responsible and sustainable management of agricultural lands, without fragmenting habitats and contributing to the extinction of some species of flora and fauna. The survival of some species with a role in biodiversity for agricultural crops, the adaptability of some of them in dry areas and the improvement to create different hybrids with resistance to increasingly aggressive environmental factors, is due to this type of agriculture and to the new directions in specialized research. The study was conducted as an open-field experience, in the southeastern part of Romania, at the Agricultural Research and Development Station, Braila. The research started with the agricultural year 2019 but its climatic conditions were registered as excessive, which is why the capitalization of the results was made only for the agricultural year 2020-2021. Of the 7 cultivated plant species that do not normally fit into the crop plan in the study area, only three species (flax, sorghum, mustard) coped with climate stress and could be analyzed qualitatively and quantitatively.

Key words: *biodiversity, adaptability, dry-farming, climate stress, alternative species.*

THE IMPACT OF DIFFERENT TILLAGE SYSTEMS ON THE QUALITATIVE INDICATORS OF SOWING WORKS AND WHEAT CULTURAL DEVELOPERS

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Abstract

Soil tillage methods have complex effects on the physical, chemical and biological properties of the soil with the influence on the crop. In the paper it was proposed to study the effect that agricultural works for the preparation of the germination bed have on the work of sowing wheat or the degree of sunrise. The studies started in the southwestern part of Olt County, on an area of 4.5 hectares divided into plots of 0.5 hectares. Germination bed preparation works were carried out on each plot as follows: conventional works for autumn sowing, land covered with mowed vegetable waste (TAV), reduced work using heavy disc harrows on land covered with plant debris (LDG), work with harrow with vertical rotors. (LGR).

After the execution of the works for each plot, the soil moisture, the degree of crushing, the degree of compaction, the uniformity of the incorporation depth of the seeds were determined. The study will be continued by tracking the crop throughout the growing season, including crop production.

Key words: soil tillage methods, TVA, LDG, LGR.

APPLICATION OF SILICON AND BIOCHAR ALLEVIATE THE ADVERSITIES OF ARSENIC STRESS IN MAIZE BY TRIGGERING THE MORPHO-PHYSIOLOGICAL AND ANTIOXIDANTS DEFENSE MECHANISM

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Abstract

Arsenic (As) contamination in soil adversely affects crop productivity, grain quality, and human health. Application of silicon (Si) and biochar are known for imparting tolerance to crops against abiotic stresses. A pot experiment was performed to assess sole and combined effect of Si and biochar on growth, physiological, antioxidant defense mechanism, yield and grain quality of maize. Treatments comprised of control (no As no Si and no biochar), only As (12 mg kg^{-1}), only Si (100 mg kg^{-1}), only biochar (50 g kg^{-1}), Si + biochar ($100 \text{ mg kg}^{-1} + 50 \text{ g kg}^{-1}$), As + Si ($12 \text{ mg kg}^{-1} + 100 \text{ mg kg}^{-1}$), As + biochar ($12 \text{ mg kg}^{-1} + 50 \text{ g kg}^{-1}$) and As + Si + biochar ($12 \text{ mg kg}^{-1} + 100 \text{ mg kg}^{-1} + 50 \text{ g kg}^{-1}$ soil) were applied at the time of sowing. The experimental was carried out by using the completely randomized design (RCD) with three replications. The As toxicity significantly reduced chlorophyll a, chlorophyll b and chlorophyll a+b, primary metabolites (soluble protein, amino acids, total soluble sugar and phenolic contents) while increased the activities of enzymatic antioxidants like superoxide dismutase (SOD), peroxidase (POD), catalase (CAT) and ascorbate peroxidase (APX) in the leaves of maize. Moreover; As stress increased the lipid peroxidation in the form of malondialdehyde (MDA) and also enhanced the hydrogen peroxide (H_2O_2) content, and electrolyte leakage (EL) as well as proline contents in the leaves. In addition, As contamination reduced the grain yield and yield related attributes relative to respective no-As treatments. Among the soil application Si and/or biochar improved maize grain yield by triggering the activities of enzymatic antioxidants, proline contents and reducing the H_2O_2 and MDA contents in plants treated with sole application Si/ biochar or combined. Combined application of Si and biochar application enhanced the Si contents shoot in controlled and As-contaminated plants and significantly reduced As concentration in shoot and grain of maize. In conclusion, combined application of Si and biochar was found to be best soil amendment strategy to improve yield of maize under As contaminated soil.

Key words: biochar, silicon, arsenic, antioxidants, malondialdehyde.

FOLIAGE APPLIED ZINC, BORON AND MOLYBDENUM ON YIELD AND QUALITY ATTRIBUTE OF SUNFLOWER HYBRIDS ON SANDY LOAM SOILS

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Abstract

Sunflower (Helianthus annuus L.) is the main source of edible oil worldwide. However its production is very less in Pakistan. Therefore; current study was conducted to assess the influence of foliage applied of micronutrients on the yield and quality of sunflower hybrids. Eight levels of micronutrients viz. i) control; ii) Zn; iii) B; iv) Mo; v) Zn + B; vi) Zn + Mo; vii) Mo + B; viii) Zn + B + Mo were foliage applied on two sunflower hybrids (FMC-1 and Parson) at heading stage. The experimental design was randomized complete block design (RCBD) under factorial plot arrangement; with three (3) replications. Foliar application of micronutrients (Zn, B, Mo) increased the yield and quality of sunflower hybrids. Results indicated that 'Parson' produced the head diameter, biological yield, oil content, stearic, palmitic acid and linolenic acid as compared to FMC-1. Among the micronutrients, the highest plant height, number of leaves, head diameter, 1000-achene weight, achene yield, oil contents, and palmitic acid were recorded with the sole application of Zn + B. In conclusion, the hybrid 'Parson' should be grown with the application of Zinc + Boron to achieve the maximum yield and nutritional attributes of sunflower hybrids under arid climate of Layyah, Punjab-Pakistan.

Key words: *sunflower hybrids, micronutrients, oil content, achene yield, fatty acid profile.*

**PAST, PRESENT AND FUTURE
IN THE SUSTAINABLE MANAGEMENT OF WEEDS
IN AGRICULTURAL CROPS - A STUDY ON MEANS
AND METHODS USED IN CORN CROPS**

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Abstract

Climate and soil conditions, tillage methods, type of rotation, crop density, irrigation etc. influences the degree of weeding of agricultural crops. They can be managed, to a greater or lesser extent, to help reduce weeds. The non-chemical methods used over time for weed management have proven to be more or less effective. After the 1960s, the use of herbicides dominated weed control methods, but over time, their impact on the environment, production quality, and human health proved increasingly harmful. Thus, in the current era, in order to achieve a sustainable control of weeds, more and more innovative means and methods are used to ensure the necessary agricultural production, environmental protection and human health. The aim of this paper is to present the evolution of weed control means and methods over time and their effectiveness in order to identify components that could be integrated into modern control systems and to ensure the highest possible degree of environmental resilience.

Key words: *weed management, methods, innovation, environment resilience.*

EFFECTIVENESS OF BIOSTIMULANTS APPLIED TO WHEAT, SUNFLOWER AND SOYBEAN CROPS

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Abstract

It is known that the application of organic substances has effects to stimulate the development of plants. The paper presents the effect of two plant biostimulants (FERT - H and FERT - A) with organic matter of vegetable origin (protein hydrolyzate, respectively seaweed extract) on quality and production indicators for wheat, sunflower and soybean crops. The plant biostimulants were tested for three years by foliar application both in the experimental field in a wide range of crops, obtaining statistically significant and very significant yields compared to the unfertilized control. The obtained yields ranged between 50-60% for wheat, 8 – 9% for sunflower and 24-38% for soybean. Although there were differences in production between the two biostimulators, these were not significant. The plant biostimulants with natural organic matter (algae and soy hydrolysate) that were used can influence crop nutrition leading to increased product quality.

Key words: *plant biostimulants, protein hydrolysate, seaweed extract, foliar application.*

EFFECT OF SOIL FERTILIZATION WITH SELENIUM ON THE TOTAL ANTIOXIDANT CAPACITY (TAC) OF AMARANTH LEAVES

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Abstract

The effect of selenium Se(IV) (0, 0.1, 0.25, 0.50, 1.0 and 2.0 mg·kg⁻¹ soil) on the TAC of leaves of Polish amaranth cultivars - Rawa and Aztek - at the BBCH 15, BBCH 61 and BBCH 67 developmental stages, was studied in a pot experiment. The experiment was conducted in 5.0 kg pots filled with silty clay of slightly acidic pH in 3 replicates. Before sowing, the following uniform fertilization with macronutrients was applied (g·pot⁻¹): N - 0.72, P - 0.36, K - 0.36 in the form of aqueous solutions along with an appropriate Se dose. After emergence, 3 plants were left in the pots. Leaves were collected at the indicated developmental stages for extract preparation, and subsequently the TAC was tested using the Rice-Evans and Miller method with Bartosz modifications. The research showed that amaranth leaves in the BBCH 1 stage had the highest TAC, while the lowest values were recorded in the BBCH 67 stage. A significant increase in leaf TAC was also observed with the applied Se doses compared to control, with the exception of 1.0 and 2.0 mg kg⁻¹ soil doses, for which this parameter was not significantly different. Leaves of the cultivar Aztek had a significantly higher TAC compared to the cultivar Rawa at all analyzed developmental stages.

Key words: fertilization, selenium, amaranth, leaves, Total Antioxidant Capacity (TAC).

COMPARATIVE STUDY OF ESSENTIAL OILS OBTAINED FROM TWO BASIL TAXA

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Abstract

*The objective of this study was to evaluate the essential oils (EOs) obtained from two medicinal plants belonging to the genus *Ocimum* sp. These were compared in terms extraction yield and analysis of EOs compounds using GC/MS (content, chemical composition and quantitative dosage of some compounds: linalool, estragole and eugenol). *Ocimum basilicum* L., fam. Lamiaceae with 2 cultivars: Yellow basil (*Ocimum basilicum* L., 'Aromat de Buzău' variety), Purple basil (*Ocimum basilicum* cv. *purpurascens*, 'Seraphim' variety) and Holy basil (Tulsi) was used in the experiments. Extraction yields obtained: 5 ml EO/1 kg plant material for Yellow basil, 1 ml EO/1 kg plant material for Purple basil and 0.9 ml EO/1 kg plant material for Tulsi. Twenty-six compounds of the Yellow basil, sixteen compounds of the Purple cultivar and twenty-eight compounds in Tulsi and were identified using GC/MS. Linalool (46.70%-48.52%), Estragole (31.50% for the 'Aromat de Buzău' variety) and Eugenol (13.18% for the 'Seraphim' variety and 35.85% for the Tulsi) were dosed quantitatively and identified as the main and common compounds, for the essential oils obtained from the two species of Basil.*

Key words: *Ocimum basilicum*, *Ocimum sanctum*, yield, essential oils, GC/MS.

NITROGEN AND PHOSPHORUS FERTILIZERS AFFECTING THE QUALITY AND QUANTITY OF THE DURUM WHEAT

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Abstract

The experiment was based on the block randomized method in four replications, after cotton predecessor in Field Crops Institute, Bulgaria in the period 2018/19-2019/20. Were tested: N_{40} , N_{80} , N_{120} , N_{160} ; P_{40} , P_{80} , P_{120} and P_{160} . As a control variant was adopted N_0P_0 . Based on the results obtained, we can conclude that the maximum nitrogen rate did not lead to the best results. The norm of 120 kg N ha was the most effective in most parameters – grain yield (76.2%); test weight (113.3%); grain vitreous (32.36%); gluten content (50.2%), respectively compared to the control. Thousand kernel weight was most affected by N_{160} (13.3%). Protein content had the same values in N_{120} and N_{160} (35.1%), and this effect does not justify the high rate of N_{160} . Phosphorus fertilization showed a weaker effect for all studied traits, and grain yield did not have significantly higher values. The other parameters were most affected by fertilization with P_{80} : thousand kernel weight (7.7%); test weight (2.0%); grain vitreous (9.69%); gluten content (22.3%), respectively. Protein content had the same values at P_{80} and P_{160} (9.0%).

Key words: *environmental conditions, nitrogen, phosphorus, fertilization.*

ECONOMIC EVALUATION OF THE PRODUCTIVITY OF COMMON WHEAT VARIETIES

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Abstract

The study was conducted in the period 2017-2019, in the Department of Plant Breeding at the Faculty of Agriculture at the Trakia University, Stara Zagora, Bulgaria. The subject of the study are seven varieties of common wheat - Syngenta (Ingenio, Bologna, Dalara, Moyson, Falado, Gabrio and Pibrak) and variety Factor from the Bulgarian selection of common wheat. The aim of the present study is to assess the productivity and ecological plasticity of common wheat varieties by analyzing the main economic indicators. The economic evaluation of the results was performed according to the following indicators: GO - Gross output (euro/ha); Y - Yield of common wheat for grain (kg/ha); SPP - stock purchase price (euro/kg); P - profit (euro/ha); PC - Production costs (euro/ha); CP - Cost price (euro/kg) and RP - Rate of profitability (%). As a result of the economic analysis it was found that the varieties Falado (26.02%) and Gabrio (25.01%) have the highest profitability rate. This makes them the most adaptable to specific soil and climatic conditions. The cost of the grain is estimated at 0.13 euro/kg for Falado and Gabrio. Dalara and Moyson (0.14 euro/kg) are also characterized by low cost. Factor variety appears to be unprofitable and low productive in specific soil and climatic conditions.

Key words: *common wheat, productivity, Anova, economical analysis.*

RESEARCH ABOUT INFLUENCE OF VARIETY, CULTURE SUBSTRATE AND NUTRIENT SPACE ON POTATO MINITUBERS PRODUCTION

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Abstract

This study was conducted to determine the minituberization capacity of three Romanian potato varieties. The three-factor experiment included the following factors: A - culture substrate with two graduations: a₁ - 80.00% red peat, 9.90% black peat and 10.10% perlite, a₂ - 84.03% red peat, 7.9% black peat and 8.06% perlite; B: nutrition space, with two graduations: b₁ - 1.5 l, b₂ - 2 l; C: variety, with three graduations: c₁ - Marvis; c₂ - Castrum; c₃ - Ervant. Examination of the results on the number and weight of minitubers/plant suggests the high capacity of the Castrum variety for the production of minitubers, when using increased space nutrition and the substrate consisting of a smaller concentration of red peat (80.00%). Regarding the minitubers number, when it was used the substrate with a higher concentration of red peat (84.03%) the Castrum variety was distinguished in a bigger nutrition space (2 l).

Key words: potato minitubers, variety, nutrition space, substrate.

RESEARCH ON THE BEHAVIOR OF SOME LEGUME SPECIES IN THE ACTION OF DIFFERENT TYPES OF FERTILIZERS (CHEMICAL VS. BIOLOGICAL)

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Abstract

The processes of interaction between the plant and the active soil microbiome are the determining factors of plant welfare and health, crop productivity and soil fertility. The new technologies applied in the agricultural field have as role the promotion of the growth and development of the plants, the sustainability of the agricultural crops, the maximization and the yield of the agricultural crops. The bacteria used in the composition of fertilization or plant protection products are selected bacteria, bacteria accredited by international gene banks, these bacteria being determinants and plant health. The associativity of bacterial cultures has the role of developing and supporting the growth of plants and their protection from certain diseases or pests, through various mechanisms. The use of live bacterial cultures in agriculture has different characteristics. The most important characteristics that these biopreparations have are represented by: the biological fixation of atmospheric nitrogen in the soil, the solubilization of phosphates, the acceleration of the ACC deaminase process, the production of siderophores and phytohormones, the growth and development of plants. The present paper aims to present the role on which the combinations of bacterial cultures that are used in agricultural ecosystems, bacterial cultures that can replace chemical fertilizers as well as some plant protection products. This article presents, in addition to the biology of each bacterium - the role, action and benefit that these bacterial cultures have in the activity of the soil microecosystem. The positive impact of biofertilizer "BioWais" on plant growth and development, enhancement of resistance of bacterized plants to hypothermia and pathogenic infection, increase of carotid content were demonstrated at the stations where we done the experiments.

Key words: biofertilizers, live bacterial cultures, nitrogen fixation, phosphorus mobilization.

THE INFLUENCE OF TEMPERATURE ON VARIOUS FIELD CROPS SEEDS GERMINATION

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Abstract

The quality control of the biological material is done systematically through analyses: genetic, physical, physiological and the sanitary conditions, as well as regarding to respect the quality parameters standards. Depending on testing results, the seeds are or not accepted for sowing. The influence of environmental factors on seeds germination for sowing is very important. The temperature influences the activity of involved enzymes in seeds germination metabolism. The minimum, optimal and maximum temperatures differ from one species to another, so this must be taken into account when it is organizing the seeds sowing. The purpose of this paper is to present results of the temperature influence on the seeds germination for sowing, for 10 field crops species, as follows: Triticum aestivum, Hordeum vulgare, Hordeum distichon, Zea mays conv. dentiformis, Zea mays conv. sacharata, Sorghum bicolor var. eusorghum, Brassica napus spp. oleifera. Helianthus annuus, Lupinus albus and Cicer arietinum, from the profile market. The influence of temperature on the germination process showed that there were normal seedlings, which are taken into account to express germination, but there were also abnormal seedlings or dead seeds (that did not germinate). Thus, at exposure for one hour at temperature of 40°C, for the species such as: Triticum aestivum, Hordeum vulgare, Hordeum distichon, Brassica napus ssp. oleifera, germination was reduced with 10-25%. In the experiment with exposure for one hour at temperature of -7°C, the species such as: Helianthus annuus or Lupinus albus, completely lost their ability to germinate.

Key words: field crops, seeds germination, seeds quality, sowing, temperature.

THE QUALITY OF FRESH AND ENSILED BIOMASS FROM WHITE MUSTARD, *Sinapis alba*, AND ITS POTENTIAL USES

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Abstract

We investigated some biological peculiarities and the quality of fresh and ensiled biomass from white mustard, Sinapis alba, which was cultivated on the experimental land in the National Botanical Garden (Institute), Chisinau. The fresh mass was mowed in the flowering stage, some assessments of the main biochemical parameters: crude protein (CP), ash (CA), acid detergent fibre (ADF), neutral detergent fibre (NDF), acid detergent lignin (ADL), total soluble sugars (TSS) have been determined by near infrared spectroscopy (NIRS) technique PERTEN DA 7200, the concentration of hemicellulose (HC), cellulose (Cel), digestible energy (DE), metabolizable energy (ME), net energy for lactation (NEL) and relative feed value (RFV) were calculated according to standard procedures, the sensorial and chemical characteristics of the prepared silage were determined in accordance with the laboratory standard SM 108. It has been determined that the white mustard fresh mass contained 183-208 g/kg dry matter with 18.3-22.9% CP, 9.2-10.9% CA, 43.9-51.8% NDF, 28.3-34.7% ADF, 4.8-5.6% ADL, 23.5-29.1% Cel, 15.6-17.1% HC, 6.3-8.7% TSS, 63.3-75.9% DMD, 57.3-66.1% DOM, RFV=111-142, 12.22-13.08 MJ/kg DE, 10.03-10.74 MJ/kg ME and 6.04-6.77 MJ/kg NEL. this fact indicates a good quality of the natural feed for ruminants. The white mustard silage was distinguished by homogeneous olive colour, pleasant smell specific of pickled cucumbers with pH = 4.12, it contained 7.4 g/kg acetic acid, 41.8/kg lactic acid, 24.6% CP, 14.1% CA, 41.1% NDF, 28.2% ADF, 2.9% ADL, 25.3 % Cel, 12.9 % HC, 5.3% TSS, 81.7% DMD, 71.3% DOM, RFV=151, 13.11 MJ/kg DE, 10.76 MJ/kg ME and 6.78 MJ/kg NEL. The biochemical methane potential of Sinapis alba substrates reached 295-330 L/kg organic matter.

Key words: biochemical composition, biochemical methane potential, feed value, fresh mass, silage, *Sinapis alba*.

EVALUATION OF THE BIOMASS QUALITY OF WHITE SWEETCLOVER, *Melilotus albus*, AND PROSPECTS OF ITS USE IN MOLDOVA

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Abstract

Legume plants play a major role in promoting sustainable agriculture, at global, regional and national levels. We investigated the biomass quality of the local ecotype of white sweetclover, Melilotus albus L., grown in an experimental field of the National Botanical Garden (Institute), Chișinău. That the green mass cut in the flowering period contained 27.9% dry matter. The dry matter of whole plants contained 132 g/kg CP, 82 g/kg ash, 381 g/kg CF, 386 g/kg ADF, 567 g/kg NDF, 64 g/kg ADL, 322 g/kg Cel, 181 g/kg HC, 86 g/kg TSS, with 58.8% DMD, RFV= 97, 11.66 MJ/kg DE, 9.57 MJ/kg ME, 5.59 MJ/kg NEI. The fermented fodder from Melilotus alba contained 127 g/kg CP, 414 g/kg CF, 99 g/kg ash, 407 g/kg ADF, 581 g/kg NDF, 58 g/kg ADL, 62 g/kg TSS, 348 g/kg Cel, 174g/kg HC, with nutritive and energy values: 57.2 % DMD, RFV= 92, 11.38 MJ/kg DE, 9.34 MJ/kg ME and 5.30 MJ/kg NEI. The biochemical methane potential of white sweetclover green mass substrate reached 267 L/kg organic matter and white sweetclover silage substrate - 278 L/kg organic matter. The local ecotype of white sweetclover can be used for the restoration of degraded lands, as a component of the mix of grasses and legumes for the creation of temporary grasslands. The harvested biomass can be used as alternative fodder for farm animals or as substrates in biogas generators for the production of renewable energy.

Key words: biochemical composition, biochemical methane potential, forage quality, green mass, *Melilotus albus*, silage.

BARLEY YIELD RESPONSE TO AGROCLIMATIC INDICES VARIABILITY

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Abstract

This study analyses the barley genotypes response to different agro-climatic indices, used to characterize the effect of genotype and environment on yield potential, providing an overview on a different six and two rows barley genotypes (varieties and lines). The variability was obtained under two growing conditions (CGC1 - conventional growing condition and LSC2 - late sowing condition) in the southeast of Romania, and the agro-climatic indices were evaluated based on the number of days from sowing to heading and from heading to physiological maturity. The relationship between barley grain yield data under CGC1 and LSC2 and seven agro-climatic indices was analyzed. According to growing degree days (GDD), bright sunshine hours (BSH), heliothermal units (HTU), photothermal index (PTI), heat use efficiency (HUE), rainfalls sum (RS), rainfall index (RI), barley genotypes had different yield potential and agro-climatic indices.

Key words: agro-climatic indices, barley, grain yield, growing condition, phenological stages.

MONITORING OF BARLEY NET BLOTCH (*Pyrenophora teres drechsler*) IN BULGARIA

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Abstract

Worldwide, net blotch caused by *Pyrenophora teres* Drechsler is a major foliar disease of barley (*Hordeum vulgare* L.) causing economic losses by reducing the yield and grain quality. Two forms *P. teres* f. *maculata* and *P. teres* f. *teres* have been identified as similar morphologically, however, different at the genetic and pathophysiological levels. The aim of the current study is to monitor the distribution of barley net blotch in Bulgaria. The total surveyed area during the investigation is 5212 dka. The lowest prevalence of the disease is in the regions of Imrenchevo and Chirpan, respectively 14.35% and 15.2%. The manifestation of net blotch is strongest in the region of Kamburovo - 82.2%. Based on the studied samples from different regions the species *D. teres* predominates in Bulgaria, while *D. maculata* is much rarer. The conidia of *D. teres* are light brown, cylindrical, with 3 to 8 partitions and dimensions - 69.5-181 x 15.28-24.1 µm. The conidia of *D. maculata* are oblong-cylindrical with 3 to 5 partitions and with dimensions - 65-143 x 10.2-19.3 µm.

Key words: Barley breeding, *Hordeum vulgare*, net blotch, pathogen resistance, *Pyrenophora teres*.

CULTIVATION POTENTIAL OF CHIA (*Salvia hispanica* L.) IN CLUJ COUNTY

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Abstract

Chia (Salvia hispanica) is an annual herbaceous species from the Lamiaceae family. It is a tropical short-day species, native to Mesoamerica. Chia seeds are considered a “superfood” due to nutritional characteristics. Aim of this research was to assess the cultivation potential of chia in local climate (Cluj-Napoca, Romania). The research was conducted on four Salvia hispanica accessions cultivated in the experimental field from Agro-Botanical Garden of the University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca. In field conditions, growth cycle lasted between 150-170 days. According to BBCH scale were identified eight principal growth stages. Fruit development and fruit maturation were the longest. In September, seeds were harvested for analysis. The average thousand seeds mass was 1.43 g, average protein content 17.06 g/100 g and average fat content was 31.32 g/100 g. Plants developed a specific habitus and had a complete life cycle, producing fruits with viable seeds at the end of summer. Average seed germination was 92.88%. Quality of seeds was comparable with the one from literature, indicating to the potential for cultivation of chia in continental temperate conditions of Cluj county, Romania.

Key words: food, proteins, lipids, germination, quality, phenology.

EFFECTS OF DIFFERENT SOWING DENSITY IN WINTER WHEAT IN ECOLOGICAL PRODUCTIONS IN TWO DIFFERENT LOCATIONS IN ROMANIA

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Abstract

Straw cereals, especially wheat (Triticum aestivum), are the most widely cultivated plant in the world, grown in over 100 countries, and are a prime commercial source. The uses of straw cereals are many and varied. The grains are used for a range of milling products from which a rich assortment of bakery products, pastries and biscuits are made, which constitute basic foods for 35-55% of the world's population, providing 50-55% of calories consumed worldwide, along with other grains grown. The processing of wheat in high-capacity mills results in large quantities of bran, which is a valuable concentrated feed (rich in protein, lipids and mineral salts) and germs high in vitamins, which is a natural provitamin but also lipids with uses in cosmetics. Straw left over from harvesting can be used to make pulp, bulk feed or bedding for various categories of animals, organic fertilizer after a period of composting or incorporated as such into the soil after harvest, and by briquetting can be used as fuel. The agronomic importance is given by: integral mechanization of the crop; early release of the land and the possibility of summer plowing, being a good precrop for most crops; according to the early varieties, it allows the location of successive crops in certain areas. In this respect, a field experiments were established in the year 2020 at the Agricultural and Development Research Station Secuieni (ADRS Secuieni) located in North Romania (Neamț County) and at Experimental Trials of Saaten Union Romania at Drajna Nouă located in South-East (Călărași County). The experimental variants were represented by the nine winter wheat varieties (Trublion, Centurion, Katarina, Glosa, Aspekt, Izvor, Avenue, Solehio, Alcantara) and one hybrid wheat (Hyxperia) in three repetitions in both locations, with the following graduations: a) 250 germinable kernels/sm; b) 360 germinable kernels/sm; c) 500 germinable kernels/sm. The obtained results indicate that at medium density the production results are superior to the variants of low and high density, which implies giving us more profitability.

Key words: wheat, ecological system, sowing rate, wheat varieties, hybrid wheat.

WATER CONSUMPTION AND EFFICIENCY OF IRRIGATION OF MAIZE HYBRIDS OF DIFFERENT FAO GROUPS IN THE SOUTHERN STEPPE OF UKRAINE

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Abstract

The results of research on the influence of irrigation methods and regime on the processes of total water consumption and irrigation efficiency in the cultivation of maize hybrids of different FAO groups in the Southern Steppe of Ukraine are presented. It is confirmed that the method of irrigation, the genotype of the hybrid significantly affects the formation of water regime of the soil and the productivity of corn. The use of drip irrigation provides the highest levels of grain yield ($16.09\text{--}16.72\text{ t}\cdot\text{ha}^{-1}$) at the lowest specific water consumption for the formation of the unit of yield (water use efficiency) – $365.90\text{--}376.13\text{ m}^3\cdot\text{t}^{-1}$, the highest payback of irrigation water by yield increase ($3.95\text{--}4.16\text{ kg}\cdot\text{m}^{-3}$) when using FAO 400-440 hybrids adapted to irrigation conditions. According to the absolute parameters of irrigation water consumption, surface drip irrigation is the most economical. Hybrids with adequate response to the level of soil moisture and provide grain yield: without irrigation - $2.89\text{--}3.01\text{ t}\cdot\text{ha}^{-1}$ (drought-resistant), with water-saving irrigation regime - $9.45\text{--}9.51\text{ t}\cdot\text{ha}^{-1}$ (homeostatic type), with the optimal irrigation regime - $14.85\text{--}16.72\text{ t}\cdot\text{ha}^{-1}$ (intensive type).

Key words: irrigation methods, water consumption, maize, hybrids, water use efficiency.

EVALUATION OF COTTON GENE POOL SAMPLES IN DIFFERENT YEARS OF HEAT SUPPLY IN THE CONDITIONS OF THE SOUTHERN STEPPE OF UKRAINE

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Abstract

The article presents the results of studying of the gene pool of cotton in different years of heat supply, with and without irrigation. As a result of many years of research from the collection of the gene pool, more than 30 sources of economic and valuable traits have been identified, which are characterized by high adaptability to environmental factors, excellent indicators of product quality. On the basis of the studied material, two working signs and a training cotton collection were formed. Valuable samples of cotton were isolated from the gene pool on the basis of economically valuable features. These included drought resistance, fiber color, a combination of signs of precocity and partial pubescence of seeds, high attachment of the first sympodial branch and large capsule, long fiber, ultra-early maturity and high productivity. Also, medium-fiber high-yielding very early varieties of cotton - 'Dniprovskiy 5' and 'Pidozerskiy 4' were created.

Key words: cotton collection, climate change, precocity, yield, ripening period.

HERBICIDAL WEED CONTROL IN WINTER WHEAT (*Triticum aestivum* L.)

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Abstract

*During 2019-2020 and 2020-2021 on the experimental field of the Agricultural University of Plovdiv, Bulgaria, a field experiment with winter wheat variety 'Enola' was performed. The trial included the following herbicidal treatments: Quelex + Trend 90 (37.5 g ha⁻¹ + 0.1%); Quelex + Trend 90 (50 g ha⁻¹ + 0.1%); Quelex + Aminopielik 600 SL (37.5 g ha⁻¹ + 0.4 l ha⁻¹); Quelex + Aminopielik 600 SL (50 g ha⁻¹ + 0.4 l ha⁻¹); Quelex + Mustang 306,25 SC (37.5 g ha⁻¹ + 0.3 l ha⁻¹); Derby super one + Trend 90 (33 g ha⁻¹ + 0.1%); Mustang 306,25 SC (0.6 l ha⁻¹); Sekator OD (1.25 l ha⁻¹); Sekator OD (1.50 l ha⁻¹) and Biathlon 4D + Dash (55 g ha⁻¹ + 0.5 l ha⁻¹). The herbicides were applied in phenophase tillering of the winter wheat (BBCH 21-29). The application of Quelex + Mustang 306,25 SC (37.5 g ha⁻¹ + 0.3 l ha⁻¹) and Quelex + Aminopielik 600 SL (50 g ha⁻¹ + 0.4 l ha⁻¹) ensured excellent efficacy against *Anthemis arvensis* L., *Papaver rhoeas* L., *Consolida orientalis* J.Gay, *Vicia hirsuta* L., *Galium aparine* L., *Sinapis arvensis* L., *Lamium purpureum* L., and *Fumaria officinalis* L.. The wheat biological yield as well as the supplementary biometrical indicators for the concrete two treatments was the highest.*

Key words: winter wheat, herbicides, weeds, efficacy, biometry.

INFLUENCE OF LIQUID ORGANIC FERTILIZERS ON THE YIELD STRUCTURE CHARACTERISTICS AND PRODUCTIVITY OF CHICKPEA (*Cicer arietinum* L.)

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Abstract

*The aim of this study was to determine the effect of liquid organic fertilizers Naturamin Plus and Amalgerol Essence on the yield structure characteristics and productivity of chickpea (*Cicer arietinum* L.). The experiment was conducted in the period 2019-2021 in the region of South-Central Bulgaria. The trial was designed by the block method in 4 repetitions and 3 doses of fertilizers were tested in two phases of chickpea development: growth phase (4th leaf) and beginning of flowering. Results obtained for the yield were statistically processed by ANOVA. It was found that the treatment with the tested fertilizers increases the values of the structural elements of yield (number of pods per plant, number of grains per plant, grain mass per plant and 1,000 grain mass). The maximum increase in productivity was obtained with treatment with liquid organic fertilizer Amalgerol Essence in dose 1,000 ml.ha⁻¹ – 21.8% more compared to the control. A higher effect on productivity was found when applying the tested fertilizers in the beginning of flowering.*

Key words: chickpea, fertilization, productivity, yield structure characteristics.

**INFLUENCE OF FERTILIZATION WITH LIQUID
ORGANIC FERTILIZER ON THE PRODUCTIVITY
AND BOTANICAL COMPOSITION OF NATURAL
Agropyron repens GRASSLAND**

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Abstract

The aim of this study was to establish the influence of organic leaf fertilization on the productivity and botanical composition of natural grassland Agropyron repens type in the region of South-Central Bulgaria (305 m altitude). The experiment was carried out with leaf organic fertilizer Naturamin Plus, during the period 2018-2019. The trial was designed by the block method in 4 repetitions and 3 doses of fertilizer were tested: 1,500; 2,500 and 3,500 ml.ha⁻¹. Results obtained for the yield were statistically processed by ANOVA. The use of the Naturamin Plus in natural grassland Agropyron repens type has been found to have a positive effect on productivity regardless of weather conditions over the years. Average for the period of investigation, more green and dry mass were obtained by treatment with a dose of 2,500 ml.ha⁻¹ – respectively 31.6% and 30.7% more compared to the control. In grassland with predominant species Agropyron repens (L.) P. Beauv., the largest share is occupied by perennial cereal grasses, while legumes have a small share. Fertilization with liquid organic fertilizer Naturamin Plus increases the participation of perennial cereal and legume grasses and reduces that of weeds.

Key words: botanical composition, fertilization, natural grassland, productivity.

MISCELLANEOUS

CHITOSAN TREATMENTS IN ORGANIC VINEYARD AND THEIR IMPACT ON THE COLOUR AND SENSORY PARAMETERS OF FETEASCA NEAGRA WINES

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Abstract

Chitosan is a natural polymer approved for the treatments of organic vineyards based on its fungicide effect. Beside the protection it offers, chitosan has also the potential to modulate polyphenolic content in the black grapes, hence improving the colour of the resulted red wines. The present study on Feteasca neagra variety organically cultivated showed that there was indeed an improvement of the total polyphenolic content and colour of wines obtained from grapes treated with chitosan (5 kg/ha), as compared to the wines from grapes only subjected to the usual treatment based on Bordeaux mixture (5 kg/ha). The study included a mixed treatment, with both chitosan and Bordeaux mixture (5+5 kg/ha). The increase of total polyphenols and colour is apparent in all samples treated with chitosan, being higher when chitosan was used alone than in the case of the mixed treatment. The sensory qualities of the wines were also influenced. While the main sensory parameters of the wines were not significantly affected by the vineyard treatments, the aromatic profiles perceived sensorially showed that the floral scent decreased and the spiciness increased due to chitosan treatment, the effect being more evident in the case of chitosan used alone. These preliminary results suggest that chitosan can be useful for the modulation of the wine quality and style.

Key words: chitosan vine treatment, wine colour parameters, Feteasca neagra, wine sensory quality.

**THE INFLUENCE OF CHITOSAN TREATMENTS
IN ORGANIC FETEASCA NEAGRA VINEYARD
ON THE AROMATIC PROFILE OF WINES
EVALUATED BY ELECTRONIC NOSE**

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Abstract

The present study evaluates the differences in the aroma profile of wines, induced by the chitosan treatments of Feteasca neagra grapes organically cultivated. The treatments of the grapes included a variant only with Bordeaux mixture (5 kg/ha), as a control, a variant only with chitosan (5 kg/ha), and another variant treated with both chitosan and Bordeaux mixture (5+5 kg/ha). The aroma of the resulted wines produced by the classical maceration-fermentation technology was analysed by an electronic nose working on the principle of fast GC. Several organic volatile compounds with impact on aroma were identified and their relative quantities compared for each type of treatment. Esters (fruity scents) are the main aroma compounds found, but some other compounds more related to vegetal aroma were also present. The electronic nose clearly identified each type of wine in accordance to the treatment in the vineyard. The principal component analysis separated the wines based on their floral-fruity-vegetal notes (PC1) versus grassy notes (PC2). SIMCA analysis showed that, compared to the control samples with Bordeaux mixture, the samples from grapes treated with chitosan or chitosan and Bordeaux mixture placed closer in the space of odour and outside of the space of control wines. Thus, this preliminary study showed that chitosan treatment in vineyard induces measurable olfactory differences in the wines.

Key words: chitosan vine treatment, electronic nose, e-nose, Feteasca neagra, wine aroma profile.

CHANGES IN THE QUALITY OF FOOD DURING STORAGE AND THE MAIN DETERMINING FACTORS

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Abstract

Food products have a vital importance for consumers because providing the energy requirements and nutrients. Through their properties, these products can improve, maintain or affect human health. Storage is the most important aspect of the food supply chain that ensures food security and round-the-year quality food supply of a country. During storage, the food quality can undergo significant changes, as most food products are characterized by a relative stability over time, influenced by both internal and external structural factors, which can modify their fundamental properties, through some degradation, alteration, chemical or microbiological processes, impurification with foreign substances, etc. Storage conditions, the microclimate and hygiene of the warehouses, environmental factors, gas composition, the nature of the packaging, the nature of other products present in the warehouse, management practices etc. affect the shelf life and quality of food products to great extent. Storage in a controlled atmosphere can slow down the loss of food quality and is an important alternative to chemical preservatives and pesticides. For example, reducing the oxygen content in a warehouse slows down the degradation of stored food. Controlled atmosphere systems maintain the organoleptic characteristics of the food and reduce losses due to pathogens.

Key words: food quality, storage, chain; biochemical, microbiological.

SOME PHYSICAL AND TECHNOLOGICAL PROPERTIES OF SEEDS OF NON-TRADITIONAL PLANT SPECIES IN THE REPUBLIC OF MOLDOVA

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Abstract

*The goal of our research is to fulfil the potential of non-traditional plant species in the Republic of Moldova, of the families: Asteraceae (*Silphium perfoliatum*, *Cynara cardunculus*), Fabaceae (*Galega orientalis*, *Astragalus galegiformis*, *Medicago sativa*) and Poaceae (*Sorghum alnum*, *Festuca arundinacea*). This study presents the results of the research on the seeds characteristics of these plant species: dimensional parameters, friability, morphological structure, specific apparent weight, the weight of 1000 seeds, dosing instability and degree of seeds crushing in the respective device of the seed drill. Our research has shown that the seeds of the studied plants (except tall fescue) have high indices of dimensional uniformity and friability: angle of repose $\alpha \leq 32.5^\circ$ and flow angle on steel $\alpha_1 \leq 27.8^\circ$, on wood $\alpha_1 = 30.6^\circ$ and on enamel $\alpha_1 = 26.3^\circ$. The obtained indices of the physical properties are necessary to justify the correct choice, calculation and adjustment of the technical means of handling the seeds, and the indices of the technological properties serve as a basis for the correct choice of the seed metering devices for seed drills and the sowing parameters.*

Key words: dimensions, dosage instability, friability, non-traditional plant species, seed properties.

ESTIMATION OF MEASUREMENT UNCERTAINTY FOR POTASSIUM IN ORGANO-MINERAL FERTILIZERS

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Abstract

Along with nitrogen and phosphorus, potassium is one of the primary nutrients that provides significant yield increases when applied in amounts necessary for crop development. In order to avoid environmental pollution and to ensure the necessary content of this nutrient, it is important to know the amount of soluble potassium in the applied fertilizers. This article presents the evaluation of some parameters for estimation of measurement uncertainty for water-soluble potassium in organo-mineral fertilizers. Potassium was determined by flame-photometric method and the expanded uncertainty (U) of the method, obtained by multiplying the combined uncertainty by the coverage factor $k = 2$ (confidence level 95%) was 10.18%. The determinations were performed on a sample of organo-mineral fertilizer with a complex matrix and known composition in which the average of the determinations was 12.69% K_2O .

Key words: *measurement uncertainty, potassium, organo-mineral fertilizers, flame photometric method.*

**ENTOMOFAUNISTIC STUDY ON THE SPECIES
Silphium perfoliatum L. IN THE REPUBLIC OF MOLDOVA**

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Abstract

*This article presents the results of entomofaunistic investigations on the species *Silphium perfoliatum*, known as a fodder, honey, energy, medicinal and ornamental crop. Under the climatic conditions of the Republic of Moldova, *S. perfoliatum*, starting with the 3rd year of vegetation, enters the generative phase, blooms, bears fruit and produces viable seeds. It is characterized by a staggered and long flowering period (52-63 days) that occurs in July-October. The monitoring of the entomofauna has allowed the determination of the spectrum of insects attracted by the *S. perfoliatum* plants in the flowering stage. Ten species of insects included in 6 families and 4 orders were determined. The species of the Apidae family (*Apis mellifera*, *Bombus terrestris*, *B. lapidarius*), recognized as the main species of pollinating and honey insects, had the highest frequency on flowers.*

Key words: *Silphium perfoliatum*, development, pollinating insects.

EXPLOTATION OPPORTUNITY FOR WOODEN MASS BY MULTIFUNCTIONAL MACHINERY

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Abstract

The aim of this paper was to highlight the economic and productive efficiency of the use of modern woodworking machine systems, as well as the motivation for the extension of these systems, compared to classical systems. In order to achieve these desideratums, an object of study was chosen, an exploitation parquet within the activity was made the design of the works of exploitation of the wood mass, using the proposed system. The use of Harvester and Forwarder multifunctional machines, in addition to the opportunity to make definitive assortments in the exploitation floor and a clear record of the resulting quantity, considerably reduces the damages caused to the existing natural regenerations and avoids the destruction of the exploitation roads and the damage exploitation.

Key words: *economic efficiency, modern machines, harvester, forwarder, operating technology.*

**THE PROSPECTS OF CULTIVATION
AND USE OF THE SPECIES PEARL MILLET,
Pennisetum glaucum, IN MOLDOVA**

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Abstract

*The goal of this research was to evaluate the quality of phytomass of the non-native species pearl millet, *Pennisetum glaucum*, cultivated in the experimental plot of the National Botanical Garden (Institute), Chișinău, Republic of Moldova. It has been found that the green mass contained 116 g/kg CP, 361 g/kg CF, 370 g/kg ADF, 606 g/kg NDF, 33 g/kg ADL, 166 g/kg TSS, 236 g/kg HC, 337 g/kg Cel, with 9.75 MJ/kg ME and 5.58 MJ/kg NEL, the prepared silage was characterized by pleasant smell, pH = 3.78, 18.0 g/kg DM lactic acid and 1.8 g/kg DM acetic acid. The pearl millet grain contained 132.8 g/kg CP, 58.5 g/kg EE, 21 g/kg CF, 764.1 g/kg NFE, 304.6 g/kg starch, 10.9 g/kg ash, 0.6 g/kg Ca, 0.7 g/kg P, 1.09 nutritive units and 11.78 MJ/kg ME, but pearl millet straw 57 g/kg CP, 487 g/kg CF, 530 g/kg ADF, 823 g/kg NDF, 74 g/kg ADL, 293 g/kg HC, 456 g/kg Cel, with 7.92 MJ/kg ME and 3.95 MJ/kg NEL. The pearl millet substrates for anaerobic digestion have C/N= 26-54 with biochemical methane potential 282-375 l/kg. The theoretical ethanol potential from structural carbohydrates of the pearl millet straw averaged 544.4l/t, Pearl millet, *Pennisetum glaucum*, can be used in many ways: as multi-purpose feed for livestock and as feedstock in the production of renewable energy.*

Key words: biochemical composition, energy biomass, forage value, pearl millet *Pennisetum glaucum*, phytomass.

WHICH WOODY SPECIES SHOULD BE USED FOR AFFORESTATION OF HOUSEHOLD DUMPS CONSISTING OF DEMOLITION MATERIALS MIXED WITH ORGANIC MATERIALS?

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Abstract

Romania has a great tradition in afforestation of diverse categories of lands, including the degraded terrains. Afforestation projects are made in accordance with the technical norms approved by normative acts. In the last two decades, even if there were hundreds of afforestation projects, the forested area didn't increase significantly. This was mainly due to the fact that the targeted areas were small and due to the very bureaucratic process. In the perspective of upcoming funds from the European Union, through the dedicated component of the Romanian Recovery and Resilience Plan, it is expected that an area of 56.700 hectares of diverse lands, other than the ones already included in the national forest fund, would be forested until 2026. In this perspective, several reforms and investments are planned. Among them, a greater flexibility of the normative acts is envisaged, especially for lands situated outside the forest fund. In this context, the present paper analyzed the proposals contained in the afforestation technical norms corresponding to group no. 121, by introducing additional criteria. In AHP, three scenarios were considered. Out of the six species recommended by the technical norms, Tree of Heaven and black locust proved to be the most preferred species for afforestation of household dumps consisting of demolition materials mixed with organic materials.

Key words: AHP, black locust, household dump, Tree of Heaven, woody species.

DETERMINING THE SEEDS SOWN PER REVOLUTION OF THE SOWING APPARATUS

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Abstract

Increasingly, work is being done to replace the mechanical gearbox for driving the shaft of seed drills with electric ones. To achieve this, it is necessary to determine the transfer function of the drive system. A stage in its definition is to determine the quantity and volume of seeds sown per revolution of the sowing apparatus. In the present study, a tooth (pin) sowing apparatus was used for sowing wheat with a Saxonia A200 seeder. The seed density is 825 kg.m^{-3} . It was found that for 1 revolution of the sowing apparatus 29,77 g of seed were sown, and their volume was $0,0000360646 \text{ m}^3$.

Key words: sowing apparatus, seeds sown.

“OPEN INNOVATION ECOSYSTEM 2.0” DIGITAL PLATFORM FOR AGRICULTURE, FORESTRY AND FOOD INDUSTRY

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Abstract

The paper presents an “OPEN INNOVATION 2.0” digital platform that allows multilateral interaction between independent parties. The platform is based on a web portal and offers information, collaboration and communication resources and services for organizations and users who can work together and create value based on innovation. It facilitates transactions between customers and companies. The business environment, research institutions, civil society and public administration - Quadruple Helix model can work together in dynamic and diverse innovation ecosystems online through this platform. The digital platform contains specific instruments: innovative instrument for trading the demand and supply of RDI in the field of agriculture, forestry, food industry and related fields (databases with research results, patents and section dedicated to communication and discussions on topics specific to the trading of supply and demand of RDI; databases with entities involved in open innovation and technology transfer: Universities, Clusters, Stakeholders; open discussion forum to address new topics specific to innovation and technology transfer; e-learning section in the field of open innovation, agriculture, forestry and food industry, as well as related fields; events section, newsletter etc.

Key words: *Open innovation ecosystem, digital platform, innovative instruments.*

**DEVICE WITH CHISEL-TYPE WORKING PARTS
FOR MEASURING THE TENSION STRENGTH
INDEPENDENTLY ON EACH WORKING PART
OR VARIOUS GROUPS OF WORKING PARTS**

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Abstract

The paper presents a device with chisel-type working parts for measuring the tensile strength independently on each working parts or on various groups of working parts, equipped with devices designed for separate measurement, intended for complex research of agricultural machinery in interaction with the soil. The proposed solution is new and is based on flexibility and allows the mounting of various working parts in various positions. The functional model developed with elements of novelty and innovation led to the elaboration of a patent application, which refers to a load-bearing structure modulated with multiple applications for tillage machines, on which active parts are mounted in different working variants, in order to extension of the period of use, depending on the size of the agricultural exploitations and the power of the tractor. The modular design of the device will allow the development of a range of flexible cultivators that can be configured to in order to use power sources (tractors) from 30 hp to 90 hp, allowing the manufacturer to expand its market.

Key words: *device, working parts, chisel, load-bearing structure, tensile strength measurement.*

***Datura wrightii* Regel. INVASIVE PLANT IN OLTENIA, ROMANIA**

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Abstract

The heavy anthropic activity has as a result the invasion of allochtones in the natural damaged ecosystems from Romania and the whole Europe. This fact has a negative impact over the genuine evolution and development of natural biocenosis. Invasive species are the real main threats for the agro-biodiversity. Datura is a genus of nine species of poisonous vespertine flowering plants belonging to the family Solanaceae. All species of Datura are poisonous, especially their seeds and flowers. Datura wrightii is an invasive species whose range has expanded greatly in recent years in Romania. According to studies in our country, the species Datura wrightii was identified for the first time in Romania from the Galati County – Foltești, Tg. Bujor, Umbrarești. This species has an aggressive character on biodiversity and we found it in ruderal areas, garbage storage on land, vacant lots, edges of the road. The species has an important anthropogenic impact on herbaceous and woody plant communities and therefore on some types of community interest habitats. D. wrightii has also been used to induce hallucination for recreational purposes. Ingestion of plant material can induce auditory and visual hallucinations similar to those of Datura stramonium.

Key words: *Datura wrightii*, invasive species, ecology, corology, plant communities.

THE VEGETATION CHARACTERISTICS OF A POLLUTED SMALL RIVER (GLAVACIOC RIVER) FROM ROMANIAN PLAIN

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Abstract

Glavacioc River crosses many rural areas in southern Romania. The soil and groundwater in the neighboring area of the Glavacioc River are mainly polluted by nitrates from agriculture (excessive fertilization with mineral nitrogen fertilizers), husbandry (mismanagement of manure) and/or human waste. Based on previous research regarding soil and water chemical content, our aim was to identify the plant species that could survive in the vicinity of Glavacioc River. Knowing the concentration of chemical content in some localities, we inventoried the plant species from the water and from the river banks. We can argue that the vegetation changes from up to down river, most nitrophilous and ruderal species (diversity and abundance) growing down river. The highest impact on plant species distribution and abundance is given by clear cutting the woody vegetation growing natural on the river banks (riparian). Any management practices should include re-vegetation of river banks with the natural woody vegetation that have a very important role in diminishing the entrance of pollutants in the water and maintaining most of the herbaceous natural vegetation.

Key words: *Glavacioc River, Romanian Plain, vegetation characteristics.*

BIODYNAMIC AGRICULTURE AN ALTERNATIVE TO CONVENTIONAL AGRI-CULTURE: A CASE STUDY OF TRANSILVANYA AREA, ROMANIA

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Abstract

The delimitation of the research topic has as a starting point the problematic situation represented by the unfavorable effects on the environment and food safety caused by chemical agriculture. Biodynamic agriculture, through its peculiarities, represents an alternative for farmers concerned about environmental health and obtained products. The elaboration of a questionnaire and its application on a sample of 95 farmers from the Transylvanian Plain and Plateau, Romania has consisted an important support for revealing their perception on biodynamic agriculture. Our research results allow us to conclude, at least in this phase, that biodynamic agriculture, although little known among farmers, can help protect biodiversity and the environment, and biodynamic farms can be profitable due to the increased interest of consumers for healthy products

Key words: *biodynamic agriculture, sustainability, farmers' opinion, yield, profitability.*

METHODS USED FOR ECOTOXICITY ASSESSMENT OF POLYMERIC PACKAGING MATERIALS

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Abstract

In recent years, the growing demand and use of polymeric materials resulted in a great waste disposal problem at a global level. Furthermore, polymeric materials can cause serious damage to the environment due to the fact that they are not biodegradable and persist in the environment for hundreds of years. In order to minimize the environmental impact, researchers developed various formulations of polymeric materials that can be obtained from natural resources and present properties such as biodegradability and biocompatibility, as substitutes to the traditional polymers. In addition to biodegradation tests, in order to determine their effect on the environment, ecotoxicity tests have been used. The aim of this study is to present various methods for polymeric materials ecotoxicity determination.

Key words: *aquatic ecotoxicity, soil/compost ecotoxicity, polymeric materials.*

IN VITRO PROPAGATION OF SWEET POTATO VARIETIES USING AXIAL SHOOTS AS A SOURCE OF EXPLANTS AND THEIR ANALYSIS BY COMPARING SOME GROWTH PARAMETERS

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Abstract

In order to obtain the shoots in laboratory conditions, it was necessary to prepare the sweet potato tubers and plant them, ensuring favorable conditions of temperature, light and humidity. Axial shoots from sweet potato varieties: KSP1, DK 19/1, DK 19/2, DCh 19/3, DK 19/4 and DK 19/5 were used as a source of explants for the initiation of in vitro culture. Through a single factor experiment in three repetitions, the analyzed factor was the sweet potato variety, with 6 graduations, and as a control the average values for the studied elements were established. Determinations were made on the following parameters: the formation of shoots, the number of leaves, the height of the plantlets and the weight of the fresh root. The results presented in this study highlight the possibility of obtaining sweet potato shoots and in laboratory conditions, throughout the year, with minimal costs. allowing in vitro cultivation technique to obtain in a short time a stock of healthy starting material, which can be used as planting material.

Key words: *sweet potato shoots, in vitro, plantlets.*

**MACROMYCETES RECORDED IN THE CAMPUS
OF THE UNIVERSITY OF AGRONOMIC SCIENCES
AND VETERINARY MEDICINE OF BUCHAREST:
PRELIMINARY DATA**

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Abstract

Basic components in the stability of natural ecosystems, with an an important role in nature conservation, macromycetes are indicators of different substrates and specific habitats. In this preliminary survey, some of the macroscopic fungi (Basidiomycota: Agaricomycetes) collected from “Agronomie-Herăstrău” campus of the University of Agronomic Sciences and Veterinary Medicine of Bucharest were morphological described, in terms of cap (pileus), gills (lamellae), stipe (stem), ring (annulus) and spores. Also, some aspects concerning edibility were discussed. The following species were subjected to the research: Coprinellus micaceus, Agaricus arvensis, Macrolepiota excoriata, Hypholoma fasciculare, Scleroderma citrinum, Xerocomellus porosporus and Marasmius oreades.

Key words: macrofungi, mushroom, morphology, spores, edible, Bucharest.

QUANTITATIVE AND QUALITATIVE DIFFERENCES IN OAT PRODUCTION (*Avena sativa* L.) GENERATED BY THE TYPE OF COMPOST USED AS FERTILIZER

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Abstract

*Interest in composting biodegradable organic waste has grown significantly in recent years in Romania. An important role in stimulating this interest was played by the integration in the European Union (EU) and the acquisition of the European legislation on waste management but also the pressure of the civil society to improve the environment quality. Thus, more and more composting centers appeared and a composting law was adopted. Of great interest is the composting of the organic fraction of municipal solid waste (FODMS). However, composts can present certain risks (heavy metals and even pathogens) coming from raw materials or by the way the composting process is conducted. Therefore, a rigorous approach to compost quality is needed in relation to specific standards, especially when they are to be used as amendments to agricultural soils. This paper presents results obtained in a study in which there were compared the effects of five composts on a test plant, oat (*Avena sativa* L.), in order to evaluate the impact of the waste collection method and the composting method on their quality.*

Key words: *compost quality, heavy metals, composting method, source separate collection.*

***Asclepias syriaca* A NEW SEGETAL SPECIES IN ROMANIA**

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Abstract

The purpose of this study was to report the presence of Asclepias syriaca in agroecosystems in Romania. The species Asclepias syriaca L. is part of the Apocynaceae or Asclepiadaceae family, since 2018, it has been observed in corn culture, in western part of Romania. The study was conducted in 2019-2021, in eight counties (Alba, Arad, Caraş-Severin, Mureş, Sibiu, Satu-Mare, Sibiu, Timiş) in May-August. The species Asclepias syriaca was present in seven counties (Alba, Arad, Mureş, Sibiu, Satu - Mare, Sibiu, Timiş), both in the plain areas (77 m altitude) and in the hills area (412 m altitude). The study carried out in Romania showed that the species is present in the agroecosystems of: corn, alfalfa, sunflower, wheat, soybean. Up to date, there are no studies in Europe that indicate the presence of Asclepias syriaca in the sunflower agroecosystem. We consider that this species, which is classified by EPPO as an invasive species for Europe, will become a weed problem for Romanian crops, due to its strong competitive capacity, due to the rhizomatic root system and the plant's property to produce allelopathic substances.

Key words: *Asclepias syriaca, reporting, crop, area.*

EFFECTS OF COMPOST ON PLANT AND SOIL: STUDY CASE IN SUCCESSIVE CROPS

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Abstract

*Composting is a biotechnology that can turn waste into a product (compost). It can help to improve the condition of waste materials and thus increase the sustainability of the bioeconomy. The collection of household waste without source separation can affect the quality of the compost. This paper will present the results obtained in a study that involved three composts obtained from biodegradable waste. Two of these were obtained from the organic fraction of municipal solid waste (FODMS) collected together and separated within the integrated waste management center, and the third one resulted from biodegradable household waste, separated at source. Soil and compost mixtures were made of 25%, 50% and 75% compost. A 100% soil control was used for comparison. The study was conducted in a greenhouse, in pots. Two successive crops were grown: the first one was lettuce (*Lactuca sativa* L.) and the second one, after lettuce, was radish (*Raphanus sativus* L.). The effects of compost on plants growth and development, their production and chemical composition, as well as the effects on soil were analyzed.*

Key words: *compost, circular economy, plant production, chemical composition, soil properties.*

OBTAINING POTATO MICROTUBERS UNDER THE INFLUENCE OF OSMOTIC AGENTS IN DIFFERENT CONCENTRATIONS

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Abstract

In order to investigate the effect of osmotic agents on the induction of microtubers, a study was carried out in the Laboratory of Vegetable Tissue Cultures of NIRDPSB Braşov. Bifactorial experience included the following factors: experimental factor A, variety, with three graduations: a1 - Marvis; a2 - Castrum; a3 - Ervant (as a control, the average of the values obtained for the three varieties was taken into account) and experimental factor B, microtuberization medium (with 4 graduations): b1 - classical microtuberization medium without osmotic agent (control medium); b2 - microtuberization medium with mannitol; b3 - microtuberization medium with sorbitol; b4 - microtuberization medium with PEG. The determinations were made for number of microtuber/plantlets and weight of microtubers/plantlets, in function of experimental factors. Compared to the control medium, osmotic agents added to nutritive medium had a positive effect on studied parameters. Therefore, osmotic agents in low concentrations can be introduced as a stimulator of microtuberization.

Key words: potato, genotype, osmotic agents, microtubers.

INFLUENCE OF OPERATING TEMPERATURE AND FUEL CONSUMPTION ON ADBLUE® CONSUMPTION DURING SOWING OF SILAGE CORN

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Abstract

The study is based on a Polish experiment (2021) in the territory of the Plovdiv region in the central part of the Republic of Bulgaria. The study was conducted with a nine-meter precision seed drill, aggregated to a 302 kW tractor when sowing silage corn. Using the service diagnostic program, graphic dependences describing the consumption of AdBlue® in relation to the operating temperature and the consumed diesel fuel have been extracted. Factors influencing AdBlue® consumption were monitored: operating temperature, diesel quality, and tractor engine load. It has been found that any drop in temperature, whether influenced by external factors or by the tractor engine, appears to be a determining factor for AdBlue® dosing. The consumption of AdBlue® for 8 hours of working change of the machine-tractor unit was monitored and it was found that the consumed amount of liquid reagent is 37.5% of the entire tank and the consumption of diesel fuel is 68.75%.

Key words: sowing unit, silage corn sowing, service diagnostic program, fuel consumption, AdBlue® consumption.

THE MAIN FUNGAL DISEASES IN STRAWBERRIES CROP - REVIEW

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Abstract

Strawberry cultivation is one of the most important fruit crops in the world from a commercial point of view, but it is constantly threatened by fungal pathogens, which cause significant economic losses. The decline of strawberry plants is also seen as a severe threat to strawberry production in Romania. Due to recent restrictions on pesticide use and the lack of effective and efficient alternatives, achieving consistently high yields has become difficult. The most important diseases that cause significant economic losses are: Botrytis cinerea, Phytophthora cactorum, Colletotrichum fragariae. They affect all parts of the plant: flowers, fruits, leaves and roots causing significant annual losses: 40% for Phytophthora cactorum attack, 50% for Colletotrichum fragariae and up to 80% for Botrytis cinerea attack. This review provides an overview of the latest studies on the main fungal pathogens, the measures and control strategies currently available, the risk factors influencing the development of pathogens and what strategies we can address to limit the economic losses of the strawberry crop.

Key words: strawberries, pathogens, control, strategies.

**FIRST RESULTS REGARDING RELATION
BETWEEN GIBBERELLINS AND OTHER GROWTH
HORMONES IN MICROPROPAGATION PROTOCOLS
OF TWO ECONOMICALLY IMPORTANT SPECIES:**

Solanum tuberosum* and *Ipomoea batatas

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Abstract

Potato is the world's most important non-cereal food crop, one of the major sources for humankind food. Conventional propagation asexual by tubers, can disseminate pathogens to new cultivation areas which can threatens the maintenance of genotypes of these specie. Ipomoea batatas as well, is a hard climate conditions plant, with a major role in food worldwide battle and have similar response to viruses or diseases In this work we analyzed varieties of Ipomoea batatas, 'Ro-Ch-M', 'KSH' and 'KSP1', two varieties of Solanum tuberosum L. with purple flesh, 'Violet Queen' and 'Purple Majesty'. The study compare the influences of gibberellic acid GA3, along with another two hormones, cytokinins (6-benzylaminopurine BAP), and α -naphthaleneacetic acid (NAA), the culture duration and response to tuberization of those varieties. Optimal proliferation was observed when shoots were cultured on MS medium that was supplemented with 1.5 mg/L GA3 and a variation of another two hormones. In this medium, the greatest number of shoots (4.1) and total number of nodes (12.2) per explant were observed.

Key words: auxins, cytokinins, gibberellins, *Ipomoea batatas*, micropropagation, *Solanum tuberosum*.

INTERCROPPING - AN OPPORTUNITY FOR SUSTAINABLE FARMING SYSTEMS. A REVIEW

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Abstract

As population expansion, urbanization, environmental pollution, and climate change, the global food crisis is currently aggravated in the world. One strategy for coping with the effects of climate change in arid regions is intercropping. The purpose of this paper is to review the main types of intercropping- Row intercropping, Mixed intercropping, Strip intercropping, Relay intercropping and present their advantages. Intercropping is as a multiple cropping system, in which two or more crops species planted simultaneously in a field during a growing season. An example of sustainable farming systems is intercropping, which creates balance with the environment, contributes to better use of resources, and reduces damage from diseases and pests. Potential advantages of this practice include higher crop yields- due to extra sunlight that taller crops receive on their borders. Intercropping enables plants to efficiently utilize plant growth resources like water, nutrients, sun light; to improve soil erosion control. Intercropping patterns are more effective than monocropping in suppression of weeds, but their effectiveness varies greatly. Intercropping is ways to increase diversity in an agricultural ecosystem.

Key words: agroecosystem; intercropping; sustainable agriculture.

GEOINFORMATION ANALYSIS OF THE CURRENT STATE OF THE PROTECTIVE FOREST BELT ON THE TERRITORY OF THE VOLGA UPLAND

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Abstract

The state protective forest belt Penza-Kamensk is an important component of the ecological framework of the territory, where it is included in the system of protective forest plantations and contributes to the transformation of the steppe agricultural landscape into an agroforest landscape. The purpose of the research was an inventory and assessment of the state of forest protective plantations in order to preserve and restore the agroforest reclamation fund. In office conditions, up-to-date cartographic material was created on the basis of satellite images of high and ultra-high resolution, visual interpretation was carried out with the compilation of a vector polygonal layer of the current location of protective forest plantations, the number of decoded objects was determined. Visual interpretation of space images made it possible to identify disturbed areas of forest belts, in which the sparseness (fragmentation) of the forest stand is noted. At present, forest stands of pedunculate oak (62.0% of the forested area) dominate in the plantations of the forest belt in terms of species composition, the second place is occupied by birch (22%), pine, larch and spruce by 12%, willow - 2%, aspen and ash - by 1 %. Artificial plantations in most of the area have an average density of 0.7-0.8, which indicates a qualitative selection of the main forest-forming species in relation to soil conditions, on the one hand, on the other hand, the correct choice of the type of crops and the required planting density, taking into account the survival rate and preservation of plants at all stages of forest growing. Preservation of plantings is high, fluctuating within 75-85%. In general, the state of plantings is satisfactory.

Key words: *inventory, protective forest plantations, planting safety.*

**DETERMINING OF THE PARAMETERS
FOR MOVEMENT ON A VACUUM SOWING
APPARATUS OF SEEDER SECTION
FOR PNEUMATIC PRECISION SEED DRILL**

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Abstract

The parameters necessary for driving the working bodies from the sowing section of the precision seed drill are substantiated. With these machines, the seeder disc is mechanically driven. The seeds are retained in its holes on seed disk by the force created by the vacuum. The stepless mechanical drive allows for the realization of different sowing rates (pieces of seeds per decare). The force required to hold the seed to the sowing disc varies to some extent due to differences in weight. In the present work are researched and determined the power for driving the sowing disc and the pneumatic units for creating a vacuum. The obtained results were used to determine the elements of a device for mechatronic control of the operation on a seed section from a precision seed drill.

Key words: *pneumatic seed drill, power, vacuum, corn.*



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