University of Agronomic Sciences
and Veterinary Medicine of Bucharest

Faculty of Horticulture

International Conference

"Agriculture for Life, Life for Agriculture"

BOOK OF ABSTRACTS

Section 2

HORTICULTURE

2026
Bucharest

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SUMMARY

FRUIT GROWING

VITICULTURE AND OENOLOGY

VEGETABLE GROWING

FLORICULTURE, ORNAMENTAL PLANTS, DESIGN AND LANDSCAPE ARCHITECTURE

MISCELLANEOUS

FRUIT GROWING

SENSORY CHARACTERIZATION OF FERMENTED BEVERAGES PRODUCED FROM WHITE GRAPE MUST ENRICHED WITH CRUSHED ARONIA FRUIT

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Abstract

*Aronia (Aronia melanocarpa, black chokeberry) is characterized by a very high polyphenolic content and relatively low concentrations of fermentable sugars, which limit its direct consumption and fermentation. However, the high levels of proanthocyanidins and anthocyanins make aronia attractive for the development of functional foods. One potential application is the production of grape must–based fermented beverages by enriching white grape must with crushed aronia fruit. In this study, three experimental fermented beverages were produced by adding crushed aronia at levels of 20%, 40%, and 60% (w/w) to white grape must from the Feteasc*ă *regal*ă *variety and fermenting with Saccharomyces cerevisiae Lalvin EC-1118. An additional 60% aronia variant was fermented using S. cerevisiae Zymaflore XPure. The objective was to assess the sensory quality and acceptability of these aronia-enriched beverages. Sensory evaluation was conducted by students using a laboratory-developed quantitative profile method and the OIV score sheet. Data were analyzed using ANOVA, PCA, and cluster analysis. Although none of the samples reached high-quality wine scores, beverages containing 60% aronia showed the highest overall acceptability, irrespective of yeast strain, supporting their potential for further development.*

Key words*: Wine, aronia, black chokeberry, beverage, sensory analysis, acceptability.*

EVALUATION OF INTRODUCED PROTANDROUS WALNUT VARIETIES IN THE CENTRAL POMOLOGICAL ZONE OF THE REPUBLIC OF MOLDOVA

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Abstract

This study evaluates the agronomical and pomological performance of introduced protandrous walnut varieties (Franquette, Fernor, Ferjean, and Lara) compared with local varieties (Cazacu, Pescianskii, Chișinău, and Costiujenskii) under the pedo-climatic conditions of the Central Pomological Zone of the Republic of Moldova. The experimental orchard was established in 2018 with a planting scheme of 10 m × 10 m. The results indicate a comparatively late blooming period for pistillate flowers, moderate to high fertility on lateral branches, strong resistance to late spring frosts, and low susceptibility to major diseases. Analysis of male and female flowering overlaps demonstrates high pollination compatibility between the introduced protandrous varieties and the local cultivars. Preliminary economic analysis showed significantly higher profitability (rentability) for Fernor (248%) and Franquette (143%) compared to the local protogynous variety Cazacu (120%). These findings emphasize the excellent adaptability and commercial potential of the studied French varieties for industrial cultivation in Central Moldova.

Key words*: walnut, varieties, pedo-climatic conditions, Republic of Moldova, profitability.*

OPTIMIZATION OF CROWN GEOMETRY PARAMETERS IN HIGH-DENSITY ORCHARDS

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Abstract

This paper aims to optimize orchard systems by correlating planting distances with crown architecture and natural resources in order to identify the optimal balance between planting density and crown geometry parameters in terms of sustainability and superior fruit quality. The research was conducted between 2013 and 2024 in the southern, central, and northern regions of the country. Ten apple varieties grafted onto M9 and M26 rootstocks and planted at varying distances (from 3.2 x 0,8 m to 4.0 x 2 m) were evaluated. The crown shapes studied included Improved slender spindle, Improved natural crown with reduced volume, Delayed flattened vase, and the KGB system. The H/L ratio (height/width between rows) between 0.71 and 0.84 maximizes the productive volume. It is essential to maintain a strict conical shape to prevent shading of the base. The width of the fruiting wall (G) has a linear impact on production; an extension of only 20 cm generates a 25% increase in the productive volume. Short models (L < 3 m) have a clear physiological advantage, ensuring uniform radiation distribution and eliminating internal shade areas. To ensure the longevity of the lower fruit branches, it is recommended to maintain the H/L ratio below 0.8. In the case of mechanized systems, a distance of 3.14 m represents the ideal compromise between machine accessibility and the productive potential of the orchard.

Key words*: Malus domestica, crown geometry, shaping, photosynthetic efficiency, productive volume.*

STUDY ON CULTIVATION SYSTEMS AND THE ESTABLISHMENT OF HIGH-YIELD CHERRY PLANTATIONS

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Abstract

The study aimed to analyze the interaction between cultivation systems, planting distances, and crown shapes, in correlation with pedoclimatic factors and agricultural techniques. The research was conducted between 2013 and 2024, covering the southern, central, and northern fruit-growing areas of the country. The evaluation included various combinations of rootstock varieties and planting densities: Classic systems: Record and Valerii Cikalov varieties grafted onto Mahaleb rootstock (6x5 m). Intensive and super-intensive systems: A range of 16 varieties grafted onto Gisela 6 rootstocks (spacing between 5x1.5 m and 4x1 m) and Maxima 14 rootstocks (5x3 m). Crown shapes: structures such as Tiered Pyramid, Bowl, UFO, Thin Spindle, TSA, KGB, and Drapeau Marchand were tested. The research identified the optimal configuration for achieving a production potential of 71.7%, based on the following geometric parameters: Distance between rows (L): 4.0 m. Crown height (H): 2.9 m. Angle of inclination (α): 12° (relative to latitude 47°). The rational use of soil in orchards is determined by the way the trees are placed on the land and by the crown formation systems.

Key words*: cherry tree, variety, rootstock, planting distance, crown shape.*

FRUITING CHARACTERISTICS OF APPLE TREES IN INTENSIVE ORCHARDS AS INFLUENCED BY THE TRAINING AND PRUNING SYSTEM

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Abstract

The study, conducted between 2015 and 2023, evaluated the fruiting of apple trees according to the training system and pruning technology. The intensive plantation (3900 trees/ha), established with the varieties Granny Smith, Gala Buckeye Simmons, Red Velox, Golden Delicious Reinders, and Fuji Kiku on M9 rootstock, was managed on a monoplane trellis with drip irrigation. The research followed the impact of light distribution, branch insertion angle, and fruit wood renewal on productivity. The results demonstrate that maintaining an optimal ratio between 1-3-year-old branches, their inclination below the horizontal, and regeneration pruning stimulates early and constant fruiting. Although M9 rootstock ensures early fruiting, it requires rigorous control of the vegetative-generative balance. The implementation of modern training systems and specific pruning optimizes the productive potential of the studied varieties, guaranteeing high and quality yields in the pedoclimatic conditions of the central Republic of Moldova.

Key words*: Malus domestica, fruiting, rootstock, cuttings, light, harvest.*

THE EFFECT OF CULTIVATION SYSTEM ON THE GROWTH AND YIELD OF 'VERSAILLES' RASPBERRY

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Abstract

The cultivation system plays a key role in determining vegetative growth and fruit yield in raspberry crops. This study aimed to evaluate the effect of different cultivation systems (in-ground and container cultivation) on growth, productivity, and fruit quality of the 'Versailles' raspberry cultivar. Several vegetative and generative parameters were analyzed, including the number of root suckers, their length, leaf area, number of fruits per cane, fruit size characteristics (weight, length, diameter, shape index, size index, number of drupelets per fruit) as well as biochemical traits such as dry matter content, water content, total soluble solids, total sugars, titratable acidity, and pH. The results demonstrated that the cultivation system significantly influenced both plant growth and yield components; however, in-ground cultivation led to superior plant growth and yield compared with potted plants. Overall, the findings highlight the importance of selecting appropriate cultivation systems to maximize yield and improve fruit quality in 'Versailles' raspberry production.

Key words*: Rubus idaeus, in-ground, container, root restriction, fruit quality.*

REALTIMEFRUIT: AN INTEGRATED AI- AND IoT-BASED SYSTEM FOR REAL-TIME PHENOLOGICAL MONITORING AND GROWTH-STAGE FORECASTING IN EXPERIMENTAL FRUIT ORCHARDS AT USAMV BUCHAREST

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Abstract

Accurate, real-time monitoring of fruit tree phenological development is essential for modern orchard management in the digital ecosystem. Conventional manual observation is labor-intensive and limited. This study presents RealTimeFruit, an integrated AI- and IoT-based system developed at USAMV Bucharest for automated phenological monitoring and growth-stage forecasting in experimental orchards of apple, pear, peach, nectarine, apricot, paw-paw, and jujube. The system combines multiple RGB cameras transmitting daily field images, a Pessl iMetos 3.3 weather station providing high-frequency micro-climatic data, automated AI-based BBCH classification of selected daily images using Anthropic Claude models (Opus 4.7, Sonnet 4.5, and Haiku), and phenological prediction based on Dynamic Model Chilling Portions, Chilling Hours, and Growing Degree Hours. All components are integrated into an operational web dashboard that displays parallel manual and camera-derived BBCH stages. The dashboard supports multi-year datasets (2023-2026) and historical-curve-based forecasting of upcoming stages. Future developments include the integration of fertilization and plant protection modules, cultural practices (pruning, fruit thinning), and water management.

Key words: *phenology, BBCH classification, artificial intelligence, chilling portions, growing degree hours, orchard monitoring.*

EVALUATION OF AGRONOMIC PERFORMANCE OF ARONIA SHRUBS UNDER THE IMPACT OF DIGITAL TECHNOLOGY INTEGRATION IN BISTRITA AREA

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Abstract

This study evaluates the integration of digital technologies and their direct impact on the agronomic performance of Aronia shrubs, a crop increasingly valued for its nutraceutical properties. The real-time data analytics facilitated the early detection of hydric stress, preventing productivity losses common in conventional management, while maintaining an optimal fruit nutritional composition. The management of technological factors not only improves the physiological vigour of Aronia plants, but also ensures their economic sustainability within the plantation. This optimization highlights a significant improvement in resource-use efficiency, crucial for adapting to climate variability. By quantifying the correlation between sensor-derived metrics and agronomic performance, the study validates digital tools as essential for risk mitigation. This research provides a model for transitioning from traditional aronia berry cultivation to a data-driven, high-performance horticultural system, offering a framework for producers aiming to maximize both environmental responsibility and commercial profitability in modern berry crops.

Key words*: Aronia melanocarpa, precision agriculture, IoT sensors, agronomic yield, digital workflows.*

INSIGHT THE WALNUT ORCHARD: EVOLUTION AND PERFORMANCE OF 'FERNOR' VARIETY

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Abstract

Walnut has become, in the last decades, a precious investment due to its high-valueproduction and market demand. In 2012, a new intensive orchard was established in Sahateni, within Buzau County. The trees were planted in an 8 x 4m scheme, with a density of 313 trees/ha. A smart fertilization programme was applied, differentiated into three blocks as experimental variants. The goal of the present research was to evaluate, under these conditions, the evolution and performance of the 'Fenor' variety in terms of vigour assessed by tree height, trunk cross-sectionalarea, crown volume, annual growths, and production per tree and per ha. We found that the year and fertilizers influenced and revised the biometric parameters and yield.

Key words*: Walnut, intensive orchard, planting density, fertilization strategies, Fenor cultivar, tree vigour, biometric parameters, yield, productivity, experimental variants, Romania, Sahateni, Buzau County.*

THE INFLUENCE OF SOME NOVEL FERTILIZERS UPON THE SOIL MICROBIOME WITHIN A WALNUT ORCHARD

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Abstract

Currently, the management of modern fruit tree plantations targets sustainability and resilience as key practices for obtaining clean,higher production. In a walnut orchard of 60 ha situated in the South-Eastern part of Romania, in Sahateni, Buzau County, novel fertilizers were applied starting in 2023, having in mind the aim of improving soil health along with overall production potential of fruit trees. The variants consist of five products with two application rates: ROOTS (4 l/ha and 8 l/ha), COUNTRY 600 (12 l/ ha and 24 l/ha), TERRA CLEAN (4 l/ha and 8 l/ha), N-BACTER (4 l/ha and 8 l/ha), P-FIX (4 l/ha and 8 l/ha) and a control plot with no application. After two consecutive years of application, the composition of the soil microbiome analysed at two depths (0-30 cm and 30-60 cm) showed a small variation in terms of the types of fungal and bacterial species and the numbers/g of dry soil.

Key words*: Walnut orchard, sustainable management, soil health, novel fertilizers, soil microbiome, bacterial diversity, fungal diversity, application rates, experimental variants, soil depth, productivity potential, Romania, Sahateni, Buzau County.*

MORPHOMETRIC CHARACTERISTICS AND VALORIZATION OF *PRUNUS DOMESTICA* L. STONES

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Abstract

European plum (Prunus domestica L.) is one of the most important fruit species in the Balkan Peninsula, where it is predominantly used for fruit brandy production. Destoning during processing generates large quantities of stones and seeds that are mostly discarded as waste. This study aimed to evaluate the morphometric characteristics of plum stones and seeds of four cultivars ('Čačanska Lepotica', 'Stanley', 'Empress', and 'Požegača') to assess varietal differences relevant for further processing. For valorisation studies, seeds were subjected to cold-press oil extraction to determine the fatty acid composition and oxidative stability of the obtained oils. Oleic acid was the dominant fatty acid in plum seed oil, reaching 72.49% in Stanley and 58.55% in Empress, followed by linoleic acid. Oxidative stability ranged from 35.17 (Empress) to 73.51 h (Stanley), indicating high oil stability. Oil cakes were further evaluated for techno-functional properties and for their potential as a source of bioactive compounds using eutectic solvent-based extraction. These results highlight plum stones as a valuable raw material for sustainable processing.

Key words*: plum stones, seed, seed oil, oil cake.*

INFLUENCE OF TEMPERATURE DURING THE SCIONS GROWTH ON THE PERCENTAGE OF GRAFT TAKE SUCCESS IN WALNUT PROPAGATION

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Abstract

The experiment was conducted at the Fruit Growing Institute-Plovdiv during the period 2022-2025. The local walnut cultivar Izvor 10 was used, grafted onto a rootstock (Juglans regia L.). Scions were collected during winter dormancy, immediately before grafting. The percentage of graft take success was evaluated under two propagation methods: Variant I - plants propagated in a stratification room and Variant II - plants propagated in a heated tunnel with a water-based nutritional solution. Average monthly and maximal outdoor temperatures for the experimental region were recorded for the entire observation period. Statistical analysis revealed a clear tendency toward decreasing graft take success in winter grafting of walnut. The study examined the potential relationship between temperature conditions in the preceding year and the percentage of graft take success under controlled callus-formation conditions (air temperature 26°C and relative humidity 80-90%). The results suggest that elevated summer temperatures may negatively affect scion quality and subsequent grafting success.

Key words*: walnut, propagation, temperature, scions, influence.*

QUALITY TRAITS OF SWEET CHERRY (*PRUNUS AVIUM* L.): REGIONAL CHARACTERIZATION AND CULTIVAR DIFFERENCES IN PLOVDIV, BULGARIA

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Abstract

The present study investigates the morphological, chemical, and technological characteristics of six cherry cultivars: 'Kordia', 'Canada Giant', 'Regina', 'Skeena', 'Lapins', and 'Ferrovia', grown at the Fruit Growing Institute in Plovdiv, Southern Bulgaria. Measurements included fruit weight and size, the proportion of fruit flesh, stone, and stalk, total soluble solids, total sugars, invert sugar, sucrose, pH, total acids, and firmness of fruit flesh. The findings revealed distinct differences among cultivars in fruit weight, size, stone weight, and stalk weight. Chemical analyses also indicated significant differences. In the second year, increases in sugar content and total soluble solids (TSS), decreases in acidity, and higher TSS/TA ratios were observed. Despite Bulgaria's dynamic cherry sector, growers in the Plovdiv region still lack data-driven guidance on which cultivars combine the most marketable quality traits for local conditions. This study aims to address this gap by providing comparative evidence to inform better cultivar selection and breeding strategies. These results provide region-specific insights into cherry fruit quality and highlight the advantages of specific cultivars, offering valuable information for growers and breeding programs.

Key words*: fruit quality, Prunus avium, morphological traits, chemical composition, technological indicators.*

GROWTH AND DEVELOPMENT OF SOME BLUEBERRY CULTIVARS UNDER MOUNTAIN CONDITIONS WITH NATURAL INTER-ROW GRASSING

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Abstract

The aim of the study was to evaluate vegetative and reproductive traits in three blueberry cultivars (Bluecrop, Spartan, and Toro) under natural grassing conditions in the interrows. Bluecrop is the highest-yielding blueberry cultivar for the semi-mountainous conditions of the Middle Balkan Mountains. The yield per bush ranged from 225.24 g to1537.71 g across all tested cultivars. Toro stands out as the most prolific, with fruit weights ranging from 1.65 g to 2.29 g. The cultivar with the lowest value is Spartan (0.76-1.61 g). In the years of the experiment, the inter-row strips in the fruit crop were distinguished by a relatively rich floristic composition. The predominant species were H. lanatus, R. obtusifolius, P. pratensis, R. acetosa, A. repens, A. capillaris, M. pulegium, Tr. pratense, V. sativa, P. fruticosa, L. serriola, V. officinalis, L. perenne, V. officinalis, and A. elatius. The presence of useful forage grasses, cereals, and legumes was found to be lower, and that of non-forage grasses relatively higher.

Key words*: Vaccinium corymbosum L., vegetative and reproductive indicators, natural grassing.*

INFLUENCE OF IRRIGATION REGIME ON THE DEVELOPMENT OF ANTHRACNOSE AND BACTERIAL BLIGHT IN WALNUT (*JUGLANS REGIA* L.)

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Abstract

Climatic changes and prolonged drought periods in Bulgaria highlight the need for irrigation strategies that support sustainable walnut production while limiting the development of key diseases. This study investigated the effect of four irrigation regimes (150% m, 100% m, 50% m, and a non-irrigated) on disease severity and infection percentage in the walnut cultivar 'Izvor 10', grown at the Fruit Growing Institute – Plovdiv. To compare the irrigation treatments, disease incidence and severity indices were calculated for leaves and fruits. The 50% m irrigation regime resulted in the lowest mean disease levels on leaves, with anthracnose showing 56.26% infection and a severity index of 12.57%, and bacterial blight showing 5.48% infection and a severity index of 1.07%. Fruit infection was lowest at 50% m, with bacterial blight averaging 5.00% infection and a severity index of 1.00%, and anthracnose showing 6.00% infection and a severity index of 1.20%. Overall, the results demonstrated that the 50% m irrigation regime provided the most favourable balance between water supply and disease suppression.

Key words*: Gnomonia leptostyla, Juglans regia L., Regulated water deficit, Xanthomonas arboricola pv. juglandis*

GROWTH PERFORMANCE AND PHENOLOGICAL RESPONSE OF SWEET CHERRY CULTIVARS GRAFTED ON SEVERAL ROOTSTOCKS UNDER NORTH-EASTERN ROMANIA PEDOCLIMATIC CONDITIONS

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Abstract

Analyzing and understanding the interaction between cultivar genetics and rootstock vigor is a key factor in optimizing cherry orchard performance. This study evaluates the biometric and phenological characteristics of five sweet cherry cultivars ('Andreias', 'Cociuvaș', 'Ludovan', 'Kordia', 'Regina') grafted on three rootstocks: 'IP-C7' and 'IP-C5' (vegetative) and 'Prunus mahaleb L.' (generative). Conducted between 2022 and 2024 at RSFG Iași, Romania, the research assessed BBCH phenological stages, biometric indicators (trunk cross-section area, tree height, canopy volume, annual growth parameters), and foliar resistance to cherry diseases. The earliest vegetation was observed at 'Andreias' on 'IP-C7' (March 16-23), while 'Regina' on 'P. mahaleb L.' started latest (March 22-30). 'Prunus mahaleb L.' exhibited superior vigor, with larger trunk cross-sections (up to 24.81 cm² for 'Cociuvaș'). Annual growth lengths ranged from 37.8 cm ('Ludovan' on 'IP-C7') to 88.5 cm ('Cociuvaș' on 'P. mahaleb L.'). Crown volume was highest for trees on generative rootstocks (4.55 m³ for 'Cociuvaș'). Foliar resistance was better in vegetative rootstocks such as 'IP-C7' (<5 % damage), compared with 'P. mahaleb L.' (>5% damage). Results were statistically analyzed, highlighting significant differences between cultivar-rootstock combinations.

Key words*: evaluation, phenological stages, Prunus avium L., rootstocks.*

YIELD, WATER USE EFFICIENCY AND NUTRIENT USE EFFICIENCY OF GREENHOUSE WHITE STRAWBERRY CULTIVATED UNDER DIFFERENT IRRIGATION AND FERTIGATION REGIMES

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Abstract

Strawberries are drought-sensitive plants, and deficit irrigation allows some water stress during an irrigation season without a significant reduction in yield and production quality. This could be achieved by accurately determining the crop water requirements and nutrient regime. A two-factor experiment was conducted during 2024-2025 in an unheated greenhouse at the Chelopechene experimental field, Sofia, Bulgaria, with drip-irrigated and fertigated strawberry cultivar (Fragaria x ananassa 'Snow White'). The irrigation and fertilization factors were applied at two rates: I1 - 75% (ETc) I2 - 50% (ETc), F1: optimal fertilization $N_{8.09}P_{12.76}K_{15.62}$; F2 – suboptimal fertilization - 75% (F1). Five treatments were tested: control: I0F0:100% (ETc) without fertigation; I1F1; I1F2; I2F1; I2F2. The highest average strawberry yield (9980.63 kg ha^{-1}) was obtained in I1F1 treatment, while the lowest strawberry yield (5975.55 kg ha^{-1}) was obtained in I2F2 treatment. The highest WUE (3.70 kg m^{-3}) was obtained in I2F1 treatment, while the lowest WUE (2.04 kg m^{-3}) was obtained in the control treatment I0F0. The highest NUE (17.06 kg kg^{-1}) was obtained in I1F1 treatment, and the lowest NUE (13.62 kg kg^{-1}) was obtained in I2F2 treatment.

Key words*: white strawberry, greenhouse, WUE, NUE, Bulgaria.*

GENETIC DIVERSITY ANALYSIS OF *CORYLUS AVELLANA* L. GENOTYPES USED FOR NEW VARIETY DEVELOPMENT

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Abstract

A study compared nine hazelnut genotypes from Transylvania's spontaneous flora with five Corylus avellana cultivars, using 10 microsatellite markers to assess genetic diversity and identify valuable genotypes for developing new varieties. Among the primer sets tested, cavSSR14418 was the most informative, with Na = 5, Ne = 3.88, I = 1.56, PIC = 0.71, and He = 0.74. The observed heterozygosity (Ho) ranged from 0.64 (cavSSR 2135; cavSSR 3909; cavSSR 4217; cavSSR 14875) to 1.0 (cavSSR 2704), with an overall mean of 0.72. The NJ dendrogram grouped the genotypes into two main clusters. The clear separation between clusters grouping established cultivars and those including the new selections demonstrates the latter's potential to enrich the current genetic pool and confirms that wild genotypes exhibit high genetic variability, making them valuable biological resources for biodiversity conservation and future breeding programs.

Key words*: hazelnuts, wild accessions, cultivars, morphological characteristics, SSR markers.*

IMPACT OF FERTILIZER TYPES ON VEGETATIVE GROWTH AND FRUIT QUALITY IN BLUEBERRY

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Abstract

This study evaluated the influence of different fertilizer types on vegetative growth, productivity, and fruit quality in four highbush blueberry (Vaccinium corymbosum L.) cultivars - 'Simultan', 'Lax', 'Pastel', and 'Blueray'- grown under Romanian conditions. Research was conducted during the 2024 and 2025 seasons in a young plantation established on acidic soil. Fertilization treatments were compared with respect to their effects on plant vigor, yield, and fruit quality attributes, including pH and total soluble solids (TSS). Results demonstrated that fertilizer type significantly affected both vegetative development and fruit quality parameters, though responses varied among cultivars. Certain fertilizer treatments enhanced productivity and improved fruit biochemical composition, while others had neutral or cultivar-specific effects. Overall, findings highlight the importance of fertilizer selection in optimizing growth and fruit quality in blueberry plantations cultivated on acidic soils.

Key words*: different growing condition, fertilization, highbush, Romanian conditions, vegetative growth.*

RESPONSE OF WALNUT TO INTEGRATED WATER SUPPLY STRATEGIES: GROWTH DYNAMICS AND PRODUCTIVITY

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Abstract

The study was conducted in 2023-2024 in a walnut orchard at the Fruit Growing Institute - Plovdiv, using the walnut cultivar Izvor 10. The aim was to estimate the influence of different irrigation regimes on the vegetative growth and productivity of the trees. The experiment involved the application of different irrigation rates: 100% m (T100), 150% m (T150), 50% m (T50), and a non-irrigated control (T0). T100 was characterized by the highest yield (24.70 kg/tree) and productivity coefficient (0.054 kg/cm), combined with balanced vegetative development compared to the other regimes. T50 and T0 showed significantly reduced productivity and growth parameters. Regression analysis revealed a moderate to strong positive relationship between yield and trunk cross-sectional area ($R^2 = 0.68$) and a very strong relationship between yield and canopy volume ($R^2 = 0.95$). Canopy volume is a key structural indicator that is reliable for predicting yield. The findings identify T100 as a sustainable irrigation strategy that optimizes the balance between growth and productivity.

Key words*: growth parameters, irrigation regimes, productivity coefficient, walnut (Juglans regia L.), yield.*

THE INFLUENCE OF PARENTS ON PULP FIRMNESS AND KEEPING THE CAPACITY IN APPLE GENOTYPES

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Abstract

The aim of the study was to evaluate the influence of parents on the expression of pulp firmness, a morpho-physiological trait essential for the quality and keeping capacity of apple fruits. The research also sought to highlight the genetic contribution of different parental combinations to both the level and stability of this trait, in order to identify valuable parents for breeding programs. The results revealed a significant phenotypic variability of pulp firmness among the 40 genotypes analyzed, as well as interannual differences determined by the genotype–environment interaction. Certain parental combinations, particularly those including the parent 'Prima', were frequently associated with high and stable firmness values, both at harvest and after storage. Moreover, the concordance between non-destructive and destructive evaluation methods confirms the efficiency of rapid firmness assessment in genotype selection. Overall, the findings underline the determining role of genetic background in firmness expression and the importance of careful parent selection for developing varieties with stable texture and superior storage capacity.

Key words*: apple, fruit firmness, parental influence, genotype–environment interaction.*

DEVELOPMENT OF AN SSR-BASED PROTOCOL FOR THE IDENTIFICATION OF DUPLICATES AND SYNONYMS IN BLUEBERRY GERMPLASM COLLECTIONS

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Abstract

The accurate identification of duplicate and synonymous accessions is essential for the effective management and conservation of blueberry (Vaccinium corymbosum L.) germplasm collections. Owing to extensive vegetative propagation, cultivar exchange, and historical naming inconsistencies, blueberry collections are particularly prone to redundancy, which can reduce collection efficiency and obscure true patterns of genetic diversity. This work aims to develop and standardize an SSR-based genotyping protocol for the reliable identification of duplicates and synonyms in blueberry collections. The proposed methodological framework focuses on SSR marker selection, allele calling and binning strategies, and data analysis workflows suitable for routine laboratory application. The expected outcome is a robust and transferable protocol that supports accurate molecular identification, improves germplasm curation, and facilitates informed decision-making in conservation and breeding programs. This contribution provides a practical foundation for molecular-based collection management in blueberry prior to large-scale genotyping and diversity analyses.

Key words*: Blueberry (Vaccinium corymbosum L.), SSR markers, duplicate identification, allele binning, germplasm management.*

USE OF SEXUAL PHEROMONES IN THE CONTROL OF MICROLEPIDOPTERS IN FRUIT ORCHARDS

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Abstract

Climate change is forcing scientists to find alternatives to how to keep the number of pests in fruit growing as low as possible and also to minimize the use of plant protection products.
Fruit moths (Lepidoptera: Tortricidae) cause significant damage in fruit orchards. This paper provides data on the flight activity of these microlepidoptera and contributes to improving their management in orchards in southern Romania. The monitoring was carried out in the Experimental Didactic Field of the Faculty of Horticulture within USAMV-Bucharest during the vegetation period of 2025. The species Cydia funebrana, C. molesta, C. pomonella, Phylonorycter blancardella, Enarmonia formosana, and Anarsia lineatella were monitored using the pheromone traps AtraFun, AtraMol, AtraPom, AtraBlanc, AtraEnaform, and AtraLin. In addition to the direct damage caused by Cydia larvae, they allow fungal pathogens to enter through the holes created in the fruit, especially those that cause rot. During the observations, it was found that although control treatments were applied, the species Cydia fumebrana, Anarsia lineatella, and Cydia pomonella showed high populations above the economic damage threshold.

Key words*: fruit moths, sexual pheromones, rot.*

POULTRY AND THE EFFECT OF SOIL SCIENCE

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Abstract

Poultry production plays a critical role in sustainable agriculture, not only as a source of animal protein but also as a key contributor to soil health through nutrient cycling. This study examines the relationship between poultry farming and soil science, with an emphasis on the effects of poultry manure on soil physical, chemical, and biological properties. Poultry litter, when properly managed and applied, serves as a valuable organic amendment that enhances soil fertility by increasing essential nutrients such as nitrogen, phosphorus, and potassium, while also improving soil structure, water retention, and microbial activity. However, excessive or poorly managed application can lead to nutrient leaching, soil acidification, and environmental pollution. The abstract highlights best management practices that align poultry production with sound soil science principles, including appropriate application rates, timing, and integration with crop nutrient requirements. By linking poultry production to soil sustainability, this work underscores the importance of integrated agricultural systems that promote long-term soil health, environmental protection, and food security within the framework of agriculture for life.

Key words*: poultry production, soil science, poultry manure, soil fertility, nutrient cycling, sustainable agriculture, organic soil amendments, environmental sustainability.*

STATISTICAL ASSESSMENT OF ESSENTIAL TRACE ELEMENTS IN BILBERRY AND ROSEHIP FRUITS

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Abstract

The total mineral concentration in foods does not always reflect the actual nutritional value, as only the fraction released from the food matrix during digestion becomes available for intestinal absorption. The study aimed to evaluate the total concentration, bioaccessible concentration, and bioaccessible fraction of four essential microelements - iron (Fe), manganese (Mn), zinc (Zn), and copper (Cu) - in bilberry (Vaccinium myrtillus L.) and rosehip fruits (Rosa canina L.) harvested from hilly and submontane areas of western Romania. Total concentrations were determined by atomic absorption spectrometry, and bioaccessibility was assessed using a standardized in vitro gastrointestinal digestion model. The results revealed significant differences ($p < 0.05$) between the harvesting sites for the total and bioaccessible concentrations of the analyzed elements. Rosehip fruits showed higher levels of Fe, Mn, and Zn, while bilberries showed comparable or higher levels of Cu. Iron had the lowest bioavailability and copper the highest, while Mn and Zn had intermediate values. The results suggest that rosehip fruits are a more important source of Fe, Mn, and Zn, while bilberries can contribute significantly to dietary Cu intake.

Key words*: in vitro digestion, bioaccessibility, Rosa canina, Vaccinium myrtillus, Duncan test for multiple comparisons.*

TRENDS IN LATE FROST DAMAGE PROBABILITY FOR PLUM AND SWEET CHERRY IN ROMANIA: A COMPARATIVE ANALYSIS OF 2013-2022 VS. 2000-2009

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Abstract

Late frost damage probability (LFDP) was analyzed in Romania for plum and sweet cherry by comparing the decades 2013-2022 and 2000-2009, using a patented warning method for late-frost damage in orchards based on phenoclimatic simulation. An uneven spatial gradient of LFDP tendency was observed, distributed between the southern half of the country (from -1 to 1.5% for plum and from -1 to 3% for sweet cherry) and the submontane depressions located in the eastern part of Transylvania (7.5-9%). Although in plum the areas with almost unchanged LFDP occupied the south, east, and partially the west of Romania's territory, for sweet cherry, they were restricted to the south-western part of the country and the coastal area. The increase in the critical minimum temperature exerted an overriding influence on the increase in late frost damage probability for sweet cherry and plum, compared with the phenological advance. The study analyzes the circumstances that led to the increasing LFDP for plum and sweet cherry in the 2013-2022 decade and identifies the areas with increased late frost damage frequency and intensity.

Key words*: climatic accidents, 'Tuleu gras' and 'Germersdorf' cvs., bud swelling, budburst, beginning of flowering, end of flowering.*

FRUIT QUALITY OF SOME SWEET CHERRY (*PRUNUS AVIUM* L.) CULTIVARS IN THE CONDITIONS OF NORTH-EAST ROMANIA

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Abstract

The sweet cherry (Prunus avium L.) is one of the most appreciated fruit crops worldwide due to the taste, color, and nutritional value of the fruits. The present study was conducted during 2022-2024 and involved five native sweet cherry cultivars ('Alexus', 'Iașirom', 'Bucium', 'Mihailis' and 'Ștefan'), created within the Research Station for Fruit Growing (RSFG) Iași. The aim of the study was to evaluate multiple fruit quality indicators, both physical: fruit weight, length, thickness, width, fruit geometric diameter, sphericity, flesh weight and stone weight, peduncle length, firmness, and biochemical (total soluble solids, titrable acidity and sugar-acidity ratio). If the 'Andreiaș' cv. stood out with the largest fruits in flesh weight (FlW=9.82 g), the 'Ștefan' cv. had the highest values in terms of fruit firmness (F=7.2 N), while the 'Mihailis' cv. had the highest soluble sugar content (TSS=22.87 °Brix). All the five analyzed cultivars represent valuable phenotypic resources, with an average weight of 9.4 g and a soluble dry matter content of 21.23 °Brix.

Key words*: Prunus avium L., fruit quality, traits, physical, biochemical.*

THE INFLUENCE OF ECOLOGICAL TREATMENTS ON PEACH FRUIT QUALITY IN SOUTHEASTERN ROMANIA

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Abstract

*This study aims to evaluate the influence of ecological treatments on the quality of peach fruits, using physicochemical and biometric parameters. During the period 2023-2025, 3 peach cultivars, 'Mimi', 'Filip', and 'Florica', created and cultivated at the Research Station for Fruit Growing (RSFG) Constanta, were studied. During the study period, a series of parameters were investigated, such as fruit weight, size, total dry matter content (%), acidity (mg/%), pH, and stone percentage (s%), a number of positive and statistically significant correlations were found between the fruit mass of the assessed fruits (g) and some other parameters, such as: fruit mass-fruit high diameter r=0.6415**, fruit mass small-diameter r=0.5293*, fruit mass-fruit high r=0.9539***, fruit mass-total dry matter content r=0.6092**, fruit mass-total acidity r=0.5097*, fruit mass-flesh pH r=0.7989**, fruit mass-stone mass r=0.9242** and fruit mass-stones percentage r=0.7501***. The application of ecological products led to an increase in fruit mass, diameter, and height, as well as in soluble dry matter and acidity content, the main indicators of fruit quality and sustainable fruit production.*

Key words*: Prunus persica*, *ecological treatments, fruit quality, production quality, sustainable fruit growing.*

STATUS OF NITROGEN AND MAGNESIUM IN APPLES ON THE CITY OF ZAGREB MARKET

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Abstract

The apple (Malus x domestica Borkh.) in Croatia covers 22 % of the fruit-growing area. As a food, it is recommended as part of the daily diet due to its extremely high nutrient content. The importance of this study is to provide consumers with information on the sales channels where they can find apples with the highest mineral content, while the aim is the determination the nitrogen and magnesium content of apples on the Zagreb market. Sampling of apple fruits was carried out in triplicate on October 23, 2023 in the city of Zagreb in three markets, three retail chains, and three stores with organic products. The results show that the highest nitrogen content (0.42 % N in dry weight) was found in apples from retail chains, while in all sales channels the magnesium content was 0.03 % Mg dry weight. The highest nitrogen content (69.12 mg N/100 g in fresh weight) was found in apple samples from markets, while the highest magnesium content (5.77 mg Mg/100 g in fresh weight) was found in stores with organic products.

Key words*: fruit, macroelements, Malus x domestica Borkh., minerals, nutritional value.*

FRUIT TRAITS VARIATION IN WILD POPULATIONS AND CULTIVATED GENOTYPES OF SWEET CHESTNUT

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Abstract

Sweet chestnut is a valuable species for ecosystems and landscapes, with multiple uses for fruits, wood, tannin, honey, etc. The chestnut fruit has important benefits for human health and diet. The sweet chestnut trees can be found in wild, coppice, and orchard populations. In Romania, it is especially widespread in the southwest part. The investigated plant material was composed by three Romanian wild populations, two Romanian selections, and five Romanian and French cultivars. The objective of this study was to establish the variability of several morphological fruit traits and the diversity among sweet chestnut genotypes in order to provide useful information for producers and breeders. Significant differences between wild populations and cultivated genotypes were found for almost all traits, especially for fruit weight and height. The differences between and within the cultivated selections and cultivars indicate their diverse genetic background. The studied wild populations can be used to obtain seedling progenies as a germplasm source for selection and conservation.

Key words*: Castanea sativa, diversity; nut morphological traits, variability.*

THE EFFECT OF PILARHANCE, SL GROWTH REGULATOR ON YIELD AND QUALITY OF SOUR CHERRY FRUITS

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Abstract

The research was carried out in the orchard of the „Ceteronis ST SRL"enterprise, founded in the spring of 2022, with trees of the Erdi Botermo variety, grafted on the Mahaleb cherry rootstock. The planting distance was 4 x 2 m, and the crown shape was a free-growing spindle. The soil between the rows and between the trees in a row was maintained as clean cultivation and irrigated. The following variants were investigated in the research plot: 1. Control (spraying with water); 2. Pilarhance, SL, 0.8 l/ha; 3. Pilarhance, SL, 1.3 l/ha. Two treatments were carried out during the growing season. During the reference period, it was established that the greatest intensity of the growth processes in the tree crown and sour cherry fruits was recorded in the variant with Pilarhance, SL at a dose of 1.3 l/ha, treated twice by spraying. The first treatment should be carried out at the end of the flowering period, and the second during the period when the fruit color changes from green to yellow.

Key words*: growth regulator, leaf area, production, fruit setting, Prunus cerasus.*

THE INFLUENCE OF BIOLOGICAL CHARACTERISTICS OF PLUM VARIETIES ON FRUIT PRODUCTION IN THE NORTHERN PART OF THE REPUBLIC OF MOLDOVA

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Abstract

The *research was carried out in a plantation established in the spring of 2018, including six plum varieties: Piteșteanca, Cacanska Najbolia, Empresso, Stanley, Blue Free, and President (Mt), grafted on the rootstock Prunus cerasifera Mhr. The planting distance was 5.0 x 3.0 m; the crown shape was a mixed pyramid with high volume. During the research, the following parameters were analyzed: trunk diameter and growth, trunk cross-sectional area (TCSA), phenological phases of the fruiting organs during 2025 growing season, the morphological parameters of the fruit and seeds, number of fruits per tree, average fruit weight, yield per tree, yield per unit area, and yield per unit TCSA. During the reference period, it was established that the studied varieties had favorable conditions for growth and fruiting in the northern part of the country. The lowest production, of 11.7 t/ha, was registered for the Blue Free variety, while the higher production were obtained for Piteșteanca (25.4 t/ha) and Cacanska Najbolia (27.6 t/ha). The other varieties registered intermediate values (18.3-21.7 t/ha), characteristic of intensive plum plantations. The ripening period for the studied varieties was distributed over 45 days of harvesting.*

Key words*: plum, variety, diameter, flowering, maturation, production.*

EVALUATION OF THE PRODUCTIVITY AND MORPHOMETRIC CHARACTERISTICS OF THE SIBERIAN BLUEBERRY FRUITS (*Lonicera caerulea* L.)

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Abstract

Siberian blueberry (Lonicera caerulea L.) is an emerging berry crop, which is attracting increasing interest due to its high nutritional value and adaptability to various climatic conditions. This study evaluated the productive performance and morphometric characteristics of Siberian blueberry fruits in the fifth year of cultivation under pedoclimatic conditions of the Bucharest–Băneasa area. Productivity was analysed using descriptive statistics and Pearson correlations, highlighting a very strong and positive correlation between the number of fruits and total production (r = 0.956), while the average fruit mass had an insignificant influence on yield. The analysis of the morphometric characteristics of the fruits included determinations of height, diameter, and individual mass, complemented by Pearson correlations and linear regressions, highlighting that fruit mass of the fruit was strongly correlated with its height (r = 0.763), compared to a moderate correlation with the diameter (r = 0.465). Therefore, production was determined by fruit load, and fruit mass accumulation was associated with fruit elongation. The results confirm the productive stability and adaptability of Siberian blueberry to the real conditions in south-eastern Romania.

Key words*: Siberian blueberry, Lonicera caerulea L., productivity, fruit morphometry, Pearson correlation, linear.*

ANALYSIS OF BIOMETRIC AND ECONOMIC INDICATORS IN TWO PEACH CULTIVARS (*PRUNUS PERSICA* L.) – GLOUGHAVEN AND CRESTHAVEN

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Abstract

The study was conducted during the period 2023-2024 at the Institute of Fruit Growing in Plovdiv. A comparative analysis of the peach varieties 'Gloheaven' and 'Kresthaven' was performed based on biometric and economic indicators. In 2023, the average fruit weight ranged from 0.239 g for the `Glowhaven` cultivar to 0.256 g for the `Cresthaven` cultivar. The yield per decare for ``Glowhaven`` was 1265 kg, followed by ``Cresthaven`` with 1201 kg. The average fruit weight in the second year ranged from 0.159 g for `Glowhaven` to 0.163 g for `Cresthaven`. The Randemana as follows: 2023 – 96% for `Cresthaven` and 95% for `Glowhaven`; 2024 – 95% for both cultivars. The economic analysis shows that the `Glowhaven` cultivar has a higher average annual profitability (233%) compared to `Cresthaven` (62%), which indicates a better ratio between the resources invested and the yield. The results obtained from the yield per decare for both cultivars in 2024 (3624.70 kg for `Glowhaven` and 1768.13 kg for `Cresthaven`), all other conditions being equal, emphasize the need to continue observations and conduct a multifactorial analysis over a long period.

Key words*: Prunus persica (L.) Batsch, peach, biometric indicators, yield, market potential.*

STATISTICAL EVALUATION OF BIOMETRIC AND PHYSICOCHEMICAL VARIABILITY IN THE FRUITS OF FIVE SWEET CHERRY CULTIVARS (*PRUNUS AVIUM* L.)

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Abstract

The cherry (Prunus avium L.) is a fruit tree belonging to the genus Prunus of the Rosaceae family, originating around the Caspian and Black Seas, on the border between Europe and Asia, and thriving best in temperate or Mediterranean climates. Sweet cherries are grown commercially in over 40 countries worldwide (Webster and Looney, 1996).In 2025, cherry production in Romania was severely affected by April frosts, which compromised orchards by up to 100% in some areas. For this study, 5 cherry varieties were analyzed (Inima de Porumbel, Van, Boambe de Cotnari, Bigarreau Burlat, Rosii de Bistrita), originating from a family plantation established 7 years ago in the town of Bistrita, Bistrita-Nasaud County, Romania.The following fruit quality indicators were studied for these varieties: large fruit diameter (mm), small diameter (mm), fruit height (mm), weight (g), soluble dry matter (^{0}Bx), sugar percentage (%), fruit pH, and firmness (25 fruits of each variety, from the experimental year 2025).All statistical analyses were performed using R statistical software [v4.4.1; RCoreTeam, 2024]. Comparisons of means were performed using Duncan's multiple-range test (DMRT).

Key words*: cherry varieties, biometric characteristics, physicochemical, fruit quality.*

LOCAL CLIMATIC REGIME: TEMPERATURE AND PRECIPITATION TRENDS IN THE CONTEXT OF GLOBAL WARMING

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Abstract

The climatological analysis for the period 2021-2025 highlights a clear warming trend in southeastern Romania compared with the multiannual averages for 1975-2022. The annual mean temperature ranged between 12.2°C and 13.7°C, exceeding in most years the climatological norm of 12.7°C, with more pronounced positive deviations during 2023-2025. The mean maximum temperatures reached 19.2°C in 2025, while extreme summer values exceeded 32.0°C, reflecting increasingly hot summers. The average minimum temperatures, between 6.9°C and 8.2°C, indicate warmer nights and milder winters, emphasizing thermal variability particularly in winter and spring months and an earlier onset of the warm season. The pluviometric regime shows significant variability, alternating between very wet and dry years, with uneven precipitation distribution concentrated in short, intense episodes. The 2021-2025 precipitation average is slightly above the multiannual mean; however, rising temperatures and altered rainfall patterns suggest an intensification of hydric stress. These climatic changes have a significant impact on fruit growing, influencing phenology, productivity, and water management, and requiring the adaptation of agricultural strategies and careful monitoring of the thermo-hydric regime in southeastern Romania.

Key words*: climate variability, regional adaptation, analysis.*

SUITABILITY OF AGRICULTURAL LAND FOR OLIVE CULTIVATION IN PRIMORJE-GORSKI KOTAR COUNTY (CROATIA)

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Abstract

The olive (Olea europaea L.) is one of the oldest cultivated plants in the world and is a major crop in the Mediterranean region, which includes Primorje-Gorski Kotar County in the Republic of Croatia. Evaluation of land suitability was based on detailed soil surveys and analyses of natural characteristics (climate, terrain, geology, hydrology, and land use) according to the FAO concept. In the area of the county, 18 pedosystematic units were determined. Around 60% of the county`s hilly and mountainous areas are not suitable for olive cultivation due to climatic limitations. In the coastal and island areas of the county, 64.744,2 hectares of agricultural land with varying suitability for olive cultivation have been identified. There are 10.448,3 hectares of land suitable for growing olives (16.1% of the total agricultural area), 6.790,5 hectares moderately suitable (10.5%), and 7.926,7 hectares of limited suitability (12.2%). Temporarily and permanently unsuitable land covers 39.578,6 hectares, or 61,1% of the total agricultural area. A qualitative assessment of land suitability for olive cultivation provides a solid basis for planning the development of olive growing in this county.

Key words*: olives, assessment, agricultural land, cultivation.*

FRUIT QUALITY OF SOME ROMANIAN SOUR CHERRY CULTIVARS

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Abstract

The sour cherry is mainly used in fruit processing due to its high acid and low sugar content, as well as the small fruit size of the most cultivated cultivars. The objective of this study was to analyze the fruit quality of sour cherry cultivars in correlation with consumer preferences, in order to recommend the cultivars for fresh consumption. The study was carried out during the 2023-2025 period at the Genetics and Breeding Department of the Research Institute for Fruit Growing Pitesti, Romania, on 15 Romanian sour cherry cultivars ('Bucovina', 'Crișana 2', 'De Botoșani', 'Dropia', 'Ilva', 'Mocănești 16', 'Nana', 'Rival', 'Pitic', 'Scuturător', 'Stelar', 'Timpurii de Osoi', 'Timpurii de Pitești', 'Țarina' and 'Vrâncean'). The following determinations were carried out: fruit size by weighing, flesh firmness with a penetrometer non-destructive Qualitest, soluble solids content with a digital refractometer, and pH with a Hanna HI 84532 minititrator, as well as sensory evaluation of fruits using a scale from 1 (very low) to 9 (very good). The average fruit weight was 4.56 g, varying between 3.55 g ('Scuturător') and 5.76 g ('Vrâncean'). The average fruit firmness was 18.77 HPE units, the firmest being the fruits of the 'Țarina' cv. The average fruit soluble solids content was 14.73% Brix, the highest content being recorded in the 'Țarina', 'Dropia' and 'Mocănești 16' cvs. The fruit pH was on average 3.34%, sour cherries being acidic fruits. After the sensory evaluation of the fruits, the total score ranged from 41.22 point at 'Scuturător' cv. and 56.81 point at 'Țarina' cv. These results could be useful to breeders for selecting the genitors in a breeding program, to farmers for establishing new orchards with the most valuable cultivars, and to the fruit market for fresh consumption.

Key words*: sour cherry, fruit size, soluble solids content, acidity, firmness.*

ANALYSIS OF SOCIAL BEHAVIOUR IN THE CONTEXT OF VALORISATION OF FRUIT RESOURCES IN NATURAL ECOSYSTEMS

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Abstract

Wild fruits are valuable natural resources with significant nutritional, therapeutic, and economic potential; however, their role in modern food systems and local economic development remains insufficiently explored in many regions. This study aimed to analyze public perceptions regarding consumption, their economic valorisation, and their contribution to local community development. Data were collected through a questionnaire examining consumption habits, perceived health benefits, knowledge of traditional products, and attitudes toward economic activities related to wild fruits. The results indicate a moderate level of consumption, although most respondents recognize their health benefits and their role in a balanced diet. Participants also show openness toward the economic use of wild fruits through activities such as harvesting, processing, marketing, and integration into rural tourism. Many respondents believe that establishing collection centres or small processing units could stimulate local economic development. However, the relatively low level of knowledge about traditional products made from wild fruits suggests a decline in transmitting this knowledge between generations. Overall, the findings highlight the potential of wild fruits to support healthy diets, diversify rural economies, and promote the sustainable use of natural resources.

Key words*: ecosystem resources, local communities, rural development, rural tourism, traditional knowledge, wild fruits*

RELATIONSHIPS BETWEEN THE MINERAL COMPOSITION OF FLOWERS AND LEAVES IN THREE PEACH CULTIVARS

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Abstract

Peach leaves function as the main organ for mineral accumulation and redistribution, reflecting soil conditions and cultivar characteristics, while the mineral composition of flowers provides an earlier indication of the tree's nutritional status. The present study examines the cultivars Cresthaven, Glohaven, and Redhaven using data on essential nutrients (N, P, K, Ca, Mg, and Fe) in flowers and leaves. Calculated elemental ratios reveal differences in nutritional balance and potential productivity among the cultivars. Principal Component Analysis (PCA) was performed, identifying variable-correlation relationships between nutrient contents in flowers and leaves. Moderate to strong correlations were observed at 60 DAFB, particularly for P, Mg, Ca, and Fe, indicating coordinated physiological roles during early vegetative growth. The study provides a scientifically grounded basis for improving nutrient management strategies based on the individual needs of plants rather than a uniform approach.

Key words*: peach, nutrient management strategies.*

FURTHER STUDIES ON THE DAMAGES ON *FRAGARIA ANANASSA* VAR. 'SNOW WHITE' CAUSED BY *ERWINIA AMYLOVORA* AND APPLICATION OF CHAENOMELES PLANT EXTRACT FOR REDUCTION OF SYMPTOMS

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Abstract

Erwinia amylovora causes the well-known disease "fire blight", which affects a large number of plants from the Rosaceae family. Strawberries are also among the pathogen's hosts. The present study aimed to further investigate the damages that E. amylovora induces in greenhouse-grown strawberries (Fragaria ananassa) var. "Snow white" in Bulgaria and the potential of a plant-derived extract from fruits of Chaenomeles sp. to reduce the symptoms for another vegetation period but with early infection. The experiment includes four irrigation and fertilization levels, as well as a comparison between the symptoms of the disease in the greenhouse and those induced in optimal laboratory conditions. The results showed greater leaf and flower losses of the diseased plants compared to the healthy plants. Treatments with the plant extract reduced the manifestation of symptoms below the levels of the diseased plants.

Key words*: Erwinia amylovora, Fragaria ananassa, disease control, Chaenomeles sp., plant extract.*

GENETIC DIVERSITY, HERITABILITY AND HETEROSIS ESTIMATION IN F1 STRAWBERRY HYBRIDS

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Abstract

Strawberry (Fragaria × ananassa Duch.) is cultivated and enjoyed globally for early ripening of the fruits, high yields, and special nutritional qualities (high content of minerals and vitamins). In strawberry breeding, agronomic performance and fruit quality attributes highlight the successes of strawberry breeding in recent decades. The present study evaluates the heritability of some biometric and biochemical parameters in hybrids derived from intraspecific crosses and their inheritance patterns. Broad sense heritability calculated over the entire experiment with the hybrid combinations for most traits indicated a high degree of genotypic control, ranging between 0.59 (hue angle) and 0.91 (yield and chroma index). The values indicate a high proportion of total genetic variance to phenotypic variance, which indicates that hereditary dowry plays a significant role in the expression of traits. Narrow sense heritability estimates were mainly high for yield, fruit size, and fruit colour and low for fruit firmness, total soluble solids, and pH, indicating that, for half of the traits, more than 50% of the total genetic variation was the result of non-additive genetic effects, and that the breeding process was quick. The results can use breeders in selecting parents for cross combinations and in maximizing genetic gain, ultimately for creating varieties supporting the advancement of commercial strawberry production.

Key words*: Fragaria × ananassa, breeding, cross combinations, genetic gain, fruit quality.*

THE STUDY OF SOME CHOKEBERRY GENOTYPES IN THE CONDITIONS OF SOUTHWESTERN ROMANIA

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Abstract

At the Research-Development Station for Plant Cultivation on Sandy Soil Dabuleni, three genotypes of Aronia melanocarpa were evaluated between 2022-2025. The Viking, Nero, and Melrom genotypes were tested for their suitability for expansion in fruit-tree plantations from the southwestern area of Romania. Following the study, it was found that the evaluated genotypes recorded good yields ranging between 14.25 and 16.00 kg/bush, with an average bush height of 152 to 168 cm in the 7th year after planting. The Melrom variety stood out from the other varieties studied, with an average fruit weight of 0.99 g, the largest number of berries in an inflorescence (22) and an average yield of over 16.00 kg/bush (44 tons/ha).

Key words*: Aronia melanocarpa, bush vigour, yield, fruit quality.*

COMPARATIVE EFFICACY OF CONVENTIONAL AND BIOLOGICAL INSECTICIDES AGAINST *DROSOPHILA SUZUKII* IN ROMANIAN RASPBERRY SYSTEMS

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Abstract

Drosophila suzukii (Matsumura) is an invasive pest that causes severe economic losses in soft fruit crops worldwide, particularly in raspberry production. The present study evaluated the susceptibility of a D. suzukii population collected from raspberry orchards located in the Oltenia region of Romania to several conventional and biological insecticides. Laboratory bioassays were conducted using abamectin, spinosad, tau-fluvalinate, acetamiprid, chlorantraniliprole, and Bacillus thuringiensis subsp. kurstaki. Larval viability was recorded at 24, 48, 72, 96 and 120 hours after exposure. Spinosad and abamectin showed the highest efficacy, causing 95% and 81.4% adult mortality, respectively. Tau-fluvalinate and acetamiprid showed moderate efficacy, with mortality values of 88.8% and 77.7%. In contrast, chlorantraniliprole and Bacillus thuringiensis showed very low activity against D. suzukii, with mortality values below 5%. These results suggest differential susceptibility patterns and indicate potential early signs of tolerance to certain active substances. The findings highlight the importance of insecticide rotation and integrated pest management strategies for sustainable raspberry production in Romania.

Key words*: Drosophila suzukii, raspberry production, insecticide susceptibility, resistance risk, integrated pest management (IPM), invasive pest.*

IDENTIFYING THE IMPORTANCE OF APPLE VARIETIES RESISTANT TO THE ATTACK OF THE MAIN PHYTOPATHOGENS ON THE ECOLOGICAL FOOTPRINT – A REVIEW

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Abstract

In Romania, almost every household in rural areas has some apple trees of different varieties; this aspect places them among the species of great interest. The paper provides the theoretical foundation of our own research through a parallel between old and new apple varieties in terms of their resistance to disease. The need for such research derives from maintaining the ecological footprint at a low level through a reduced number of phytosanitary treatments. Also, these new varieties are suitable for organic orchards, with a direct impact on food quality. Most of the scientific literature focuses on a single disease, but it has been found that integrated management of the main phytopathogens is of interest. According to this concept, treatments are adapted depending on the cultivation area, the incidence of diseases in the last 3-5 years, and the varieties existing in the orchard. In conclusion, the fact that a universal formula is no longer used for all apple orchards can only have beneficial effects on the soil, the trees, and the resulting fruits.

Key words*: apple, phytopathogens, integrated management, treatments, ecological footprint.*

YIELD OF RASPBERRY CROP IN ORGANIC FARMING IN THE FIRST THREE YEARS AFTER ITS ESTABLISHMENT

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Abstract

For this work, a 100 m raspberry crop established in the Bucharest region on certified organic land was monitored for three years. The crop is composed of two varieties: the Opal variety and the Delniwa variety, planted alternately, resulting in four rows, two of each variety. The monitoring period was between June 2023 (the year of establishment) and November 2025. During this period, differences in production were observed at the variety, row, and year level. The maximum production obtained in the 3rd year after its establishment was approximately 128 kg for the Delniwa variety and about 114 kg for the Opal variety. The results obtained indicate that the right varieties for organic crops in the studied area, which can be a benefit to farmers.

Key words*: raspberries, organic farming, production, varieties.*

IMPACT OF PRUNING PRACTICES ON PEACH YIELD, FRUIT QUALITY, AND NUTRITIONAL VALUE UNDER NORTH-WESTERN ROMANIAN CONDITIONS

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Abstract

This study examines the influence of pruning practices on peach yield and fruit quality under the climatic conditions of north-western Romania, with relevance to both horticultural production and nutritional quality. The research was conducted on two peach cultivars, Redhaven and Cresthaven, chosen for their adaptability to cooler climates and tolerance to low winter temperatures. Properly pruned trees were compared with unpruned or poorly pruned trees in terms of yield and key fruit quality parameters. Although unpruned trees produced a higher number of fruits, proper pruning led to improved fruit size, uniformity, color development, and higher sugar content, which are important indicators of both commercial value and nutritional quality. Enhanced fruit firmness and storage potential were also observed in pruned trees. These findings highlight that appropriate pruning practices contribute not only to stable yields but also to the production of high-quality peaches with improved nutritional characteristics, supporting their role in a healthy diet.

Key words*: peach, pruning practices, yield, fruit quality, nutritional value, orchard management.*

MICROBIAL CONTAMINATION IN PLANT TISSUE CULTURE -A REVIEW

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Abstract

Microbial contamination remains one of the most important biological limitations affecting plant tissue cultures used in both horticultural research and commercial micropropagation. Despite continuous improvements in sterilization protocols and aseptic techniques, contamination continues to compromise culture establishment, multiplication efficiency, and plant quality. The present review critically synthesizes classic and recent literature addressing the sources of microbial contamination, the types of microorganisms involved, and their biological and physiological impact on in vitro explants. Particular emphasis is placed on latent endophytic microorganisms and secondary contamination arising during repeated subcultures, which challenge the traditional concepts of surface sterilization and absolute axenic culture. During the comparison, the effectiveness, limitations, and applicability of conventional sterilization methods and emerging integrated contamination control strategies are highlighted. In conclusion, the review emphasizes a conceptual shift from complete microbial elimination to case-specific, biologically informed contamination management and discusses future research perspectives aimed at improving the reliability and sustainability of horticultural micropropagation.

Key words*: plant tissue culture, in vitro micropropagation, microbial contamination, endophytic bacteria, fungal contamination, aseptic cultures.*

POMOLOGICAL AND BIOCHEMICAL CHARACTERIZATION OF WILD POMEGRANATE (*PUNICA GRANATUM L.*) GENOTYPES SELECTED FROM MUGLA PROVINCE IN TÜRKIYE

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Abstract

This study aimed to determine the pomological and biochemical characteristics of three wild pomegranate (Punica granatum L.) genotypes selected from natural populations in Mugla Province, Türkiye. Wild pomegranate is widely distributed in Anatolia, which is recognized as one of the important centers of origin and genetic diversity for the species. In Anatolian ecosystems, wild pomegranate populations constitute valuable genetic resources due to their adaptation to biotic and abiotic stresses, high phytochemical content, and their potential use in breeding programs. In the present study, fruit samples obtained from three wild genotypes were evaluated for key pomological traits, including fruit weight, fruit dimensions, peel thickness, aril yield, and seed hardness. Biochemical analyses comprised total soluble solids, titratable acidity, pH, total phenolic content, antioxidant capacity, and anthocyanin content. Considerable variation was observed among genotypes for both pomological and biochemical parameters, indicating a high level of genetic diversity within the local wild pomegranate population. In particular, some genotypes exhibited high phenolic content and antioxidant activity, highlighting their potential for functional food production and breeding purposes.

Key words*: Wild pomegranate, Anatolia, genetic resources, pomological traits, biochemical properties, Mugla*

SEROLOGICAL DETECTION OF *CAPILOVIRUS MALI* (APPLE STEM GROOVING VIRUS) IN PERSIAN WALNUT (*JUGLANS REGIA* L.)

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Abstract

During 2024-2025, symptoms of unknown aetiology were observed in young Persian walnut (Juglans regia L.) orchards in southwestern Bulgaria. Consecutive mycological, bacteriological, and virological tests were performed to identify the causal agent of the observed symptoms. The bacteria Xanthomonas arboricola pv. *juglandis and the fungus Alternaria* spp. *were isolated from symptomatic trees, but neither pathogen is usually known to cause symptoms corresponding to the observed injuries. At the next stage, virological tests were conducted using a double-antibody sandwich enzyme-linked immunosorbent assay (DAS ELISA) and mechanical inoculation. In DAS ELISA, the tested symptomatic walnut trees reacted positively with antiserums against Capilovirus mali (apple stem grooving virus, ASGV). To verify the presence of ASGV, the herbaceous indicator Nicotiana benthamiana was mechanically inoculated with sap from the ASGV-positive samples. The inoculated indicator plants developed systemic symptoms, and subsequent serological testing confirmed the presence of the virus. The results obtained represent the first serological detection of ASGV in Persian walnut orchards in southwestern Bulgaria and underscore the need for expanded virological monitoring of this crop species.*

Key words*: Juglans regia L, apple stem grooving virus, DAS ELISA, Nicotiana benthamiana.*

NATURAL PLUM POX VIRUS INFECTION IN PLUM: FIVE-YEAR FIELD ASSESSMENT OF GENOTYPIC RESPONSE

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Abstract

Thirty-four plum genotypes were monitored over a five-year period (2021-2025) to evaluate their response to natural infection with plum pox virus (PPV), the most damaging viral pathogen of stone fruit species. The experimental orchard was established at FRDS Bistrița in spring 2020 using virus-free planting material. Two to six trees per cultivar were planted in the field and visually inspected during each growing season. During the first three vegetative periods, trees showing PPV symptoms were removed, destroyed, and replaced with healthy planting material. In 2024 and 2025, symptomatic trees were no longer removed in order to avoid large age differences within the orchard and to maintain comparable conditions among genotypes. Visual monitoring for PPV symptoms continued during these years, and in 2025 all trees were additionally tested serologically using DAS-ELISA. The elimination of PPV sources during the first three growing seasons limited virus spread, resulting in a low PPV incidence of 2.7% in 2023. After this practice was discontinued in 2024–2025, virus spread increased sharply, with PPV incidence reaching 14.1% by 2025. Nevertheless, thirteen cultivars remained symptomless throughout the five-year period, and PPV infection was not detected by DAS-ELISA.

Key words*: cultivars, DAS-ELISA, sharka, survey, visual monitoring.*

VITICULTURE AND OENOLOGY

THE IMPACT OF CLIMATE CHANGE ON THE NOBLE ROT FORMATION OF THE KADARKA RED GRAPE VARIETY IN THE MINIȘ (MÉNES) WINE REGION

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Abstract

The Kadarka red grape variety is a traditional and historically significant cultivar of the Miniș (Ménes) wine region, where its loose cluster architecture and thin berry skin make it particularly prone to Botrytis cinerea infection and the onset of noble rot. The region's favorable microclimate—marked by high nocturnal and early morning humidity alongside warm, dry daytime periods—is strongly influenced by the proximity of the Mureș River. These conditions have long supported the formation of botrytized berries and the production of sweet wines from Kadarka. In recent years, climate change has increasingly altered these environmental parameters. Higher daytime temperatures, reduced humidity variability, and shifting precipitation patterns have collectively contributed to a decline in the frequency and intensity of noble rot development. As a result, the proportion of botrytized berries in Kadarka vineyards has diminished, and the botrytization process now progresses more slowly and less uniformly. In the Miniș (Ménes) region, where whole-cluster harvesting is traditionally practiced, the reduced presence of noble-rotted berries directly affects must composition, sugar concentration, and fermentation behavior. Skin-contact fermentation, typically lasting 8–10 days before maturation in oak barrels or stainless-steel tanks, is increasingly challenged by the variability in fruit condition caused by climate-driven fluctuations. This study examines a three-year dataset on yield indicators and wine parameters to assess how climate-induced changes influence noble rot formation and the resulting wine characteristics. The findings highlight the vulnerability of Kadarka to environmental instability and suggest that maintaining consistent botrytized wine production in the Miniș (Ménes) region will require adaptive viticultural and oenological strategies. Understanding these trends is crucial for preserving the traditional identity of Kadarka-based sweet wines under evolving climatic conditions.

Key words*: Kadarka, Botrytis cinerea, climate change, Miniș (Ménes) wine region, microclimate.*

PRELIMINARY EVALUATION OF THE PERFORMANCE OF SOME LOCAL GRAPEVINE GENOTYPES UNDER THE PEDOCLIMATIC CONDITIONS OF DĂBULENI RDSPCSS

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Abstract

This study presents preliminary results on the evaluation of local grapevine genotypes cultivated under the pedoclimatic conditions of the Dăbuleni Research and Development Station for Plant Cultivation on Sandy Soils (southern Oltenia, Romania) during the 2025 growing season. The experiment was established in a young vineyard (third year after planting), trained on a trellis system with a 1.2 × 2.5 m spacing, and grown under drip irrigation. The biological material included three traditional cultivars ('Parmac', 'Berbecel', 'Roșioară') and one local genotype ('Gălbioară'). Phenological observations indicated a relatively uniform development of growth stages. Significant differences were recorded in yield components, especially cluster weight and productivity, with higher values in 'Parmac' and 'Roșioară'. Mechanical, morphometric, and physico-chemical analyses revealed genotype-specific patterns in berry structure, sugar accumulation, and acidity, reflecting adaptation to sandy soil conditions. These findings support the evaluation and conservation of regional grapevine genetic resources.

Key words*: agrobiological traits, genetic resources, phenology, sandy soils, Vitis vinifera, Romania.*

COMPARATIVE STUDY OF *AUCHENORRHYNCHA* SPECIES ASSOCIATED WITH DEALU MARE AND MURFATLAR VINEYARDS IN ROMANIA

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Abstract

The suborder Auchenorrhyncha is one of the most abundant groups of phytophagous insects present in many habitats, including grapevines. The paper presents comparative results on species richness and composition, as well as ecological characteristics of Auchenorrhyncha sampled in two vineyards, Dealu Mare and Murfatlar, located in the viticultural regions of Hills of Muntenia and Oltenia, and the Danube terraces between 2024-2025. Ten commercial vine plantations were sampled in each vineyard. Insects were collected on yellow sticky traps from late May to October, replaced every ten days. A total of 47 species was recorded in this study: 45 in the Dealu Mare vineyards and 24 in the Murfatlar vineyard. The most abundant species in the Dealu Mare, in decreasing order of relative abundance, were three invasive species: Scaphoideus titanus, Erasmoneura vulnerata, and Arboridia kakogawana, followed by Neoaliturus fenestratus, Fieberiella florii, Platymetopius rostratus, Empoasca vitis, and Reptalus quinquecostatus. The most common species collected in the Murfatlar vineyard, in decreasing order of relative abundance, were Empoasca vitis and Arboridia kakogawana, followed by Fieberiella florii and Reptalus quinquecostatus. Adult population dynamics were assessed for relevant species in both vineyards.

Key words*: Monitoring, Romania, Auchenorrhyncha, Vitis vinifera.*

SUITABILITY OF SOME *V. VINIFERA* VARIETIES AND CLONES IN THE CURRENT CLIMATIC CONTEXT OF SOUTHWESTERN ROMANIA

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Abstract

The selection and promotion of valuable grapevine clones and varieties in vineyards can be a way in the strategy for adaptation and resilience to climate change, but also a possibility to offer consumers a diverse range of wines, characterized by complexity and typicity. The aim of this study was to evaluate the adaptation potential of some grapevine varieties and clones in the context of seasonal climate variability in South-West Romania. Seven V. vinifera varieties and clones were studied: 'Chardonnay' clones R8, VCR4 and 95, 'Tămâioasă românească', 'Fetească neagră', 'Merlot'; and 'Cabernet Sauvignon' clone ISV 117, grafted on V. Berlandieri x V. Riparia SO4 rootstock. Aspects regarding phenological stages, bioproductive parameters (bud fertility, grape yield, grape weight) and qualitative parameters (soluble sugars, total acidity) were evaluated. Rising temperatures and water scarcity are constant challenges in the wine-growing areas of southwestern Romania. The effects of warming and drying from flowering to full ripening generated a decrease in production by 38.56%, production losses ranging from 25.41% ('Chardonnay' clone 95) to 44.59% in Merlot.

Key words*: climatic change, grapevine, phenological stages, high temperatures, bud fertility.*

TESTING ALTERNATIVE METHODS FOR THE PRODUCTION OF HIGH-QUALITY GRAFTED VINES UNDER THE CONDITIONS OF THE MURFATLAR VINEYARD

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Abstract

For over four decades, SCDVV Murfatlar has produced grafted grapevines using the traditional sawdust stratification, forcing under controlled conditions, and nursery planting. Despite sustained efforts to strictly comply with technological requirements, yields of first-quality grafted vines remain low, making this activity less economically viable. In 2025, a research study was initiated at Murfatlar to test a method for stratifying grafted vines in water. Four cultivars were used: Columna, Fetească Regală 21 Bl, Mamaia, and Fetească Neagră 9 Mf, grafted onto the rootstock Berlandieri × Riparia Sel. Oppenheim 4-4. Eight experimental variants, each with five replications, were analyzed after the forcing stage and after lifting from the vine nursery. The evaluated parameters included callusing degree, rooting capacity, and vigor of both shoots and roots. Favorable results regarding the yield of grafted vines obtained after forcing were recorded for the combinations Fetească Regală × SO 4-4 and Columna × SO 4-4, with success rates of 98% and 95%, respectively. After lifting from the vine nursery, the highest yields of first-quality grafted vines were obtained for the combinations Columna × SO 4-4 (38%) and Fetească Regală × SO 4-4 (35%).

Key words: *scions, rootstocks, layering modes, quality vines, nursery.*

RESEARCH ON THE TECHNOLOGICAL CHARACTERISTICS OF SOME SELECTED CLONAL ELITES FROM TWO POPULATIONS OF TABLE GRAPE VARIETIES IN THE CONDITIONS OF THE STEFANESTI ARGES VITICULTURAL CENTER

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Abstract

Between 2024 and 2025, a study was conducted at the National Research and Development Institute for Biotechnology in Horticulture Stefanesti Arges on clonal selections of two table grape varieties: 'Augusta' and 'Centenial seedless'. Eight clonal elites from each variety were comparatively analysed, evaluating their technological qualities relative to the population. During the research, the clonal elite 'Augusta 7' consistently outperformed the control and the other seven studied elites, recording high and quality yields with an average of 23 t ha^{-1}, compared with 19 t ha^{-1} for the control variety. Similarly, the clonal elite 'Centenial seedless 3' demonstrated a consistently higher level than the control and the other seven elites, with high and quality yields averaging 19 t ha^{-1} compared with 14 t ha^{-1} for the control cultivar. The clonal selections recommended for certification and propagation in the Muntenia area and in regions with similar climates are 'Augusta 7' which exhibit superior quality over the control in terms of bunch appearance, pulp consistency, aroma, and typicity.

Key words*: productivity, quality, genotypes, breeding.*

IMPACT OF UNFAVORABLE CLIMATIC CONDITIONS IN 2025 ON CERTAIN TABLE GRAPEVINE GENOTYPES FROM THE MURFATLAR VITICULTURAL CENTER

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Abstract

Grapevine is particularly vulnerable to late spring frosts, especially during the early stages of vegetative growth. Between 26 and 30 April, a severe frost event was recorded in the Murfatlar viticultural center, with minimum temperatures reaching –1°C, which caused complete necrosis of the primary shoots at BBCH phenological stages 11–13. The present study aimed to evaluate the effects of this climatic accident on the vegetative and productive behavior of four table grapevine genotypes: Cardinal, Aurana, Muscat Hamburg, and Afuz Ali 93 Mf. The results indicated a significant reduction in the number of fertile shoots and inflorescences per vine across all analyzed genotypes, with the most pronounced losses observed in Aurana and Cardinal. The real fertility coefficient showed values below the multiannual average (2015-2024), highlighting the low fertility of secondary buds. Productivity indices were also reduced; however, the average cluster weight was maintained or slightly increased in Muscat Hamburg and Afuz Ali 93 Mf. Among the genotypes, Afuz Ali 93 Mf demonstrated the highest biological and productive stability under unfavorable climatic conditions.

Key words: *grapevine, bud fertility, productivity indices, genotypes, climatic stress.*

CLIMATE INFLUENCE ON QUALITY PARAMETERS OF GRAPES, WINE, AND ECONOMIC PERFORMANCE IN FETEASCĂ NEAGRĂ

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Abstract

The consistent production of high-quality wines, characterized by typicality and authenticity, is fundamental to market competitiveness. Achieving this trait requires the ongoing adaptation of agronomic techniques to harmonize the biological needs of the cultivar with the prevailing climatic variables of each growing season. The research was conducted between 2022 and 2024 in the Miniș-Măderat vineyard, focusing on Fetească neagră*, widely regarded by specialists and consumers as Romania's most valuable grape cultivar. The climatic conditions over the four-year period were analyzed in detail, with particular attention to their influence on both grape and wine quality parameters, as well as key economic indicators. The quality parameters assessed for grapes and wine included sugar content, protein content, macro- and microelement concentrations, vitamins, and tannins. Economic indicators considered were production costs, unit costs, production value, and profit. Correlations and regression analyses were subsequently performed to evaluate the relationships between selected climatic variables and the measured quality and economic parameters. Significant variations were observed in several indicators across the four years, highlighting the impact of climatic fluctuations on grapevine performance and wine quality.*

***Key words**: grapes, economic performance, quality, wine.*

PRODUCTIVITY ELEMENTS AND QUALITY INDICES IN SOME RED WINES GRAPE VARIETIES - COMPARATIVE STUDY

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Abstract

The study aimed to evaluate the productivity parameters and quality indices of three grape varieties for red wines. The study was conducted in the 2023-2024 wine year, in the area of the Recaș Wine Center. Three grape varieties for red wines were considered in the study: "Fetească Neagră" (Gv1), "Pinot Noir" (Gv2) and "Cabernet Sauvignon" (Gv3). The vegetation diagram recorded 125 days for Gv1, 146 days for Gv2, and 145 days for Gv3 from the start of vegetation to the ripening of the grapes. Grapevine varieties showed differentiated values for productivity parameters and productivity indices of productivity, yield, and quality. Close values were recorded for total vine shoots (Tvs), but variant Gv2 was noted for fertile vine shoots (Fvs), and trunk inflorescence number (Tin). The Gv1 variant stood out for average grape weight (Agw), and the Gv3 variant stood out for yield (Y/plt). Regarding quality indices, the Gv3 variant presented higher values for total soluble solids (TSS), and anthocyanin content (Ant). The results are important for the management of vineyard plantations in relation to the yield and quality indices considered.

Key words*: correlation, productivity elements, quality indices, red wine cultivars, vineyard plantation management.*

PHENOLOGICAL AND BIOCHEMICAL PERSPECTIVES ON GRAPEVINE GERMPLASM VARIABILITY UNDER CURRENT CLIMATIC CONDITIONS

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Abstract

This study evaluated the phenological development and fruit quality in ten Vitis vinifera L. varieties from the germplasm collection of INCDBH Ștefănești, aiming to support their potential reintroduction into cultivation. Phenological stages were recorded according to the BBCH scale, revealing cultivars with shorter phenophase durations (Amurg and Rayon d'Or) and others characterized by extended developmental cycles (e.g., Blauer Zweigelt and Ezerfurtu). The differences were further reflected in fruit quality traits assessed through soluble solids, total sugars, titratable acidity, phenolic compounds, anthocyanins, and maturity index. Soluble solids ranged from 14.0 to 21.2 °Brix, indicating pronounced genotypic differences in sugar accumulation and technological maturity. Hierarchical cluster analysis based on mean DOY separated the cultivars into three phenological groups. Linear regression revealed a significant positive relationship between mean air temperature and phenophase duration ($R^2 = 0.42$, $p < 0.001$). Principal Component Analysis explained 87.7% of total variance (PC1 = 56.3%, PC2 = 31.4%), distinguishing genotypes according to sugar–acid balance and phenolic potential. The findings confirm substantial genotype-driven variability and highlight the value of germplasm resources for cultivar characterization and informed selection strategies.

Key words*: grapevine germplasm, BBCH phenology, fruit quality, phenolic compounds.*

THE IMPACT OF COVER CROPS SOWN BETWEEN GRAPEVINE ROWS ON SOIL MOISTURE AND BIOLOGICAL ACTIVITY

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Abstract

Preserving soil moisture and its biological activity are major challenges for viticulture under current climate change. Three species of cover crops: phacelia (Phacelia tanacetifolia Benth.), white clover (Trifolium repens L.) and spring vetch (Vicia sativa L.) were sown in the spring between grapevine (Vitis vinifera L.) rows in the pedoclimatic conditions of the Copou-Iaşi wine-growing center (NE Romania), in order to evaluate their impact on soil water retention and the abundance of the dominant soil microbial groups across the 0-10 and 10-20 cm depths (with perennial grass and bare soil as controls). Inter-row cover crops significantly influenced soil moisture and microbial activity as a function of soil depth and season. Soils under white clover and spring vetch maintained higher moisture, particularly during dry periods, while perennial grass preserved the most stable microbial activity. Compared with bare soil, white clover and spring vetch increased the abundance of free nitrogen-fixing bacteria and fungi. Strong relationships (r>0.80) were revealed between soil moisture and fungal abundance, while active dehydrogenase activity was positively associated with aerobic bacteria. Overall, cover crops can improve soil biological activity and moisture retention, particularly during dry periods, thereby supporting vineyard efficiency and long-term sustainability.

Key words*: dehydrogenase activity, phacelia, spring vetch, soil microbiota, white clover.*

INFLUENCE OF ORGANIC FERTILIZATION WITH VITIVINICULTURAL BY-PRODUCTS ON VINE GROWTH AND FRUIT BEARING IN THE CODRU WINE-GROWING REGION

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Abstract

This study investigates the influence of organic fertilization using vitivinicultural by-products on vine growth and fruit bearing in the Codru wine-growing region. The research was conducted in the locality of Cricova, Republic of Moldova, using the wine grape variety Pinot Noir. The experimental design included three treatment variants: an unfertilized control, application of dried grape seeds, and organic fertilization with compost obtained from grape pomace mixed with cattle manure at a 1:1 ratio. Throughout the vegetation period, vine growth and fruiting parameters, overall plant condition, and cluster development were systematically monitored in relation to soil characteristics and agroclimatic conditions. The results revealed noticeable differences among the tested variants, indicating that the use of vitivinicultural by-products as organic fertilizers may support vine growth dynamics without negatively affecting vine productivitycan positively influence vine growth dynamics. The study highlights the potential of valorizing these by-products in sustainable viticulture and supports the implementation of circular economy principles within wine-growing systems.

Key words*: fruit bearing, organic fertilization, Pinot Noir, sustainable viticulture, vitivinicultural by-products.*

INTEGRATED ASSESSMENT OF WATER STRESS IN TABLE GRAPE VINES: PHYSIOLOGICAL, BIOMETRIC AND SATELLITE INDICATORS AND THE IMPACT OF IRRIGATION ON YIELD AND HARVEST QUALITY

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Abstract

The integrated assessment of water stress in grapevines for table grapes, using physiological, biometric, and satellite indicators, highlighted the significant influence of irrigation and fertilization on yield and quality. Moderate irrigation (75% Active Humidity Index) combined with complex C4 fertilization proved most effective, enhancing both quantitative and qualitative production. The cultivar Țâța caprei neagră showed the highest performance, with the largest number of clusters per vine, the highest average cluster weight, and 100-berry mass, reaching yields over 4,000 kg/vine under optimal conditions. Țâța caprei albă exhibited stable results, while Coarnă albă showed lower potential, requiring more careful management. Water stress analysis using CWSI and ΔTc–Ta indicated high deficit tolerance in Țâța caprei neagră, moderate tolerance in Țâța caprei albă, and sensitivity in Coarnă albă. Selecting a well-adapted cultivar and applying optimal irrigation and fertilization strategies are essential for achieving stable, high-quality yields under variable climatic conditions.

Key words*: cultivar selection, CWSI, fertilization, irrigation, water stress.*

EFFECTS OF ANTI-HAIL NETS ON LEAF MINERAL COMPOSITION AND MUST QUALITY OF RIESLING ITALICO (*VITIS VINIFERA* L.)

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Abstract

Anti-hail nets are increasingly used in modern viticulture to mitigate damage caused by extreme weather events; however, their effects on grapevine physiology and fruit quality are not fully understood. This study assessed the influence of white and black anti-hail nets on leaf mineral composition, chlorophyll content index (CCI), and must quality of Riesling Italico (Vitis vinifera L.). The experiment was conducted in the Klanjec wine-growing region (northwestern Croatia) using a randomized block design with three treatments: control (no net), white net, and black net. Leaf samples were collected at three phenological stages to determine macro- and microelement concentrations and chlorophyll content, while must quality was evaluated at harvest based on sugar content. The results showed that anti-hail nets affected nitrogen dynamics and chlorophyll content, with higher CCI values generally observed under white nets in later sampling stages. Must sugar content ranged from 18.62 to 21.32 °Brix, with the highest values recorded under white nets. Overall, the findings suggest that anti-hail nets, particularly white nets, can beneficially modify vineyard microclimate and improve physiological performance and must quality of Riesling Italico.

Key words*: anti-hail nets, chlorophyll content, leaf mineral composition, must quality, Riesling Italico.*

GRAPEVINE PHENOLOGICAL RESPONSES TO INTERANNUAL CLIMATIC VARIABILITY

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Abstract

This study investigated grapevine phenological responses to interannual climatic variability during the 2024-2025 growing seasons. Mean day-of-year (DOY) values indicated that bud burst occurred at DOY 95.7 in 2024 and 98.9 in 2025, flowering at DOY 151.0 and 158.4, and ripening at DOY 207.6 and 212.6, respectively. Compared with 2024, the 2025 season showed delays of 3.2 days for bud burst, 7.4 days for flowering, and 5.0 days for ripening. The bud burst–flowering interval increased from 55.3 to 59.5 days, whereas the flowering–ripening phase decreased from 56.6 to 54.2 days. Hierarchical clustering differentiated earlier cultivars (Radames, Rodi, Triumf) from later-ripening genotypes such as Blauerzweigelt and Ezerfurtu. Pearson correlation analysis revealed significant negative associations between post-flowering temperatures and early phenological stages ($r = -0.45$ to -0.49). Results indicate genotype-dependent phenological variability under contrasting seasonal conditions.

Key words*: Vitis vinifera, phenology, climate variability, genotype response, temperature effects.*

COMPARATIVE ANALYSIS OF THE `ITALIAN RIESLING` AND `FETESCA REGALĂ` VARIETIES BEHAVIOR IN THE MINIȘ - MĂDERAT VINEYARD

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Abstract

The aim of this study was to identify and analyze the significant differences between two grape cultivars - `Italian Riesling` and `Fetească Regală` - with regard to specific qualitative traits, as well as key physical-chemical parameters for evaluating their yield potential under variable conditions. The research emphasizes the advantages and particular characteristics of each cultivar, providing valuable information for winegrowers, oenologists, and specialists involved in improvement and selection of cultivars adapted to current soil, climatic, and technological requirements. Fresh grape samples were collected from a vineyard located in the Miniș – Măderat area, a region with a long tradition of grape growing and high-quality wines. The results show that the growth vigour of the 'Italian Riesling' cultivar was lower than that of 'Feteasca Regală'. It was observed that 'Italian Riesling' requires a larger leaf area than 'Feteasca Regală' cultivar to produce the same grape must volume and to synthesize one kilogram of sugar. Although 'Feteasca Regală' was more productive overall, 'Italian Riesling' produced more wine.

Key words: *growing stage, ripening, vigour, sugars, acidity.*

CARBOHYDRATE RESERVES AND GRAPEVINE RESILIENCE UNDER CLIMATIC VARIABILITY: A TWO-YEAR STUDY FROM BLAJ VITICULTURAL CENTER

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Abstract

This study investigates how carbohydrate reserves vary in both grapevine and rootstock canes over two consecutive years (2023–2024) and explores their relationship with environmental conditions, assessing cultivar performance and resilience patterns. Seven grapevine cultivars (Fetească albă, Fetească regală, Fetească neagră, Italian Riesling, Neuburger, Traminer roz and Sauvignon blanc) and three rootstocks (C-26, C-71 and SO4-4) were analysed, quantifying non-structural carbohydrate (NSC) reserves in one-year-old canes. The results revealed significant differences between cultivars, vintages, and their interaction. Total NSC levels varied between 11.59±0.95 % and 17.94±0.41 %. Generally, fruit-bearing cultivars accumulated more NSC reserves than rootstocks. Almost all cultivars showed higher NSC reserves in 2023 than in 2024. *Starch content remained relatively stable across years, while soluble sugars were more sensitive to environmental variation. In terms of performance and resilience, Traminer roz and Fetească regală emerged as the top fruit-bearing cultivars, and Crăciunel 71 proved to be the most resilient rootstock.*

Key words*: grapevine, rootstock, carbohydrate reserves, climatic resilience, cultivar performance.*

MORPHOLOGICAL AND FUNCTIONAL DIVERSITY OF TENDRIL IN WINE GRAPEVINE CULTIVARS

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Abstract

Grapevine tendrils are specialized vegetative organs that influence shoot vigour, their mechanical stability, and the spread through the canopy. The objective of the study was to evaluate the influence of cultivar on tendril growth and functionality in 12 wine grape cultivars (six red and six white) from three vineyards in western Romania during the 2022-2024 vintages. For each cultivar, the morphological properties of the tendril (number, length, diameter, node of first tendril onset, second tendril branches, and insertion angle) were examined and related to shoot vegetative and physiological traits (length, diameter, biomass, leaf area, photosynthesis, and transpiration rate). The study revealed substantial differences ($p < 0.05$) between cultivars and vineyards, indicating distinct adaptations to soil and climate conditions. Positive correlations between tendril traits and shoot vigour indicate that this vine organ can be used to evaluate cultivar vegetative ability and adaptation. The findings are valuable for optimizing training systems, selecting cultivars, and managing the canopy in modern viticulture.

Key words*: cultivar, morphology, shoot, tendril, vineyards.*

THE CHARACTERIZATION OF PHENOLIC CONTENT AND ANTIOXIDANT ACTIVITY OF POMACE EXTRACT AND FORTIFIED ROMANIAN WINES WITH POMACE EXTRACT

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Abstract

Grape pomace, a byproduct of winemaking, possesses significant nutraceutical potential and is produced in substantial quantities, making it a promising ingredient for food fortification. This study examined seven pomace varieties: three from the Murfatlar vineyard (Cabernet Sauvignon, Mamaia, and Pinot Noir) and four from the Ștefănești wine-growing region (Cabernet Sauvignon, Burgund, Merlot, and Pinot Noir). Valuable compounds were extracted using ultrasound-assisted extraction (UAE). The Burgund variety exhibited the highest levels of total phenolic compounds (TPC = 13.808 g/L) and anthocyanins (0.37625 g/L), whereas the lowest levels were observed in Pinot Noir from Murfatlar (TPC = 1.74 g/L) and Cabernet Sauvignon from Ștefănești (anthocyanins = 0.02975 g/L). The polyphenolic profile of the pomace was characterized using UHPLC–ESI/HRMS. Principal Component Analysis (PCA) of the test sample was performed using XLSTAT.

Key words*: Pomace; Fortified wine; PFT; UAE; UHPLC–ESI/HRMS.*

SOIL MANAGEMENT PRACTICES AND THEIR ROLE IN ENHANCING THE RESILIENCE OF VITICULTURE TO CLIMATE CHANGE IN THE VALEA CĂLUGĂREASCĂ VITICULTURAL CENTER

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Abstract

This study evaluates how soil management practices influence the physical and biological properties of the soil, grapevine productivity, and the adaptive capacity of vineyards to climate change in the Valea Călugărească wine region. Compared with black fallow, permanent grassing cover cropping increased soil organic matter content to 1.6%, while grass reached 1.7%. Mixtures of dwarf white clover with grass and vetch with grass enhanced organic matter by 38% (1.8%), reduced soil compaction to 255-250 kPa, and increased water-holding capacity to 44-47%. Erosion was limited to 2.2-2.1 t/ha/year, and biodiversity increased to 55-59%. Legumes and grass mixtures supported yields 50% higher than the control (3.960 kg/vine), with grapes containing 240 g/L sugars, allowing the production of wines with 14° alcohol content. These results highlight that such practices significantly contribute to soil fertility, biodiversity, and the sustainability of viticulture.

Key words*: biodiversity, cover crops, climate change, soil fertility, sustainable viticulture.*

THE EFFECT OF SHADING DETERMINED BY PHOTOVOLTAIC PANELS INSTALLED ABOVE THE VINES ON THE PERFORMANCE OF SAUVIGNON VARIETY IN THE WINE-GROWING URLAȚI-CEPTURA CENTER

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Abstract

The integration of photovoltaic panels into vineyards is part of an agrovoltaic system, which allows the simultaneous use of land for electricity generation and grape cultivation. Panels installed above vine rows influence the vineyard microclimate by modifying solar radiation, temperature, and water availability, directly affecting vegetative growth and the physiological status of grapevines.

This study, conducted in the Urlati-Ceptura viticultural center on Sauvignon blanc, analyzed the effect of shading from semi-transparent photovoltaic panels with different transparency levels, compared with an unshaded control. The results showed that partial shading contributed to reducing water stress and maintaining a more balanced vegetative development during the summer, a period characterized by high temperatures and water deficit.

Additionally, the panels provided protection against excessive solar radiation and extreme temperatures without negatively affecting vine growth. Panels with lower transparency offered the most favorable balance between thermal protection and light availability. Overall, the results demonstrate that the use of semi-transparent photovoltaic panels in vineyards represents a viable agrovoltaic solution, capable of supporting vine adaptation to changing climatic conditions.

Key words*: balanced vegetative development; light availability; photovoltaic panels; thermal protection.*

BUNCH THINNING AND ITS EFFECT ON WINE QUALITY IN SYRAH VARIETY CLONES

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Abstract

The experiment was conducted during the period 2020-2022 at the Agricultural University-Plovdiv. A unified technological scheme for the production of red dry wines was used. The object of the study was clones from the Syrah variety numbered 100, 174, 470 and 524 grafted onto SO4 rootstock. After flowering, at a berry size of 4 to 6 mm (BBCH - 75), bunch thinning was applied; the number of clusters was reduced to 60% (8 clusters per vine). The following physicochemical indicators determining wine quality and differences were found in the analysis of relative density (g/dm^3); alcohol (%); sugars (g/dm^3); total extract (g/dm^3); sugar-free extract (g/dm^3); titratable acids (g/dm^3); volatile acids (g/dm^3); free sulfur dioxide (mg/dm^3); total sulfur dioxide (mg/dm^3); total phenols (mg/dm^3). Bunch thinning had a positive impact, expressed in the higher average content of total extract (30.00 g/dm^3), sugar-free extract (28.53 g/dm^3) and total phenols (1884.42 mg/dm^3). Selective bunch thinning during vine vegetative growth is a technological practice that positively affects the wine quality obtained from vines with reduced yield.

Key words*: clones, green pruning, Syrah variety, red wine, wine analysis.*

STUDY ON THE CARBOHYDRATE RESERVE OF SOME ROMANIAN ANCESTRAL VINE CULTIVARS IN ODOBEȘTI VINEYARD, VRANCEA COUNTY

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Abstract

The carbohydrates are produced by the leaves and stored in the form of starch and soluble sugars in the perennial organs of the vine. The carbohydrate reserve plays an essential role in the growth process of the vine, being the main source of carbon necessary for the start of vegetation in the following season. This paper evaluates the state of the carbohydrate reserve in the berries during the vegetative dormancy period of some ancestral Romanian grape cultivars in the climatic conditions of the Odobeşti vineyard, Vrancea. Five old cultivars that were part of the traditional assortment of the vineyard were studied: 'Galbenă de Odobeşti', 'Cruciuliță', 'Pârciu', 'Gordin' and 'Razachie albă'. The content of soluble sugars, starch content, and the amount of total carbohydrates were determined by the anthrone reagent method. Under the climatic conditions of the 2024 wine year, the analyzed cultivars presented a sufficient carbohydrate reserve for the first vegetation phenophases of the 2025 wine year; two of them were classified as very well matured, having a total carbohydrate content of over 18 g 100 g $^{-1}$ DM.

Key words*: grapevine, total carbohydrates, soluble sugars, starch.*

THE INFLUENCE OF MACERATION DURATION AND TEMPERATURE ON THE CHARACTERISTICS OF BLACKBERRY WINE

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Abstract

The production of fruit wines, particularly blackberry wine, is being improved to enhance the quality of the final product. This study aimed to investigate the influence of maceration duration and temperature on the characteristics of blackberry wine. Eight samples were prepared with the addition of a maceration enzyme, potassium metabisulfite, and yeast, with variations in sugar addition (0 and 20%), maceration temperature (20 and 25°C), and maceration duration (5 and 10 days). Analyses were performed on the prepared blackberry juice, must, and wines. Physicochemical properties were analyzed using standard methods recommended by the International Organization of Vine and Wine (OIV). Antioxidative properties included the determination of total phenolics, nonflavonoids, and flavonoids, as well as antioxidant activity (FRAP, DPPH, and ABTS assays). Antimicrobial activity was tested using the agar dilution method to determine minimum inhibitory and bactericidal/fungicidal concentrations against selected bacteria (Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Bacillus cereus, Listeria monocytogenes), pathogenic yeast (Candida albicans), and probiotic cultures (Lactobacillus plantarum and Saccharomyces boulardii). Sensory evaluation of blackberry wines was conducted using the Buxbaum method. The results showed that prolonged maceration at lower temperatures and sugar addition increased alcohol content, while higher maceration temperatures increased total acidity (6.23-10.60 g/L) and lower temperatures reduced volatile acidity (0.48–1.08 g/L). Shorter maceration at higher temperatures improved color intensity, whereas longer maceration at lower temperatures reduced color quality. The sample without added sugar, macerated for 5 days at 25°C, showed the highest phenolic content and antioxidant activity, and all samples exhibited antibacterial activity, particularly against B. cereus and P. aeruginosa, but weak effects against yeast and probiotic cultures. Wines produced without sugar addition during fermentation were quite acidic and weak. By adding sugar, wines of good quality were obtained. Samples produced with sugar addition, shorter maceration, and lower temperature proved superior, and the alcohol content in these samples (>11 vol%) was considered satisfactory.

Key words: *blackberry wine, maceration time, maceration temperature, wine quality.*

STUDY ON THE MICROMORPHOLOGICAL CHARACTERISTICS OF POLLEN GRAINS IN SOME TABLE GRAPEVINE CULTIVARS (*VITIS VINIFERA* L.)

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Abstract

The morphological structure, characteristics, and hereditary properties of pollen represent a particularly important parameter in the taxonomy of genera, species, and cultivars, due to both their similarity and diversity. In the present study, five table grape cultivats – 'Muscat of Hamburg' (syn. 'Black Muscat'), 'Cardinal', 'Coarnă neagră', 'Milcov', and 'Mihaela' – were investigated. These cultivars exhibit a certain degree of relatedness, as the first two cultivars served as paternal genitors of 'Milcov' and 'Mihaela', whereas 'Coarnă neagră' represents the maternal genitor. The cultivars were evaluated in terms of pollen viability, pollen germination, and pollen storage behavior. Pollen morphology was analyzed using a scanning electron microscope (SEM) and viability was assessed using the TTC test. Germination capacity was determined in different standardized culture media using pollen stored at -20°C. The results reveal variations in pollen micromorphology among the four investigated cultivars, with distinct sizes, shapes, and exine ornamentation. These findings demonstrate the inheritance of these traits in the progeny and indicate that such characteristics can be used for more detailed analysis of grapevine cultivars, particularly within breeding programs.

Key words*: electronic scanning microscope, grape, pollen, pollen germination, pollen viability.*

PERFORMANCE OF SELECTED CLONAL ELITES FROM POPULATIONS OF THE CULTIVARS 'PERLETTE', 'PAULA' AND 'CENTENNIAL SEEDLESS' UNDER THE CONDITIONS OF THREE ROMANIAN VITICULTURAL AREAS

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Abstract

The study analyzes the performance of clonal elites of the cultivars 'Perlette', 'Paula', and 'Centennial Seedless', tested in three representative viticultural areas of Romania: population selections of the cultivar 'Perlette' in Murfatlar, those of 'Paula' in Iasi, and those of 'Centennial Seedless' in Stefanesti-Arges, over two viticultural years (2024–2025). Within this study, eighteen clonal elites were comparatively evaluated, assessing their performance relative to the control variant. The main climatic, phenological, agrobiological, productive, and technological indicators were analyzed in order to identify clonal elites with superior potential for expansion in cultivation. Significant differences among viticultural areas reflect the climatic impact on bud fertility, phenology, yield, and grape quality. During the study period, the clonal elites 'Perlette 7/2/5', 'Paula 5/1/4', and 'Centennial Seedless 5' demonstrated the best performance in terms of productivity and quality, ensuring average yields of 15–24 t/ha. These results recommend the varieties for testing, homologation, and expansion in the studied vineyards and in areas with similar conditions, while also enhancing the profitability of viticultural holdings through the high economic potential of table grapes.

Key words*: clonal selection, quality, productivity, stability, variability.*

TECHNOLOGICAL LINKS FOR INCREASING YIELD IN GRAFTED VINES

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Abstract

For the restoration of plantations and the expansion of vineyards on new land, a basic condition is to ensure the necessary quantities of grafted vines of the best quality. The quality of wine products depends, in addition to cultivation technology, decisively on the genetic factor and the quality of the planting material. The creation of uniform, compact plantations that will bear fruit as quickly as possible is possible only by using high-quality planting material for planting. Knowledge of the organization and conduct of activities in viticulture and, especially, activities in vineyard nurseries, technologies for the production of vine planting material by vegetative propagation, generative propagation, and technologies for rapid vine propagation: "in vitro" multiplication, etc.; production of certified, virus-free planting material; storage, transport, and marketing of vine planting material. Grafting involves cutting part of a shoot and transplanting it to a similar plant for propagation. Grafting is one of the oldest methods of vegetative propagation and is used for various types of plants. When grafting, we are dealing with the scion and rootstocks. The former is the part that grows in the aerial area of the union, and the latter is the element from which the roots grow. The purpose of grafting vines is to multiply the vine, but also to obtain new grapevine cultivars of superior quality. In addition to the fact that the grapes obtained in this way are tastier, larger, and juicier, they also have the ability to better withstand environmental conditions and pests. The vine obtained through this means of propagation will be more vigorous, and to keep diseases at bay, you can opt for a rootstock resistant to a certain type of pest.

Key words*: grafted vines, diseases, rootstock, planting material, quality.*

PHYTOCHEMICAL COMPOSITION (TOTAL POLYPHENOLS AND FLAVONOIDS) OF HYDROALCOHOLIC EXTRACTS FROM *VITIS VINIFERA* L. CV. CABERNET SAUVIGNON

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Abstract

Grapes (Vitis vinifera L.) are a rich source of phenolic compounds with antioxidant, anti-inflammatory, and cardioprotective properties. Comparative data on hydroalcoholic extracts from pulp and skins of Cabernet Sauvignon are limited. In this study, extracts were prepared separately from pulp and skins and analysed for total phenolic content (TPC) and total flavonoid content (TFC), expressed as g GAE/100 g and g rutin/100 g, respectively. Skin extracts showed significantly higher TPC (up to 2.47 g GAE/100 g) and TFC (up to 0.91 g rutin/100 g) than pulp extracts (TPC: 1.36-1.73 g GAE/100 g; TFC: 0.43-0.59 g rutin/100 g), confirming that skins are the main reservoir of polyphenols in Cabernet Sauvignon berries. These findings highlight the high antioxidant potential of grape skins and support their valorisation as natural bioactive ingredients for food and pharmaceutical applications, in accordance with sustainable viticulture practices.

Key words*: Vitis vinifera L., Cabernet Sauvignon, grape skins, polyphenols, flavonoids, antioxidant activity, hydroalcoholic extracts.*

DIVERSITY AND SPREAD OF TABLE GRAPE VARIETIES ON A GLOBAL SCALE

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Abstract

The aim of the paper is to analyze the assortment and distribution of table grape varieties at a global level. The study addresses different genotypes, including seedless varieties, seeded varieties, hybrids, and regional varieties, and is based on the analysis of the specialized scientific literature, providing an overview of their spread across continents. The results highlight the countries where research on table grapes is most intensively developed and visible. Relevant information is also presented that facilitates the understanding of the distribution and varietal structure at a global scale. The paper provides a useful reference framework for researchers, farmers, vine-growers, and decision-makers in the field of viticulture.

Key words*: Grapevine, zoning, distribution, Vitis vinifera, genotype.*

VEGETABLE GROWING

INTERACTION OF ABIOTIC AND BIOTIC STRESS ON PHOTOSYNTHETIC EFFICIENCY AND YIELD IN FABA BEAN (*VICIA FABA* L.)

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Abstract

Faba bean (Vicia faba L.) is an important grain legume whose productivity is increasingly constrained by the combined effects of abiotic and biotic stresses under field conditions. This study evaluated the interaction between these stress factors in relation to photosynthetic efficiency and yield performance in thirteen experimental faba bean breeding lines grown in Romania. The field experiment was conducted in 2025 using a randomized complete block design with three replications. Abiotic stress response was assessed through chlorophyll fluorescence parameters, particularly the maximum quantum efficiency of photosystem II (Fv/Fm), and the chlorophyll content index (SPAD), while biotic stress was evaluated based on natural infestation by the black bean aphid (Aphis fabae). Considerable variability was observed among genotypes, with Fv/Fm values ranging from 0.57 to 0.79 and SPAD values from 10.22 to 23.77. Seed yield varied between 308.2 g m^{-2} and 1057.5 g m^{-2}. Lines L7, L17, L21, and L4 maintained higher photosynthetic efficiency, lower aphid infestation, and superior yield stability under stress conditions. These results highlight the value of integrating physiological indicators and field observations in selecting faba bean breeding material adapted to multiple stress environments.

Key words*: Aphis fabae, breeding, chlorophyll fluorescence, physiological response, SPAD index.*

INFLUENCE OF FERTILIZATION REGIMES ON YIELD, BIOACTIVE COMPOUNDS, AND NITRATE CONTENT OF BROCCOLI GROWN UNDER PROTECTED CULTIVATION

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Abstract

Fertilization management is a key factor influencing both yield and nutritional quality of broccoli. This study aimed to evaluate the effects of different fertilization regimes on broccoli yield and on the accumulation of bioactive and quality-related compounds in the main inflorescences. The experiment was conducted in a polyethylene tunnel using three broccoli hybrids. Plants were subjected to different fertilization treatments, including a non-fertilized control, organic fertilization, and mineral fertilization regimes. At harvest, yield parameters were recorded and biochemical analyses were performed to determine vitamin C, chlorophyll a and b, carotenoids, total phenolic content, antioxidant activity, and nitrate concentration in the broccoli inflorescences. Fertilization significantly influenced broccoli yield and biochemical composition. Nitrate content was also affected by fertilization type, highlighting differences between organic and mineral nutrient management. Results indicate that fertilization strategies play an important role in determining both productivity and nutritional quality of broccoli grown under protected cultivation.

Key words*: broccoli, fertilization, yield, bioactive compounds, antioxidant activity, phenolics, nitrates.*

MODULATION OF GROWTH AND STRESS-RELATED PHYSIOLOGY IN ROUND PEPPER (*CAPSICUM ANNUUM* L.) SEEDLINGS VIA OPTIMIZED FERTILIZATION

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Abstract

The present study investigates the effects of some fertilization treatments on the growth and physiological attributes of `Creolica` round pepper (Capsicum annuum L.) seedlings cultivated under controlled conditions at the Vegetable Research and Development Station Bacău. Seven fertilization variants were assessed using distinct commercial products at different concentrations: V1 (Albit 0.1% + Turboroot 0.25%), V2 (Albit 0.01% + Turboroot 0.375%), V3 (Albit 0.01% + Turboroot 0.5%), V4 (Turboroot 0.25%), V5 (Turboroot 0.375%), V6 (Turboroot 0.5%), and V7 (Control - untreated). Key morphological and physiological parameters were evaluated, including stem height, stem weight and diameter, root length and weight, number of leaves per seedling, leaf length and width, leaf surface area, leaf shape (expressed as the ratio of leaf width to leaf length), chlorophyll content, anthocyanin concentration, dry matter content, and water content. The findings of this study provide valuable insights into the potential of Albit and Turboroot combinations to enhance seedling quality and vigor in round pepper cultivation.

Key words*: seedling vigor, biostimulant-mediated regulation, controlled-environment, root morphogenesis, chlorophyll and anthocyanin dynamics.*

INVASIVE AND POTENTIALLY INVASIVE SPECIES IN VEGETABLE CROPPING SYSTEMS OF NORTHEASTERN ROMANIA

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Abstract

Vegetable crop production is increasingly affected by invasive and potentially invasive species, including weeds, insect pests, and plant pathogens. The aim of this study was to inventory weed species and to assess their role as ecological drivers influencing both pest incidence and beneficial entomofauna within vegetable agroecosystems.
Field observations were conducted to identify and document the weed species present in vegetable crops. In parallel, the incidence of major pests and beneficial entomofauna was analysed in order to evaluate their relationship with spontaneous flora. Among the 76 species identified, belonging to 26 botanical families, a total of 19 taxa were classified as invasive or potentially invasive in Romania.
The results showed that the presence of certain weed species shapes the dynamics and overall quality of the ecosystem, as some weeds can serve as hosts for important vegetable crop pests, while others provide essential resources for beneficial entomofauna, thereby mitigating pest pressure.

Key words*: biodiversity, beneficial arthropods, ecological services, weed-insect interactions.*

INTEGRATED BIOCONTROL APPROACHES FOR ROOT-KNOT NEMATODES IN BITTER GOURD CULTIVATION

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Abstract

In 2025, Momordica charantia L. *cv. 'Rodeo', a cultivar registered at the Vegetable Research and Development Station, Buzău, Romania, was cultivated under greenhouse conditions in southern Romania. During the growing season, plants exhibited severe natural infestation with root-knot nematodes, characterized by extensive root galling, with some galls visible above the soil surface, impaired root-system functionality, and moderate foliar chlorosis. Despite high nematode pressure, plants survived and continued fruit production, indicating a certain level of physiological tolerance when supported by appropriate crop management. An integrated treatment scheme based on microbial and organic inputs, including Bacillus spp., Trichoderma spp., amino acids, seaweed extracts, and micronutrients was applied to mitigate nematode damage. These treatments enhanced root regeneration, stimulated secondary root development, and contributed to the maintenance of plant vigour under biotic stress. The findings confirm the high susceptibility of Momordica charantia L. to Meloidogyne incognita, while also demonstrating the potential of microbial-based biostimulant strategies to alleviate nematode-induced damage. This study supports the development of sustainable plant protection approaches for exotic vegetable crops facing emerging biotic threats in protected cultivation systems.*

Key words*: invasive species management, Meloidogyne incognita, microbial biocontrol, Momordica charantia.*

PRODUCTIVITY ELEMENTS, YIELD, AND QUALITY INDICES IN TOMATOES AS A RESULT OF 'GENOTYPE×FERTILIZER' INTERACTION

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Abstract

The study evaluated some productivity parameters and quality indices in tomatoes in relation to fertilization. The tomato hybrid 'Polfast F1' was cultivated in relation to Naturamin WSP fertilizer (V1) and Crop Max (V2), and the tomato variety 'San Marzano' in relation to Naturamin WSP (V3) and Crop Max (V4). The 'San Marzano' variety showed an advantage for the number of clusters (PCN) and the number of fruits per plant (PFN). The 'Polfast F1' hybrid showed an advantage for average fruit weight (AFW). In terms of yield (Y/plt) the V4 variant showed an advantage, with statistically significant differences ($p<0.05$). In terms of quality indices, variant V1 showed an advantage for vitamin C (VitC), $p<0.05$, and variant V4 showed an advantage for the calcium (Ca) content, $p<0.01$, and the lycopene (LYCO) content, $p<0.05$. Multivariate analysis (PCA) explained the positioning of the productivity parameters and the fruit quality indices in relation to the principal components, with positive effects in PC1 (PCN, PFN, LYCO) and in PC2 (Ca) and negative effects in PC1 (VitC, AFW).

Key words: *fertilizers, PCA, productivity elements, quality indices, tomatoes, yield.*

GENETIC RESOURCES AND BREEDING STRATEGIES FOR SUSTAINABLE IMPROVEMENT OF EGGPLANT (*SOLANUM MELONGENA* L.). A REVIEW

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Abstract

The broad yet underutilized genetic diversity of eggplant (Solanum melongena L.) provides a crucial foundation for breeding strategies aimed at enhancing yield, resilience, and adaptability. In light of accelerating climate change and mounting biotic and abiotic stresses, the development of improved cultivars necessitates a strategic and effective deployment of these genetic resources. This review synthesizes current knowledge on eggplant genetic diversity and its practical integration into breeding programs, with emphasis on germplasm evaluation, trait-based selection, stress tolerance, and yield and quality improvement. Particular attention is given to conventional and hybrid breeding approaches, the role of phenotypic diversity in cultivar adaptation, and the linkage between genetic variation and nutritional or functional traits. By consolidating recent advances and breeding outcomes, this review highlights pathways for strengthening eggplant improvement programs and supports the development of resilient cultivars suited to sustainable agricultural systems.

Key words*: eggplant, germplasm evaluation, genetic resources, quality improvement, breeding strategies, sustainable improvement.*

AGRO-MORPHOLOGICAL CHARACTERIZATION OF A NEW GENOTYPE OF *SATUREJA HORTENSIS* IMPROVED AT BRGV BUZĂU

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Abstract

Satureja hortensis (summer savory) was included in the research plan due to its long tradition of cultivation and has been used in traditional recipes that later became a registered trademark. The research began with the establishment of a germplasm collection of over 20 genotypes, focused on the ecotype traditionally cultivated in Buzău County. The crop was grown in the field using seedlings. Breeding methods included repeated individual selection and negative mass selection. The plants obtained have a semi-upright habit, drooping shoots, and open architecture, with an average height of 36.32 cm and a diameter of 44.12 cm. The sessile, lanceolate leaves, with an average length of 2.6 cm and a moderate yellowish-green colour (RHS 138 A), give the foliage a uniform appearance. The pale purple flowers (RHS 69 D) enhance the ornamental value, and the shoots and non-lignified stems give off a slightly floral, peppery aroma. The genotype was submitted to ISTIS in 2024 for testing and proposed for approval as the "Ideal" variety.

Key words*: summer savory, plant breeding; ecotype, field evaluation, selection.*

DOCUMENTATION AND ASSESSMENT OF GENETIC DIVERSITY IN BASIL *(OCIMUM BASILICUM* L.) THROUGH MORPHOLOGICAL, YIELD, AND LEAF COLOR ANALYSIS

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Abstract

Effective documentation of plant genetic materials is crucial for maximizing the use of genetic resources in breeding programs. Well-structured information on genetic, phenotypic, and passport data empowers breeders and researchers to make informed decisions about the potential of accessions for breeding and research purposes. Basil (Ocimum basilicum L.), a versatile aromatic plant of considerable economic importance, was the focus of this study. This species is distinguished by its remarkable diversity, exhibiting a wide range of variations in phenotype and chemical composition. Such diversity underpins its broad applications in organic agriculture, food, pharmaceuticals, and cosmetics. Five distinct basil genotypes were evaluated for their morphological traits and yield. Significant variations were observed in plant height, branch number, fresh and dry herb weights, and essential oil content. Leaf color parameters were also assessed. The study identified key genotypic characteristics of the examined materials, providing valuable insights for the development of new cultivars.

Key words*: diversity, aromatics, use, phenotype, basil.*

LEG(O)NEST – OPTIMIZING THE VEGETABLE AGRI-FOOD SYSTEM THROUGH THE BROAD APPLICATION OF RESEARCH AND DEVELOPMENT RESULTS TO STRENGTHEN FARMERS` COMPETENCIES

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Abstract

The diversity of life on Earth is the foundation of agriculture - from the food we eat to the ecosystem `services` that sustain our existence. The loss of biodiversity can have a catastrophic impact on economic prosperity, agriculture, and other aspects of life. Biological resources are an essential contribution to the country`s economy, enhancing the sustainability of agri-food products. The genetic base of today`s crops is alarmingly narrow, posing a threat to food security for a growing population. Current aggressive agricultural practices and the excessive use of synthetic inputs severely endanger biodiversity, leading to genetic uniformity. Modern, imported varieties have replaced local varieties and populations in traditional agro-ecosystems, resulting in increased genetic vulnerability to diseases and pests. Leg(O)Nest proposes a model to promote biodiversity development through: identifying new genes/traits that enhance adaptation to specific cultivation conditions; identifying traits that ensure suitability for organic farming systems; developing new high-yielding varieties with a broad genetic base; enhancing the value of a wide range of newly created varieties in the agri-food chain.

Key words*: vegetables, plant genetic resources, varieties, resilience, use.*

WEED CONTROL IN TOMATO CROP USING ALLELOPATHIC SPECIES UNDER CONVENTIONAL AND ECOLOGICAL SYSTEMS

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Abstract

The aim of this study was to evaluate the allelopathic influence of white clover (Trifolium repens), barley (Hordeum vulgare), and oat (Avena sativa) on weed control in tomato crops. Two experimental factors were analyzed: (1) the impact of plant species with allelopathic potential on weed infestation, and (2) the effects of organic versus conventional fertilization on plant development. Allelopathic species were sown simultaneously with tomato planting, using the determinate tomato (Solanum lycopersicum) cultivar 'Bacuni'. The main weed species identified were redroot pigweed (Amaranthus retroflexus), lamb's quarters (Chenopodium album), gallant soldier (Galinsoga parviflora), pale persicaria (Persicaria lapathifolia), purslane (Portulaca oleracea), field bindweed (Convolvulus arvensis), cockspur (Echinochloa crus-galli), and green foxtail (Setaria viridis). The allelopathic plants significantly reduced both the number and total biomass of weeds before the first mowing, regardless of whether the cultivation system was organic or conventional. Weed biomass increased substantially before the second tillage/mowing in all treatments, highlighting the need for continuous weed management to prevent competition with the crop. Regarding tomato production, superior results were obtained under the conventionally fertilized treatment compared with the organically fertilized one.

Key words*: sustainable agriculture; weed management; tomato production; organic fertilization.*

PRODUCTION PRACTICES AND USES AT SAFFRON. A MINI REVIEW

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Abstract

Saffron (Crocus sativus L.) is a bulbous perennial species of the Iridaceae family, genus Crocus, and is cultivated for the production of stigmas. These stigmas are used as a culinary spice, food colouring, in traditional medicine, or in the cosmetic industry. Saffron is often considered the "red gold" and the most expensive spice in the world, and for this reason it has gained great popularity worldwide as a "superfood" and as a profitable crop. The species is cultivated in diverse pedoclimatic regions and requires warm and dry conditions during the vegetative dormancy phase and sunny conditions for flower appearance. The productivity of saffron is influenced by several factors, namely: climatic conditions during the vegetation period, soil type, and production practices. The paper highlights cultivation methods and post-harvest management through the study of scientific works published in Google Scholar, Web of Science, Scopus and PubMed, for the implementation of appropriate agronomic practices. Therefore, scientific evidence supports the fact that adapting the best cultivation practices influences saffron productivity and quality.

Key words*: Crocus sativus L., agronomic practices, corms.*

IN VITRO EVOLUTION OF SOME SWEET POTATO (*IPOMOEA BATATAS* [L.] LAM) GENOTYPES UNDER THE INFLUENCE OF DIFFERENT PLANT GROWTH REGULATORS (AUXINS AND CYTOKININS)

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Abstract

A study was initiated with the aim of identifying an effective nutrient medium formulation capable of stimulating the growth and development of microplants. The in vitro development of five sweet potato genotypes (DK 19/1, DK 19/2, DCh 19/3, DK 19/4, and DK 19/5) was monitored. One month after culture initiation, the sweet potato microplants were evaluated for shoot length, leaf number of roots, and root length. Six nutrient media were formulated and compared with the control (Murashige-Skoog - without phytohormones). Regarding shoot length, leaf number of leaves, and root length, the media variants V1 (MS+BAP 0.5 mg/L + IAA 0.5 mg/L), V4 (MS+KIN 0.5 mg/L+IAA 0.5 mg/L), and V0 (MS without phytohormones) showed the most notable effects. Media variants V6 (MS+KIN 0.5 mg/L+NAA 0.5 mg/L+IBA 1 mg/L) and V3 (MS+BAP 0.5 mg/L+NAA 0.5 mg/L+IBA 1 mg/L) had a positive influence on the number of roots. The study highlighted BAP 0.5 mg/L and IAA 0.5 mg/L, positively influencing the in vitro development of microplants across all five sweet potato genotypes.

Key words: *auxin, cytokinin, genotype, plant tissue culture, sweet potato.*

IN VITRO CULTURE, ACCLIMATIZATION, AND BIOCHEMICAL TRAITS OF *HYPERICUM PERFORATUM* L.

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Abstract

The present study aims to develop an efficient in vitro culture and acclimatization protocol for Hypericum perforatum and to provide a preliminary biochemical assessment of micropropagated plants compared with acclimatized ones. In vitro cultures were initiated from nodal explants collected from greenhouse-grown plants and established on Murashige and Skoog (MS) medium. Shoot multiplication was evaluated on Driver and Kuniyuki Walnut (DKW) medium supplemented with different cytokinins, while rooting was assessed on DKW medium with and without indole-3-butyric acid. Ex vitro acclimatization was performed in perlite under controlled humidity conditions, followed by transfer to a peat substrate under greenhouse conditions. The highest shoot multiplication rate was obtained on medium supplemented with benzyladenine, while the best rooting response was recorded on auxin-free medium, which ensured high explant viability. Acclimatization rates were high for both rooted and non-rooted shoots, with superior growth performance observed in plantlets rooted in vitro. The biochemical analysis revealed comparable levels of phenolic compounds and flavonoids in both plant categories, suggesting that in vitro-derived biomass may represent a potential source of phenolic compounds.

Key words*: micropropagation, 6-benzyladenine, total phenolic content (TPC), total flavonoid content (TFC).*

CLIMATE CHANGE AND TOMATO CULTIVATION: RISKS, CHALLENGES AND SOLUTIONS

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Abstract

This review examines the impacts of climate change on tomato (Solanum lycopersicum L.), a globally cultivated crop of the Solanaceae family with high nutritional and economic importance. Rising temperatures, altered precipitation patterns, increased atmospheric CO_2 concentrations, water scarcity, soil degradation, and intensified pest and disease pressures pose significant risks to tomato productivity, fruit quality, and the sustainability of production systems. The paper emphasizes adaptation strategies, including the development and use of climate-tolerant varieties, strategic selection of cultivation sites and planting periods, and the implementation of climate-smart agronomic practices such as optimized irrigation, nutrient management, mulching, and shading. Additionally, integrated approaches combining genetic improvement, technology, and sustainable farming methods are crucial for mitigating climate-related risks and ensuring continuous production while minimizing environmental impacts. Integrating these strategies enhances the resilience and long-term viability of tomato cultivation under evolving climate conditions.

Key words*: tomato cultivation; climate change; drought management; genetic improvement; sustainable farming.*

RESEARCH ON THE IDENTIFICATION OF THE NEW IDEOTYPE OF POTATO, COMPETITIVE IN THE AGRICULTURAL SECTOR IN SOUTHERN OLTENIA

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Abstract

The research was carried out at R.D.S.P.C.S. Dabuleni in the agricultural years 2024 and 2025 and aimed at comparing potato lines originating from the National Institute for Research and Development for Potato and Sugar Beet Brașov, at different stages of the improvement process, with the aim of identifying the new potato ideotype, competitive in the agricultural sector of the southern area.
The results obtained highlighted increased tolerance to thermohydric stress in lines 1927/1 and 22-1941/8, in 2024 and in line 1901/6 in 2025, a line differentiated positively, with statistically assured values that were very significant compared to the control. In terms of potato line productivity, in 2024, the 1895/4 line stood out, with an average production of 38.49 t/ha, which was 5.45 t/ha above the average of the varieties. In 2025, the 2008/4 lines stood out, with 48.75 t/ha and 22-1895/4, which achieved 44.05 t/ha.
Also, in the two years of study, environmental factors had a direct influence on the physiological, biochemical, and production processes.

Key words: *potato, sandy soils, abiotic stress, production, quality.*

ESSENTIAL MINERAL COMPOSITION OF RED ONION (*ALLIUM CEPA* L.) AS A HORTICULTURAL FOOD PRODUCT AND THE IMPLICATIONS FOR HUMAN NUTRITION

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Abstract

This study assessed the essential mineral composition of red onion as a horticultural food product and evaluated its contribution to dietary mineral intake, highlighting its nutritional relevance. Mineral analysis was conducted under controlled experimental conditions, revealing high levels of macrominerals, K, Ca, Mg, along with appreciable concentrations of essential trace elements, Fe, Zn, Cu, and Mn. Based on the determined mineral composition, the dietary intake of minerals associated with the consumption of 50 g of dry matter was estimated. The results demonstrated a substantial contribution to the recommended daily intakes of Cu, K, Mg, and Ca, as well as of Mn and Fe. Under the applied experimental conditions, red onion can be considered a valuable natural source of essential minerals and a promising ingredient for improving the mineral profile of food products. These findings highlight the quality and nutritional value of red onion as a horticultural food product and its potential application in the development of mineral-enriched foods.

Key words*: red onion, horticultural food product, mineral composition, essential minerals.*

THE BEHAVIOR OF 'VALIN 24' PUMPKIN CULTIVAR IN THE PEDOCLIMATIC CONDITIONS OF SANDY SOILS FROM DĂBULENI RDSPCSS

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Abstract

*During the two years 2024-2025 the 'Valin 24' pumpkin cultivar was studied at the Dăbuleni Research and Development Station for Plant Cultivation on Sandy Soils (RDSPCSS), as a result of the creative breeding process. The characters that play a determining role in the agronomic value of a cultivar, such as fruit weight and pulp thickness, remained constant during the study period. Also, the pumpkin cultivar presented good stability for characters such as fruit height, fruit diameter, seminal cavity diameter, and shape index**,** given by the ratio between the height of the fruit and its diameter**.** Regarding the biochemical content of pumpkin fruits analyzed during the 2024-2025 study period, it was found that the highest average values were recorded in 2024 in terms of total dry matter content (%), soluble dry matter (%), starch (%), titratable acidity (g malic acid/100 g fresh matter) and vitamin C (mg/100 g fresh matter). Following statistical analysis of the characters measured over the two years of study, it was found that the pumpkin variety developed at Dăbuleni RDSPCSS performed well under the pedoclimatic conditions in the sandy soil area.*

Key words*: pumpkin, cultivar, sandy soils, conservative selection.*

IMPACT ASSESSMENT OF PASSIVE ELECTROMAGNETIC DEVICES ON THE GROWTH PERFORMANCE OF SELECTED LETTUCE VARIETIES

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Abstract

The study was conducted at the Faculty of Horticulture in Bucharest under greenhouse conditions with LED lighting on two Lollo-type lettuce cultivars, aiming to evaluate the effect of electromagnetic frequencies (5–30 MHz) on morphological, productive, and quality parameters. The results highlighted differentiated responses depending on frequency compared with the control variant. Vegetative growth parameters, such as plant height and rosette diameter, showed small variations, suggesting low sensitivity to the applied treatments. The number of leaves remained relatively constant, with slight increases at 7 and 30 MHz, indicating a moderate influence on leaf development. In contrast, productive parameters were significantly influenced. The highest total plant weight values were recorded at 28 MHz and 30 MHz. At the same time, root system development was stimulated, with maximum values of root weight and root volume observed at 28 MHz. Root length was greater at lower frequencies and reduced at higher ones, suggesting a redistribution of resources toward volumetric growth. Frequencies of 28–30 MHz demonstrated a stimulatory effect on biomass accumulation and root system development, indicating potential applicability in optimizing production.

Key words*: Lettuce, LED Light, Electromagnetic Fields, Nutrient Film Technique, Bio Stimulation, Frequency-Dependent Effects.*

ASSESSMENT OF CLIMATIC EFFECTS ON SEED GERMINATION IN DIVERSE VARIETIES OF EDIBLE AMARANTH

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Abstract

The study investigated the effect of climatic factors on seed germination in seven cultivars of amaranth: Amaranthus retroflexus (Cezar), Amaranthus caudatus (L1 and L2), Amaranthus tricolor, and three cultivars of Amaranthus cruentus (L3, L4, L5). Germination was evaluated 5 and 13 days after sowing, and the measured parameters included germination energy (EG), germination capacity (FG), abnormal seedlings (GA), dead seeds (SM), and rotten seeds (SP). Results showed significant variation among the cultivars. The highest values of germination energy and germination capacity were recorded in Amaranthus tricolor and A. retroflexus Cezar (>94%), with minimal percentages of dead or rotten seeds, indicating high tolerance to environmental conditions. In contrast, A. caudatus L1 and A. cruentus L5 exhibited low germination and high percentages of dead or rotten seeds (up to 50%), reflecting increased sensitivity to climatic factors. A. caudatus L2 and A. cruentus L3 and L4 showed intermediate performance, with moderate germination and variable proportions of dead seeds or abnormal seedlings. These results indicate that environmental factors differently affect amaranth seed germination depending on the cultivar and highlight the importance of selecting resistant cultivars to optimize production.

Key words*: Amaranthus, cultivars, seed, germination.*

SYSTEMIC GENE EXPRESSION OF DEFENSE-RELATED ENZYMES INDUCED BY PLANT GROWTH-PROMOTING RHYZOBACTERIA

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Abstract

Plant growth-promoting rhizobacteria can induce both local and systemic plant defense responses. As in the case of local resistance, systemic resistance is associated with the activation of antioxidant enzymes, such as catalase (CAT), superoxide dismutase (SOD), and peroxidase (POX), and the synthesis of other defense-related enzymes, such as phenylalanine ammonia-lyase (PAL). This study aimed to evaluate the effect of bacterial treatment on transcriptional changes in genes encoding five defense-related proteins in distal tissues of Cucumis sativus L. plantlets. Suspensions of Pythium debaryanum Hesse phytopathogen (Py) and antagonistic bacteria, such as Bacillus licheniformis (B40), Bacillus amyloliquefaciens (Bw), Bacillus sp. (Bw1) and Pseudomonas aeruginosa (P14) were applied on cucumber plantlets rootsthe roots of three weeks old cucumber plantlets. Total RNA was isolated, and reverse transcription-PCR (RT-PCR) was performed. A semi-quantitative method was used to determine alterations in the expression of five defense-related genes in treated plants, using a semi-quantitative PCR analysis, differential responses in pretreated and untreated plants inoculated with beneficial bacteria. Plants pretreated with the selected bacterial strains showed overexpression of genes encoding two defense-related enzymes: one involved in the primary antioxidant system and the other a key enzyme in the phenylpropanoid pathway.

Key words*: plant defence-related enzymes, systemic gene expression, beneficial microorganisms.*

METHODS FOR MANAGING THE PEST *TUTA ABSOLUTA* MEYRICK IN TOMATO CROPS IN GREENHOUSE

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Abstract

Chemical and biological methods are widely used for pest control in tomato crops. In order to manage Tuta absoluta infestation, a greenhouse tomato experiment was conducted in 2025 at RDIVFG Vidra, using the hybrids Tolstoi F1 and Kalina F1, planted at a density of 33.500 plants per hectare. The crops were protected with black plastic mulch to reduce evapotranspiration and limit weed development. The experiments were arranged in four variants, each with three replications, and climatic conditions were monitored using a thermo-hygrometer. In the first variant, treatments were applied exclusively with chemicals; in the second variant, chemical products were combined with plant extract–based products; in the third variant, only biological products were applied throughout the entire growing season; while the fourth treatment served as an untreated control, with no phytosanitary applications. The effectiveness of the treatment variants ranged from 64.14% to 90.87%. In reported experimental conditions, the best results were obtained with the variant in which chemical treatments were applied.

Key words*: biological control, chemical products, plant protection.*

EVALUATION OF OPTIMAL ACETYLSALICYLIC ACID CONCENTRATIONS FOR INDUCING SYSTEMIC RESISTANCE IN CABBAGE PLANTS AGAINST PESTS AND PATHOGENS

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Abstract

The paper evaluates the potential of acetylsalicylic acid (ASA) as an elicitor for inducing systemic resistance in cabbage plants (Brassica oleracea), in the context of identifying sustainable phytosanitary protection solutions. The study was conducted under field conditions in the experimental plots of VRDS Bacău, under pressure from Xanthomonas campestris (black rot) and cabbage flea beetles (Phyllotreta spp.). Three concentrations of ASA applied foliar treatment (0.1 mM, 0.5 mM, and 1 mM) were tested. The results indicate that a dose of 0.5 mM is optimal for controlling black rot, reaching a maximum efficacy of 93.05% on day 7 after application, while the concentration of 1 mM provides the most stable protection against entomological pests. Treatment efficacy was found to be dose-dependent and temporary, with the 0.1 mM concentration presenting the highest long-term stability. Acetylsalicylic acid represents a promising, sustainable component of integrated pest management (IPM); however, repeated applications are required to ensure sustained crop protection against the targeted pests and pathogens.

Key words*: acetylsalicylic acid, biotic stress, crop protection, foliar application, sustainable agriculture.*

THE PHENOTYPIC CHARACTERISTICS OF DIFFERENT VARIETIES OF *LUFFA* SPP. IN THE COLLECTION AT BRGV BUZAU

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Abstract

Luffa spp. belongs to the Cucurbitaceae family, with its area oforigin in the subtropical zone, characterized by hot, long summers and frost-free winters. Luffa.spp is a species recently introduced in Romania. The young fruits are consumed in China in different dishes, such as soups or salads, and the fruit extract can also be used in cosmetics. The species can also be cultivated as a decorative plant due to the luxuriant appearance of the vine and its yellow, ornamental flowers.
The first cultures were established after 1960 at the Buzau Vegetable Research and Development Station, being used for a long time as an experimental variant for testing products to combat cucurbit diseases. The first seeds brought to our country were purchased from France. After 1996, the Buzau Genetics and Biodiversity Conservation Laboratory resumed research on the species, obtaining in 2021 the first variety of L. cylindrica under the name Elida. This study aims to present the main characteristics of luffa varieties in the collection at BRGV Buzau.

Key words*: Cucurbitaceae, sponge gourd, loofah, biodiversity.*

THE INFLUENCE OF ELECTRIC AND MAGNETIC FIELD TREATMENTS OF SOIL AND SEEDS ON PEPPER`S GERMINATION

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Abstract

The application of physical fields in agriculture represents an emerging approach for improving plant biological processes and enhancing crop performance. This study investigates the effects of electric field exposure on the germination of pepper (Capsicum annuum) seeds and growing substrate under controlled laboratory conditions. A preliminary monofactorial experiment focused exclusively on the effect of electric field seed treatments on germination in glass germination vessels, including several exposure-time variants and an untreated control. Subsequently, a bifactorial experiment was conducted between 2024 and 2025, including substrate treatment (20 and 40 minutes at 20 V) and seed treatment (20 minutes at 20V). Germination performance was assessed using standard indicators, such as final germination percentage and germination energy, while plant growth and early development were also evaluated. The results showed a slight increase in germination capacity and germination energy in variants with substrate treated for 20 minutes compared to the control. Prolonged exposure exhibited a minor, statistically insignificant inhibitory effect. These findings highlight the potential of electric field application as an alternative tool for improving seed germination and supporting sustainable agricultural practices.

Key words*: electric field, growth, germination, Capsicum annuum.*

EFFECTS OF HIGH TEMPERATURE ON GROWTH CHARACTERISTICS IN TOMATOES

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Abstract

The effects of high temperatures continue to be a major problem for food security. Therefore, the creation of high temperature-tolerant varieties is an essential economic measure in the adaptation of plants to climate change. The paper presents the results of screening some tomato prospective lines based on resistance to high temperatures (41°, 43°C) in early ontogenesis. Seedlings grown at 25ºC served as the control variant. The analysis of the variability of the resistance trait was carried out based on the length of the embryonic radicle, stem, and entire seedling. As a result of the analysis of the percentage of variance in the source of variation of the traits, it was found that the contributions of genotype, temperature, and the genotype x temperature interaction for radicle length were 13.9, 75.7, 5.1%; stem – 9.3, 82.9, 4.3%, and seedling – 10.2, 80.2, 5%. So, the variability of the lengths of the embryonic radicle, stem, and seedling depends mostly on temperature. By cluster analysis (k-means) in the 43ºC variant, the lines L 504, L 506, L 507 were identified, which formed a separate cluster with the highest values of the evaluated characters. Line 506 exhibited the highest values of growth traits at both levels of stressful temperature, which offers opportunities for its use in breeding programs as a resistance donor.

Key words*: tomato, resistance, temperature, variability.*

PHENOTYPIC DESCRIPTION OF *VIGNA UNGUICULATA* SUBSP. *SESQUIPEDALIS* ACCESSIONS AT BRGV BUZĂU

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Abstract

Vigna unguiculata subsp. sesquipedalis (yardlong bean) is a legume with high agronomic and nutritional potential, yet underutilized in Romania. This study aimed to perform a phenotypic characterization of six distinct clusters (C1–C6), each comprising 30 genetically related lines conserved at the Vegetable Genetic Resources Bank (BRGV) Buzău. Qualitative traits, including growth habit, flower, and pod color, as well as quantitative traits such as pod length, number of seeds per pod, and number of pods per node, were evaluated. Data were analyzed using cluster analysis to assess similarity and differentiation among accessions. The results highlighted one elite, E3, which exhibited superior productivity compared with the others. Pod length for E3 ranged from 16 to 22 cm, with approximately 15 seeds per pod and 2–3 pods per node. Cluster analysis confirmed the distinctiveness of E3 within the studied material. Based on its phenotypic performance, E3 is proposed for official variety registration and patenting. The identified traits recommend E3 as valuable material for breeding programs. Overall, this study provides essential phenotypic information to support the development and sustainable cultivation of yardlong bean in Romania.

Key words*: germplasm evaluation; elite selection; agromorphological traits; genetic resources conservation; breeding potential.*

APPLYING MARVIN SEED ANALYZER FOR PHENOTYPIC CHARACTERIZATION OF COMMON BEAN COLLECTION

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Abstract

The National Crop Genebank of Bulgaria was established in 1984 at the Institute of Plant Genetic Resources in Sadovo (Central South Region). It maintains extensive germplasm collections of local and foreign origin. Landraces constitute a strategic genetic reservoir, requiring systematic characterization and conservation. The study was conducted in the experimental field of the institute, including 84 accessions of common bean (Phaseolus vulgaris L.). They were analyzed through phenological observations and biometric measurements, using the international descriptors and analyzed with MARViN VisionLine seed screening. Biological, morphological, and quality traits with averaged data across two replications were assessed. Statistical analyses were performed with Microsoft Excel and SPSS, applying diverse approaches to reveal trait variability. Seed colour and the morphometric parameters used from the analyzer may prove to be highly informative traits that can be used for both for morphological classification and for genetic and breeding purposes. Local populations are the golden gene pool, and they should not only be studied but also preserved, with open access being guaranteed. The research was carried out under the project IS-PGR-SADOVO (Contract KP-06-H86/9/09.12.2024 of Bulgarian National Science Fund).

Key words*: genebank, Phaseolus vulgaris, seed traits, database, statistical analysis.*

THE ROLE OF ANTIOXIDANT ENZYMES IN SALINITY STRESS TOLERANCE OF BITTER CUCUMBER (*MOMORDICA CHARANTIA L.*)

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Abstract

Momordica charantia, a tropical and subtropical species belonging to the family Cucurbitaceae, is valued both for its nutritional importance and its medicinal properties. Salinity stress represents a major factor limiting agricultural productivity by affecting processes such as photosynthesis, plant growth, and development. Catalase and peroxidase are the principal antioxidant enzymes involved in the degradation of excess accumulated hydrogen peroxide. The aim of the present study was to assess the salinity stress tolerance of five bitter cucumber genotypes (Brâncuși, Rodeo, Line 3, Line 4, and Line 1) by determining their enzymatic activity. The results showed that genotype Line 3 exhibited the highest enzymatic activity (over 50%) under salinity stress conditions (100 mM and 200 mM NaCl), indicating superior antioxidant capacity and increased tolerance to saline conditions. These findings were statistically validated using Pearson's correlation analysis.

Key words*: salinity stress, catalase, peroxidase, Momordica charantia.*

PRETREATMENT OF SEEDS WITH *TRICHODERMA* STRAINS IMPROVES FORL RESISTANCE AND INDUCES THE EXPRESSION OF CHITINASE GENE IN TOMATO PLANTS

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Abstract

Some Trichoderma isolates are known to produce a variety of hydrolytic enzymes (e.g. chitinase, β1-3 glucanase, and β1-6 glucanase) that are involved in plant disease resistance through complementary modes of action. The antagonistic activity of six Trichoderma strains against Fusarium oxysporum f. sp. radicis-lycopersici (FORL) was evaluated alongside their chitinase production. The expression of the defense-related chitinase 26 gene in tomato plants was evaluated by RT-PCR analysis. The results show that the Trichoderma spp. isolates under investigation exhibited elevated chitinase activity, with one T. asperellum and two T. longibrachiatum strains showing particularly high levels. All Trichoderma isolates reduced the mycelial growth of FORL, the efficacy of this reduction varying depending on the Trichoderma strain. A positive correlation was observed between the antagonistic activity of Trichoderma isolates against FORL and their production of chitinases. Regarding the impact of various treatments on chitinase 26 expression in tomato plants, several treatments enhanced chitinase 26 expression, while one treatment suppressed this response. These findings indicate that Trichoderma isolates can have biocontrol potential and that they can elicit different effects on tomato defense activation.

Key words*: gene expression, Fusarium oxysporum f. sp. radicales-socialistes, chitineuse, plant diseuse.*

EFFECTS OF FOLIAR TREATMENTS WITH BIOSTIMULANTS BASED ON SEAWEED EXTRACT ON THE QUALITY AND LONG-TERM DURABILITY OF ROUND PEPPERS

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Abstract

Pepper (Capsicum annuum L.) is a valuable horticultural crop extensively cultivated in tropical and subtropical regions. Despite its economic significance, it is highly perishable, which limits its shelf life. Water loss during storage accelerates aging and biochemical deterioration. This study examined how foliar treatments with calcium nitrate and seaweed biostimulants applied during vegetative growth (Calcinit alone or combined with E-Dalgin, Kelpak, and Agrocean B) change water content, total dry matter, sugars, and organic acids in 'Asteroid 204' round red peppers stored at 20°C and 7°C. Samples were analyzed at harvest and after 5, 7, and 14 days of storage. Results showed that water loss, indicated by weight reduction, led to increased sugar and dry matter concentrations. Organic acids decreased over time, with storage duration and temperature significantly impacting biochemical quality. These findings highlight the critical role of storage conditions in maintaining fruit quality, emphasizing the importance of temperature and storage duration in extending shelf life. In conclusion, this research provides valuable insights for improving post-harvest handling and preserving pepper quality.

Key words*: Ascophyllum nodosum, Capsicum annuum, Ecklonia maxima, postharvest, water loss.*

VARIABILITY OF SOME MORPHOLOGICAL AND PRODUCTION CHARACTERS IN TOMATO HYBRIDS GROWN IN GREENHOUSES

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Abstract

Tomatoes represent, worldwide, the most important species due to their excellent health benefits, resulting from their nutraceutical composition, but also from the diversity of their morphological characters. Therefore, improving the genotypes of this species is very important to support its production and ensure food security, mainly in the context of abrupt global climate change and rapid world population growth. The present study aimed to explore the variability of morphological and production characters in a new assortment of tomato hybrids cultivated in the sun. In this context, the growth characteristics of seedlings and plants in culture, as well as production, were analyzed using univariate analysis methods. The results indicated that the evaluated hybrids demonstrated considerable potential to develop strong hybrid vigor for growth and production characteristics. The number of fruits per plant and the average weight of a fruit showed positive relationships that strongly influence the production yield. Production/plant ranged from 2.687 kg to 5.083 kg. The highest production was recorded with the Attiya RZ F_1, Umagna RZ F_1, Mahitos RZ F_1 and Zulfia RZ F_1 hybrids.

Key words*: Solanum lycopersicum L, morphological traits, phenotype.*

PHYSICOCHEMICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY OF DIFFERENT ONION VARIETIES (*ALLIUM CEPA* L.)

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Abstract

Onion (Allium cepa L.) is a widely consumed vegetable, recognized for its nutritional value and content of bioactive compounds with antioxidant properties. The aim of this study was to evaluate the physicochemical characteristics and antioxidant potential of different onion types in order to highlight varietal differences and their functional relevance. Fresh onion samples were analyzed for physical parameters (bulb size) and chemical properties, including pH, titratable acidity, total soluble solids (°Brix), and moisture content. In addition, total polyphenol content and antioxidant capacity were determined using standardized analytical methods. The results demonstrated noticeable variations among the analyzed onion types with respect to both physicochemical parameters and bioactive compound levels. Onion types exhibiting higher total polyphenol content also showed increased antioxidant capacity, indicating a positive relationship between these parameters. The findings suggest that the onion type plays a significant role in determining quality attributes and antioxidant potential, emphasizing the importance of varietal selection for nutritional and functional purposes.

Key words*: onion, physicochemical characterization, antioxidant capacity, polyphenols.*

STUDY ON THE IDENTIFICATION OF CUCUMBER VARIETIES DEVELOPED IN ROMANIA

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Abstract

Cucumbers are one of the vegetable species with significant importance in agriculture, being cultivated in various systems, such as greenhouses on soil, cultivation on various substrates, solar greenhouses, and open fields. The cucumber varieties are quite diverse, including long, semi-long, and gherkin-type varieties. The study focuses on analyzing cucumber varieties created in Romania, within the research institutes for vegetable growing, and highlights the progress made in the research and breeding of this species. By reviewing the genetic diversity of cucumbers, the study emphasizes the importance of selecting varieties adapted to specific climatic and soil conditions, as well as the need to improve traits such as disease resistance and tolerance to abiotic stress. These aspects are crucial for supporting sustainable and efficient production. The study contributes to the identification and development of cucumber varieties resistant to climatic factors, diseases, and pests, playing an important role in ensuring food security and increasing agricultural productivity in Romania.

Key words*: cucumber, greenhouse, cultivars.*

ECOLOGICAL MANAGEMENT OF DOWNY MILDEW OF *CUCUMIS SATIVUS* BY APPLICATION OF DIPOTASSIUM PHOSPHATE, NEEM OIL, AND SULPHUR

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Abstract

Downy mildew (Pseudoperonospora cubensis) is a major disease of cucumber, which can significantly reduce the production of vegetable crops. In the present study, we evaluated the effects of dipotassium phosphate applied individually and in combination with neem oil and sulphur on cucumber plants affected by downy mildew under greenhouse conditions. We also examined the relationships between the downy mildew severity of plants and the concentration of phosphorus in leaves. The highest severity of downy mildew was registered in the control, untreated plants. The application of a mixture of dipotassium phosphate, neem oil emulsion, and sulphur registered better results in the suppression of downy mildew and decreased the disease severity by 46.7%. However, dipotassium phosphate in combination with neem oil did not have any synergistic effect on disease development. Foliar treatments with dipotassium phosphate alone as well as in combination with neem oil and sulphur increased the content of phosphorus in leaves by 15.1%. The experimental results revealed a strong negative correlation between the disease severity of cucumber and the concentration of phosphorus in leaves.

Key words: *cucumber, downy mildew, neem oil, dipotassium phosphate, phosphorus, sulphur.*

IMPACT OF FERTILIZATION ON THE GROWTH OF LETTUCE SEEDLINGS (*LACTUCA SATIVA* L.)

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Abstract

Lettuce (Lactuca sativa L.) is one of the most highly valued vegetable species within the group of leafy vegetables, and the production of high-quality seedlings is an essential prerequisite for achieving high and stable yields. Fertilization plays a decisive role in influencing growth processes, seedling vigor, and overall development. In this context, the present study aimed to evaluate the impact of fertilization with fermented quail manure, applied at three different rates, in comparison with chemical fertilization used as a control treatment, on the growth of lettuce seedlings belonging to the cultivars Carmelian, Limeria, Kidow, Nicolina, Turbillon, Kirke, and Prestaria under controlled conditions. The effects of the fertilization treatments were assessed based on relevant morphological parameters, namely seedling height, number of leaves, as well as fresh and dry biomass accumulation. The results demonstrated that the application of fermented quail manure significantly influenced seedling growth and development, leading to superior vegetative growth and improved seedling quality compared to the control treatment.

Key words*: Lettuce, cultivars, fermented quail manure, seedling.*

MICROBIOLOGICAL PREPARATIONS FOR PLANT PROTECTION IN MOLDOVA AND PROSPECTS FOR THEIR APPLICATION

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Abstract
Based on the experience of the Institute of Genetics, Physiology and Plant Protection of Moldova State University, technologies have been developed for the mass production and application of microorganism-based biological preparations to protect major agricultural crops against harmful organisms. The materials related to these technologies were approved by the Interdepartmental Council for the Certification and Approval of Phytosanitary Products and Fertilizers of the Republic of Moldova, which enabled the developed biological products to be included in the State Register of Phytosanitary Products. Additional studies have recently been carried out to investigate the insecticidal and antagonistic activities of the biological agents that produce already registered biological products against other target organisms. These studies have significantly expanded the spectrum of activity of the microorganisms under investigation and may support the future state registration in Moldova of biological products for the protection of agricultural crops for which they have not previously been used, both in open fields and under greenhouse conditions.
Key words: *biological preparations, pathogens, pests, plant protection, state registration.*

STUDY OF THE VARIABILITY OF MORPHOLOGICAL AND PRODUCTION CHARACTERS IN SOME *VICIA FABA* L. GENOTYPES

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Abstract

Vicia faba L. is an annual species of the Fabaceae family, cultivated for the value of its seeds, rich in vegetable proteins, and for its contribution to improving and maintaining soil fertility by fixing atmospheric nitrogen. The study aims to analyze the variability of some morphological and productivity characters of an assortment of twelve faba bean genotypes. The following traits were analyzed: plant height, number of branches, minimum height of the first pod, pod length, pod width, number of pods per plant, number of seeds per pod, weight of 100 seeds, and total weight of pods per plant. Significant differences were observed between genotypes for the studied characters. From a productive point of view, genotypes G2, G3, G6, G7 and G10 were noted, with production ranging between 41.33-54.17 g/pl. These genotypes can be recommended for cultivation in the South-West area of Romania and considered valuable and useful for future breeding programs.

Key words*: agro-morphological traits; faba bean; phenotypic variability.*

WHITE CABBAGE CULTURE IN ROMANIA - STATUS, CHALLENGES, TRENDS AND OPPORTUNITIES

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Abstract

White cabbage (Brassica oleracea var. capitata) is a significant crop among the Brassicaceae family cultivated in Romania, with implications for local livelihoods and the regional economy. The study aims to comprehensively analyze the situation of this crop in Romania through important statistical indicators, such as cultivated area, total production, and average price over a 10-year period (2015-2024). Analyzing these indicators, it can be seen that the area cultivated with white cabbage in Romania was larger in the first part of the interval, with a steady downward trend, from 48.718 ha in 2015 to 36.662 ha in 2024, decreasing by 24.6% over this period. Total production shows the same downward trend, with values starting from 1.077.978 t in 2015, reaching 565.532 t in 2024 (47.5% decrease). Regarding the average price of early white cabbage and autumn in Romania, it showed an increasing trend: in 2015 recorded a value of 1.33 lei/kg, reflecting an increase of 129% and reached 3.05 lei/kg in 2024 and, respectively, from 1.83 lei/kg to 3.42 lei/kg, meaning an increase of 86.88%. To increase production, it is necessary to improve cultivation technology and promote the development of the sector.

Key words*: Brassica oleracea, cultivated area, production, growth rate.*

INTEGRATED DISEASE AND PEST CONTROL TECHNOLOGY IN PEPPER CONVENTIONAL AND BIOLOGICAL SYSTEMS

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Abstract

Pepper crops are frequently attacked by diseases caused by fungal, bacterial, and viral pathogens, as numerous insect pests, which requires the application of integrated disease and pest management strategies in pepper crops in Romania. The biological material was represented by 4 pepper hybrids: Marbella F1, Barbie F1, Kaptur F1 and the cultivar Red Elephant Ear (Slonovo Uvo). This study aims to control pathogens and pests using conventional and biological methods. For chemical control, products based on azoxystrobin, difenoconazole, sulfoxaflor, hexythiazox, difenoconazole + cyflufenamid, fluopyram + trifloxystrobin, flupyradifuron, fenpyroximate, and pyridaben were applied; for biological control, products based on Mimosa tenuiflora extracts, marigolds, citrus seeds, and microorganisms (Bacillus spp.) were applied to control diseases. Predators such as Transeius montdorensis, Phytoseiulus persimilis, and Aphidius colemani were released to control pests. The chemical products applied to combat alternariosis and grey mould recorded very good efficacy, and the biological good efficacy. The results obtained indicate a significant reduction in the adult pest population on the leaves in the variant with predators, compared to the untreated control.

Key words*: biological, conventional control, disease, pest.*

EVALUATION OF UNSTABLE PHENOTYPIC COMMON BEAN SEEDS: A CASE STUDY

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Abstract

In a normal crop, beans are self-pollinating. The aim of this study was to present the effects of cross-pollination within a bean germplasm collection (over 450 accessions) under the climatic conditions from South-eastern part of Romania. This paper presents the study of L 47 AA climbing bean accession seeds sown, and there were taken into study nine new biotypes harvested. The sown seeds represented the control variant for the analysis of the harvested biotypes. The seeds were evaluated in what it concerns quantitative (100 seeds weight, length, width, and thickness) and qualitative characteristics (shape, main and secondary seed color; the shape of the secondary color; intensity and color of the hilum ring). The mean weight of 100 seeds was 42.52 g (with a minimum value of 31.75 g and a maximum value of 55.92 g). At biotype 5 the maximum values of the quantitative characteristics were recorded (weight – 55.92 g, length – 14.93 mm, and thickness – 6.38 mm). A similar coloration to the control was found in biotype 9 (main color brown; secondary color black in streaks), but white or cream colors have also been observed.

Key words*: seeds, Phaseolus vulgaris L., germplasm collection, qualitative characteristics, quantitative characteristics.*

MORPHOLOGICAL EVALUATION OF WHITE DWARF BEAN SEEDS FROM VRDS ROMANIA

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Abstract

Dwarf bean with white seeds are highly appreciated in Romania. From the germplasm collection of V.R.D.S. Buzau, which contains over 450 bean accessions, ten dwarf beans with white seeds. This paper presents a comparative study of ten dwarf bean seed accessions. The seeds of each accession were evaluated in what it concerns quantitative (100 seed weight, length, thickness, and width) and qualitative characteristics (brilliance, veining, shape, and hilum ring). All maximum values were recorded at V_6 (weight – 49.04 g, length –15.90 mm, width – 7.10 mm, and thickness – 5.83 mm) and almost minimum values at V_3 (weight – 14.61 g, width – 4.35 mm, and thickness – 3.80 mm). The coefficient of variation was high for weight (38.18%) and moderate for the other parameters studied (length – 15.20%, width – 15.35% and thickness – 12.88%). These results confirm great variability in what it concerns the biological material collected and also justify the work on biodiversity preservation for this species.

Key words*: Phaseolus vulgaris L. var. nanus, germplasm collection, accessions, biodiversity.*

RESEARCH ON THE INFLUENCE OF VARIETY AND GROWING SUBSTRATE ON DEVELOPMENT OF POTATO PLANTS AND ON MINITUBERIZATION

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Abstract

In 2025 NIRDPSB Brasov, through the Research Laboratory for Vegetal Tissue Culture, conducted a bifactorial experiment in which the analyzed factors were represented by the culture substrate - factor A, with three gradations: perlite, vermiculite, and classic substrate peat (control) and variety - factor B, with 4 graduations: Azaria, Braşovia, Cosiana, and Cezarina (control variety). The research investigated the influence of these 2 factors on potato plant height at 1 month and 2 months after planting virus-free vitroplants, transferred to isolated spaces on various culture substrates, and on the number and weight of minitubers obtained/plant. Regarding plant height on the perlite substrate, the highest plant height values (25.42 cm) were obtained. Regarding the number of minitubers, on substrates consisting of vermiculite and perlite, positive differences were recorded compared with the classic substrate: respectively, a very significant difference (5.60 minitubers) and a distinct difference (3.54 minitubers). Regarding minituber weight on substrates with vermiculite and perlite, positive differences were obtained (56.61 and 21.61), but these were insignificant.

Key words*: vitroplants, culture substrate, variety, minitubers, potato.*

OPTIMIZATION OF TOTAL RNA EXTRACTION METHODS TO SUPPORT FLOWERING GENE EXPRESSION STUDIES IN CARROT (*DAUCUS CAROTA* L.)

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Abstract

Flowering time in carrot (Daucus carota L.) is a complex trait regulated by interconnected gene regulatory networks involving key transcription factors (TFs) from the MADS-box, CONSTANS-LIKE (COL), FLOWERING LOCUS T (FT)-like, and FLOWERING LOCUS C (FLC)-like gene families. Understanding the molecular functions and interactions of these TFs is essential for carrot breeding programs, as flowering time strongly influences bolting, root quality, seed production, and yield stability. Reliable gene expression analyses require the extraction of high-quality RNA; therefore, this study aimed to develop and validate optimized methods for total RNA extraction from fresh and frozen carrot leaves. Three extraction protocols were compared based on RNA yield, purity, concentration, and integrity; however, the TRIzol™ Plus RNA Purification Kit yielded the highest RNA purity, concentration, and integrity. This optimized protocol provides a reliable and reproducible approach for high-quality RNA isolation, supporting further transcriptomic and functional genomic studies in carrot.

Key words*: flowering, transcription factors (TFs), RNA extraction, TRIzol™, PureLink™, NanoDrop, Qubit, RNA integrity.*

LANDRACE ELECTRONIC CATALOGUE – *EX SITU*/*ON FARM* CONSERVATION, DOCUMENTATION AND MANAGEMENT

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Abstract

Although the majority of agricultural production in Europe currently depends on formally registered, genetically uniform cultivars, landraces are still cultivated in home gardens. A comprehensive inventory of on-farm maintained local varieties is currently lacking in Europe, resulting in limited and dispersed data regarding their cultivation locations and associated crops. The creation of such a catalogue is of considerable importance for promoting actions aimed at enhancing the conservation and utilization of landraces. The results showed that the highest number of landrace cultivation sites in Bulgaria are located in semi-mountainous rural areas, and they are represented mainly by horticultural species. During the period 2024-2026, progress has been made in creating the database of ex situ conserved landraces through activities conducted under the DIGIVALPGR project, funded by the Bulgarian Science Fund (Contract KP-06-Slovakia/9/13.08.2024). It includes information on over 100 local accessions, adding value to landraces in socio-cultural, environmental, and economic contexts.

Key words*: plant diversity, genebank, digitalization, valorization, European collaboration.*

PRELIMINARY STUDY ON THE NUTRITIONAL PROFILE OF ORANGE-FLESHED SWEET POTATOES (*IPOMOEA BATATAS*)

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Abstract

Sweet potato (Ipomoea batatas) is a horticultural crop of growing interest due to its high nutritional value and relatively low input requirements compared with other staple crops. Orange-fleshed sweet potatoes (OFSP) are distinguished by their characteristic orange flesh and their high content of essential nutrients and bioactive compounds with recognized health benefits. Previous research has highlighted OFSP as a valuable source of complex carbohydrates, dietary fiber, vitamins, minerals, and antioxidants, while containing low levels of fat and protein. The present study aimed to evaluate the nutritional composition of OFSP available on the local market, considering their potential use in functional foods or nutritionally enhanced products. The results, expressed on a dry matter basis, showed average values of 9.27-10.84 % moisture, 3.41-4.06 % ash, 5.66-6.21 % protein, 1.02-1.52 % lipids, 3.42-4.85 % crude fiber, and 73.46-75.03% carbohydrates. These findings indicate a high proportion of complex carbohydrates and minerals, a moderate contribution of protein and fiber, and a low lipid content, supporting the suitability of OFSP for incorporation into food products with improved nutritional profiles.

Key words*: food ingredient, nutritional profile, orange-fleshed sweet potatoes.*

EVALUATION OF THE PRODUCTION POTENTIAL IN THE COMPARATIVE CROP OF THE DANUBIUS GARLIC VARIETY REGISTERED AT BRGV BUZĂU

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Abstract

Garlic is representative of the Buzău vegetable-growing basin, known especially to local populations from Râmnicu Sărat, a micro-region with a historical tradition of garlic cultivation. The specialists at BRGV Buzău have given particular importance to this species, including it in intensive conservation and breeding programs. Research began with the creation of a valuable germplasm base composed of more than 30 distinct genotypes collected from across Romania. These cultivars underwent intensive breeding work, resulting in new registered creations: Benone, followed by the Râmniceanul variety, and, most recently, Danubius.
Between 2023 and 2025, the Danubius variety was evaluated in comparative cultivation with the Benone variety, and Danubius recorded a higher production level than the reference variety Benone. The average bulb weight for Danubius was 36 g, while for Benone it was 25 g. The number of cloves per bulb was 9 for Danubius and 13 for Benone. The average weight of a single clove was 5.2 g for Danubius and 3.9 g for Benone. Research will continue with the conservation and enrichment of the germplasm collection and the creation of new varieties.

Key words*: clone, breeding, genetic resources, germplasm, conservation.*

FLORICULTURE, ORNAMENTAL PLANTS, DESIGN AND LANDSCAPE ARCHITECTURE

INFLUENCE OF SUBSTRATE TYPE ON THE GROWTH OF *OSMUNDA REGALIS* L. SPOROPHYTES UNDER GREENHOUSE CONDITIONS

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Abstract

Ferns constitute a group of vascular plants relevant to the study of the evolution of terrestrial plants, due to the morphological and physiological adaptations that confer them high ecological versatility. This adaptive capacity explains their distribution in a variety of habitats. In accordance with these characteristics, the present study investigated the influence of the cultivation substrate on gravimetric and morphometric growth parameters and on metabolite accumulation of Osmunda regalis sporophytes in one-year potted cultures under greenhouse conditions. Six types of substrates (S1-S6), with different characteristics ranging from specific ornamental mixtures for shrubs, cacti, aquatic or acidophilic plants to natural peat, were tested. The plants developed on the natural peat substrate (S6, presented the best morphometric characteristics, with the highest concentrations of metabolites; meanwhile, variant S2 (enriched with microelements) had the best development of the vegetative part, with the lowest content of polyphenols, being the least stressed variant. Overall, the results showed that the optimal substrate should be selected according to the intended objective: vegetative growth or phytochemical potential.

Key words*: ferns, greenhouse, Osmunda regalis, secondary metabolites, substrate.*

MORPHOLOGICAL AND MOLECULAR MARKERS AS TOOLS FOR EVALUATING GENETIC VARIABILITY IN PAEONIA

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Abstract

The genus Paeonia exhibits considerable phenotypic and genetic diversity, being valuable for ornamental use and genetic resource conservation. The aim of this study is to evaluate inter- and intra-genotypic variability within a set of 13 genotypes using an integrated approach combining morphological characterization and molecular analysis. Morphological evaluation was performed based on specific descriptors, including vegetative and reproductive traits such as plant habit, leaf size, flower characteristics, and other relevant features for genotype differentiation. In parallel, molecular analysis is intended to assess genetic diversity and determine genetic relationships among genotypes using appropriate molecular markers. The obtained data are statistically analyzed to identify patterns of variability and explore potential associations between morphological traits and genetic profiles. This research may contribute to a better understanding of variability within the evaluated genotypes and may provide useful information for future breeding programs and conservation strategies.

Key words*: genotypes, morphology, molecular markers, genetic diversity.*

DESIGNING AND LANDSCAPING OF A SUSTAINABLE PRIVATE GARDEN USING NATIVE SPECIES

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Abstract

Present paper analyzes the process of designing and setting up a residential garden in Botoșani County, with the main goal of creating an aesthetic and functional space adapted to the climatic rigors of North-Eastern Romania. The central objective is to identify an optimal mix of native species and technical landscaping solutions that can withstand the extreme thermal variations specific to the area. The execution methodology presented follows a precise technical sequence: land preparation works, the execution of the paving works, the installation of the pergola, the planting of woody vegetation and flowering species, and the sowing of the lawn. The results confirm that compliance with technical standards in the early phases of the construction site minimizes the risks of degradation and maximizes the aesthetic benefits. The paper concludes that a strategically planned execution, represents the optimal solution for the development of resilient individual gardens, capable of generating a favourable microclimate and increasing the environmental value of the property.

Key words*: native species, sustainability, garden, landscape, design, environment.*

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KEY ASPECTS OF THE INTRODUCTION OF VARIOUS *CLINOPODIUM* L. SPECIES IN THE BOTANICAL GARDEN

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Abstract

This study addresses the introduction of Clinopodium L. species under ex situ conditions, with the objectives of determining their systematic position and evaluating their adaptation potential. The studied genus includes perennial, herbaceous plants from the Lamiaceae family, native to Europe and Asia. Three species are investigated within the Botanical Garden, two of which occur in the local spontaneous flora: C. nepeta (L.) Kuntze and C. menthifolium (Host) Stace. C. creticum (L.) Kuntze was obtained through an international seed exchange program from Greece. The species are studied as aromatic and medicinal plants with notable melliferous potential. According to the literature, they are characterized by a high content of high-quality essential oils and significant economic potential. The essential oil content varies depending on the plant organ, age, and phase of vegetation. The highest oil content is recorded during the full bloom phase in C. nepeta (0.46%) and C. menthifolium (0.52%). C. creticum produces the highest oil content at the end of the flowering phase, ranging from 1.20% to 1.26%. These species are recommended for diversifying the assortment of aromatic and medicinal plants.

Key words*: acclimatization, biomorphology, cosmetics, clinopodium, essential oil.*

FLOWER AND FLOWERING PECULIARITIES OF SOME *SALVIA* SPECIES CULTIVATED IN ROMANIA

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Abstract

This study addresses the morphological peculiarities of the flower and flowering in several Salvia species, a genus of significant biological, ornamental, and utilitarian importance. The genus Salvia belongs to the family Lamiaceae, which represents a plant group with remarkable morphological diversity, characterized by its bilabiate flowers and the unique staminal lever mechanism, adapted to various specific modes of pollination. The morphological and functional analysis of the flower in the Salvia species under investigation (Salvia officinalis, Salvia splendens, Salvia farinacea, and Salvia coccinea, cultivated in Romania) aims to identify specific traits by relating them to the general floral plan of the genus Salvia and, respectively, the family to which it belongs, Lamiaceae. This paper integrates data from both Romanian and international specialized literature, which will subsequently be complemented by original experimental results. These results focused on the elements of the floral structure (bracts, calyx, corolla, androecium, gynoecium, fruit) and the phenology of flowering.

Key words: *Lamiaceae, Salvia, flower, androecium, ornamental.*

FLOWER MORPHOLOGY AND FLOWERING IN SOME SPECIES OF THE GENUS *SALVIA* IN THE SPONTANEOUS FLORA OF ROMANIA

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Abstract

This study analyzes the flower morphology and flowering period (phenology) of two Salvia species found in the spontaneous flora of Romania: Salvia nemorosa and Salvia sclarea. Interest in research on these species has increased due to their adaptive capacity to various habitats and their ornamental value, particularly given that detailed morphological descriptions realized under local experimental conditions are limited or fragmented in the consulted literature. Thus, this study proposes an applied analysis of Salvia nemorosa and Salvia sclarea, using plants cultivated in southeastern Romania (Ilfov County), and provides useful data regarding the adaptability and floral biology of the analyzed species, relevant for their ornamental utilization.

Key words*: Salvia, nemorosa, sclarea, flower, ornamental.*

ENHANCING SCHOOL GARDENS THROUGH SPATIAL ORGANIZATION AND GREEN DESIGN

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Abstract

Educational outdoor spaces play an essential role in supporting learning, social interaction, and students' psychological well-being. This paper examines how circular landscape design can enhance the functionality and spatial quality of school gardens. The study combines a concise review of the psychological and spatial benefits of curved forms with an applied design approach based on site analysis and precedent studies. The research is developed through a case study of an educational campus in north-eastern Romania, where a landscape reconfiguration proposal is formulated. The design concept is structured around circular and intersecting platforms connected by sinuous pathways, creating clearly defined activity zones for different user groups. The proposal includes outdoor learning and relaxation areas, a playground integrated with the classrooms, improved pedestrian circulation, and a reorganized parking area to enhance safety. Vegetation interventions focus on preserving valuable existing trees, enhancing mid-layer planting, and improving microclimatic comfort. The results demonstrate that circular-based spatial organization improves accessibility, spatial coherence, and user experience, while contributing to safer, more inclusive, and restorative educational environments.

Key words*: educational landscapes; school gardens; circular landscape design; outdoor learning spaces; student well-being.*

INDOOR THERAPEUTIC GARDENS AS SUPPORTIVE ELEMENTS IN HEALTHCARE ENVIRONMENTS

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Abstract

People are spending less time in contact with natural elements in contemporary built environments, a situation that raises particular concerns in healthcare settings. Previous studies indicate that exposure to vegetation and nature-inspired design can support both physical recovery and psychological well-being. This paper examines the role of indoor therapeutic gardens as supportive components of hospital environments, with an emphasis on landscape and horticultural design. The research is based on a review of the literature on biophilic design and healing landscapes, combined with an analysis of international case studies and a site-specific evaluation of a medical recovery hospital in north-eastern Romania. Based on these approaches, the paper proposes a conceptual indoor garden solution that integrates vegetation, natural materials, daylight, and spatial organization while complying with health and safety requirements. The results suggest that properly managed indoor greenery can reduce stress, improve environmental quality, and support patient recovery, while also contributing to better working conditions for medical staff. The study highlights the importance of landscape architecture and horticulture in developing healthier, more sustainable hospital environments.

Key words*: therapeutic gardens, biophilic design, healthcare environments, landscape architecture, horticultural design.*

RESEARCH ON THE EVOLUTION OF URBAN GREEN SPACES IN ROMANIA (2019-2025)

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Abstract

Urban green spaces are an essential component of the population`s quality of life and the sustainability of cities, playing a major role in mitigating the effects of climate change. This research analyzes the evolution of urban green spaces in Romania between 2019 and 2025, using a methodology based on temporal and spatial comparative analysis, with reference to mapped data, complemented by official statistics provided by the National Institute of Statistics. The analysis is conducted at the level of development regions, examining both the evolution of the total area of urban green spaces and the green space per capita indicator. The study highlights disparities between more developed urban areas and those with limited resources and identifies general trends of growth or reduction in green infrastructure. The outcomes provide an overview of Romania's urban green infrastructure and offer valuable information for urban planning and public policy development, supporting strategies aimed at maintaining and expanding green spaces.

Key words*: green infrastructure, urban sustainable development.*

INTEGRATED ANALYSIS OF MORPHOLOGICAL, PHYTOCHEMICAL AND TECHNOLOGICAL CHARACTERISTICS OF TAXONS OF THE GENUS *LAVANDULA* L., WITH REFERENCE TO THE CULTIVAR 'LAVINIE DE GRĂDINĂ'

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Abstract

The article presents the results of a biomorphological, phytochemical, and technological study on the cultivation of Lavandula angustifolia Mill., the cultivar 'Lavinie de Grădină', registered at the Botanical Garden. The research focused on describing the biomorphological characteristics of the cultivar and on assessing the content and composition of its essential oil - a key resource for therapeutic and industrial applications. The plants are characterized by strongly branched stems, opposite linear leaves, and aromatic violet flowers arranged in spike inflorescences. Both generative and vegetative propagation methods were examined, along with primary cultivation practices. Generative propagation can be achieved using stratified seeds or seeds treated according to a specialized protocol, whereas vegetative propagation is performed through cuttings, lignified annual shoots, and layering. The inflorescences constitute the main raw material due to their high essential-oil yield (4.25 %), consisting mainly of linalool (50.0%) alongside other aromatic compounds with relevant biological activities. This phytochemical profile provides the cultivar with a broad spectrum of therapeutic properties. The cultivar is early-maturing and exhibits tolerance to drought and overwintering, making it a valuable local source of raw material.

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

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CARULASPIS JUNIPERI (BOUCHÉ) (DIASPIDIDAE: CARULASPIS), PEST OF THUJA FROM TIMIȘ COUNTY - CASE STUDY

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Abstract

Carulaspis juniperi (Bouché) (juniper scale) is generally known in general as pest of conifers, and especially of juniper (Juniperus spp.). It belongs to the family Diaspididae, genus Carulaspis. In Romania, the literature is scarce regarding the information available about this pest, which during the last year produces damages to conifers in parks and gardens. In the present research, we are reporting the presence of this pest on Thuja from Timiș area (western Romania, where the damages are obvious and the plants are losing their aesthetic value. Identification of the pest was performed using classic methods (visual analyses of plants and, at stereomicroscope in laboratory). There were collected samples from 15 Thuja plants from Timișoara and Calacea areas (Timiș County). On the plants, were observed located individually or in colonies on leaves, young shoots, and branches. The analysed plants presented obvious damage produced by this pest: respectively, chlorotic or browned leaves, dry sprigs, dry branches, and even dead plants. The attack intensity was comprised between 1 to 4 (marks according to the Borhsenius scale). The frequency of the attacked plants was 100%.

Key words*: Carulaspis juniperi, Thuja, juniper scale, pest, sexual dimorphism.*

STUDY REGARDING THE IDENTIFICATION OF THE FUNGUS *PESTALOTIOPSIS FUNEREA* (DESM.) STEYAERT ON THUJA FROM TIMIS AREA, ROMANIA - CASE STUDY

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Abstract

Pestalotiopsis funerea is one of the most frequently reported fungi on thuja plants from nurseries, landscape arrangements, and gardens. The species of Pestalotiopsis are generally considered in general as opportunistic pathogens. With all of these, in favourable conditions it produces severe damages to the attacked plants. The purpose of the research was to identify the pathogen that has produced burning like symptoms on the leaves of thuja plants from a landscape arrangement from Timisoara. In the first stage was performed the identification by the visual analysis of the plants. For the analysis at the binocular magnifier and microscope were prepared samples from 10 thuja plants that were transported at the laboratory. After the visual and microscopic analyses it was identified the fungus Pestalotiopsis funerea. The external symptoms observed on thuja plants were: chlorosis and yellowing of the foliage, whitish-grey foliage agglomerations, browned sprigs, burns of the sprigs starting from the top and continuing to the base. Thuja plants from the ornamental spaces from Timisoara started to dry due to this pathogen, their aesthetic value and vigour being very dramatic affected.

Key words*: Pestalotiopsis funerea, Pestalotiopsis blight, thuja, conidia, pycnidia.*

RESEARCH ON THE SUITABILITY OF THE SPECIES *PHYLLOSTACHYS PUBESCENS* FOR AIR LAYERING PROPAGATION

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Abstract

Since bamboo is a species with gregarious flowering, blooming only once during its life, after which the plants die, and the seeds are, most of the time, not viable, which is why they cannot be used in the multiplication process in order to produce, on a large scale, the plants necessary for the establishment of new plantations, it is recommended to use alternative methods of plant propagation, respectively through vegetative propagation. As a result, the present research was undertaken in order to identify an appropriate method of vegetative macropropagation in the bamboo species Phyllostachis pubescens. The present paper aims to present the main theoretical and practical aspects related to the techniques of bamboo propagation, as well as to identify a direction, in particular, regarding vegetative propagation. The results of the present research have shown that, by using alternative multiplication methods, respectively by air layering, it is possible to produce an abundance of rooted layers in the bamboo species Phyllostachis pubescens within 9 months, covering market requirements under minimal input conditions.

Key words*: air layering; Phyllostachys pubescens; rooting biostimulants; vegetative propagation.*

USING GIS IN LANDSCAPING. A CASE STUDY IN CRAIOVA

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Abstract

The arrangement and management of urban green spaces require interdisciplinary approaches that combine ecological knowledge with modern spatial technologies. This study evaluates the applicability of Geographic Information Systems (GIS) for landscaping management through a case study conducted in Craiova, Romania. A database containing tree species, spatial coordinates, age categories, and health status was created using GPS-based field observations and processed in QGIS 3.40.1. Spatial analysis enabled the classification and visualization of dendrological material according to species type, age, and phytosanitary status. The results identified 69 deciduous trees and 11 conifers, as well as 10 trees that were simultaneously old and diseased, representing priority intervention areas. GIS-based mapping and buffer analysis improved the identification of maintenance zones and optimized decision-making regarding pruning, treatment, and replacement operations. The study demonstrates that GIS technologies can support more efficient and sustainable landscape management practices in urban areas.

Key words*: Craiova, GIS, landscaping, study.*

GROWTH AND FLOWERING RESPONSES OF *HYDRANGEA MACROPHYLLA* SM. TO BIOFERTILIZER AND BIOSTIMULANT TREATMENTS

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Abstract

The aim of this study was to investigate the effects of biostimulants and biofertilizers on the growth and development of Hydrangea macrophylla Sm. Five experimental treatments were established: humic acids (HA, 2.5%), grape seed extract (GSE, 0.25%), a HA + GSE mixture (1:1, v/v), Bionat Plus (0.2%), and a water-treated control. The applied treatments led to differential plant responses at various vegetation stages. All treatments improved growth parameters compared to the control; however, Bionat Plus significantly promoted vegetative growth, particularly shoot number per plant and leaf length. In contrast, the most favorable flowering results were recorded in the HA and HA + GSE treatments. Repeated applications of Bionat Plus throughout the growing season delayed flowering onset and resulted in the lowest flowering rate. These results indicate that Bionat Plus treatments are most effective during the initial stage of vegetative growth, whereas HA or HA + GSE treatments are more suitable prior to and during the flowering period.

Key words*: Hydrangea macrophylla; biostimulant; biofertilizer; plant performance.*

EDIBLE WOODY SPECIES IN SOME GREEN AREAS OF BUCHAREST

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Abstract

Over time, urbanization has never excluded people's habit of growing edible plants near their homes. Despite the challenges of growing them in urban spaces, there is an increasing trend to have edible plants in cities around the world. Woody species from parks, private gardens, streets, and green areas near residential buildings were investigated for their edible qualities in Bucharest. The results showed that a total number of 62 edible species of trees and shrubs were present in the green areas studied. Edible species represented over 45% of the total species near residential buildings and private gardens. Most of the species were able to produce flowers/fruits under both the climatic and soil conditions of Bucharest. A clear tendency among the population to plant, near their homes, new edible species for Romania, such as Ficus carica, Punica granatum, Actinidia chinensis, or Aronia melanocarpa, was remarked. Even though some of these do not produce suitable fruits for consumption, the increased interest of people in growing edible species suggests that landscape architects may consider these species and design more edible landscapes in the future.

Key words*: edible ornamentals, fruiting trees and shrubs, gardens, parks, streets, temperate climate.*

SPECIES BIODIVERSITY AND VEGETAL COMPOSITION IN A CAMPSITE FOR CHILDREN WITH AUTISM

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Abstract

Nature acts as a healer for the human mind, and plant biodiversity has a significant role in resistance to neuropsychiatric disorders. In this article, a campsite for children with autism was investigated from a landscape perspective. The biodiversity of plant species, their visual qualities, and plant composition were investigated. The targeted garden, with an area of 0.87 ha, located in a mountainous area on the eastern border of Retezat Natural Reservation (in southwestern Romania), included a total of 83 herbaceous and woody species from 35 botanical families and 74 genera. Most of the flowering species (over 80 %) are decorative in summer, when children come to the campsite. The garden included plant species that are safe for children, with low allergenic and toxicological impact. Analysis of the visual characteristics of plants and vegetal composition revealed that species richness and the design of garden provide an optimal environment for calming and connecting autistic children with nature.

Key words*: allergenic plants, herbaceous plants, shrubs, toxic plants, trees.*

EFFECTS OF BASIL (*OCIMUM BASILICUM* L.) INFUSION USED AS IRRIGATION WATER ON VEGETATIVE GROWTH OF TUBEROSE (*POLIANTHES TUBEROSA* L.)

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Abstract

Irrigation water quality can affect growth and flowering in ornamental crops; however, the effects of non-conventional water sources are poorly documented. We evaluated two irrigation waters: municipal tap water (V1) and a basil (Ocimum basilicum L.) infusion (V2) for their physico-chemical properties and their effects on tuberose (Polianthes tuberosa L.). A controlled, replicated pot experiment (two treatments; four replicates; five plants per replicate) was conducted under standardized conditions. Water analyses included pH, electrical conductivity (EC), fixed residue, nitrate, and phosphate. Plant responses measured were leaf number, plant height, canopy diameter, and leaf blade dimensions. The waters differed in composition: the basil infusion showed higher EC and fixed residue and a lower pH (6.8) than tap water. The results suggest that basil infusion modifies the physicochemical properties of irrigation water and may influence certain growth traits in tuberose. These findings contribute to the understanding of alternative irrigation inputs in ornamental horticulture and provide preliminary evidence supporting further investigation of plant-based infusions as potential biostimulant solutions.

Key words*: botanical extracts, greenhouse cultivation, irrigation management, ornamental horticulture, plant biostimulants.*

THE INFLUENCE OF ROOTING SUBSTRATE AND BIOSTIMULATORS ON ROOTING PERFORMANCE OF *HYDRANGEA MACROPHYLLA* CUTTINGS

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Abstract

The success of vegetative propagation in ornamental species is strongly influenced by substrate characteristics, which affect both the physical environment and nutrient availability during rooting. This study aimed to evaluate the influence of the rooting substrate and biostimulators on the rooting capacity of Hydrangea macrophylla cuttings. Several substrate variants differing in composition (perlite, peat, perlite+peat, peat+sand+turf loam) and two biostimulators (razormin and sprintene) were tested. The chemical properties of the substrates were also analyzed, including pH (H_2O), electrical conductivity (EC), and hydro-soluble macroelements (N, P, K, Ca, Mg) in a 1:5 extract. Rooting performance was assessed through parameters such as rooting percentage, rooting effect index, and root number. The results indicated that substrate composition significantly affects rooting efficiency, with optimal results obtained in substrates characterized by moderately acidic pH, balanced electrical conductivity, and adequate availability of hydro-soluble nutrients. The biostimulators tested appeared to have similar effects on rooting and were less significant than the substrates.

Key words*: pH, electrical conductivity (EC), nutrient availability, hydro-soluble nutrients, rooting percentage.*

EVALUATION OF SOME GERANIUM CULTIVARS GROWN UNDER GREENHOUSE CONDITIONS

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Abstract

Geranium is one of the most valuable ornamental plants in commercial floriculture, appreciated all over the world, for its beautiful flowers in a wide variety of colours, decorative foliage, abundant and continuous flowering from late spring to autumn. It is used in pots and planter boxes on patios, porches, or balconies, where it creates an impressive visual impact, as well as in flowerbeds and borders in gardens, but it can also be cultivated indoors. The research was conducted to evaluate the main growth and flowering characteristics of six geranium cultivars grown under greenhouse conditions. The results revealed significant variations between cultivars regarding the morphologically analysed traits. Among the studied cultivars, 'Morning Sun' recorded the maximum values of plant height (31.15 cm) and number of shoots per plant (5.33), 'Abelina' had the largest inflorescence diameter (10.83 cm), while the highest number of flowers in inflorescence (39.56) was recorded in the 'Calais' cultivar.

Key words*: Pelargonium zonale, growth, flowering, cultivar*.

LANDSCAPE-LED DESIGN FOR RESILIENT PERI-URBAN COMMUNITIES: INTEGRATING GREEN INFRASTRUCTURE FOR REGENERATION

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Abstract

One of the major problems facing urban development today is the accelerated expansion of major urban centres, specifically the tendency to concentrate this development in the central areas of the city. To address this trend, an opportunity that is still not sufficiently developed is found in the modernization and strategic expansion of peri-urban areas, which would offer viable possibilities to reduce the pressure on a congested urban core as well as valuable contributions to the development of the resilience of some micro-communities. This study brings into focus an example in which landscape design can be incorporated in a relevant way, presenting a small-scale residential complex and how the creation of an appropriate and carefully planned green infrastructure can bring numerous benefits-urbanistic, ecological, and on human health. The findings demonstrate that the synergy between a built environment and a green landscape designed based on current ecological needs is a catalyst for the regeneration of underutilized areas that can be transformed into functional and high-performance community assets. The integration of green infrastructure into real estate developments is an essential principle for the development of future-oriented peri-urban residential communities.

Key words: *urban horticulture; plant-based; sustainability.*

SUSTAINABLE URBAN PLAYGROUND RESTORATION THROUGH COMMUNITY CO-DESIGN AND EDIBLE PLANTINGS

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Abstract

Urban playgrounds are public spaces with a fundamental role in the growth and development of children, especially in today's times, when young generations are increasingly captivated by modern technologies. However, a worrying phenomenon of their degradation is observed, which affects their usability and sustainability. The presented case study analyzes the restoration of an urban playground through the use of natural materials, fruit trees, and a community co-design approach. The project has as final objectives the optimization of environmental performance and the stimulation of children's well-being through efficient, nature-based, urban design solutions. Based on field observations, the examination of international examples built on the same principles, and the formulation of design solutions, the aim is to highlight the importance of integrating built and vegetal elements that support biodiversity and can serve as a catalyst for environmental education. The research illustrates how resilient landscapes are able to contribute to the transformation of urban playgrounds into sustainable environments. The study data add value to the broader debates about implementing participatory ecological design in urban spaces, creating more child-friendly cities, and developing strategic urban planning oriented on the long term.

Key words*: urban green infrastructure, playground restoration, edible landscapes.*

INVASIVE ORNAMENTAL PLANTS IN HORTICULTURE: PERCEPTIONS, RESPONSIBILITY, AND PREVENTION

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Abstract

Assessing how stakeholders perceive and understand the issue of invasive alien species is an essential prerequisite for developing effective communication and prevention strategies. Studies conducted at the international level have demonstrated the usefulness of perception surveys in identifying information gaps and supporting the adoption of appropriate management measures. In this context, the present study analyzes the level of knowledge, awareness, attitudes, and willingness of horticultural professionals in Romania to address the issue of invasive ornamental plants, as well as their openness toward voluntary or legislative control measures. The study was based on responses to a 22-item questionnaire distributed to 300 potential respondents, of whom 156 completed the survey (response rate: 39%). The results highlight varying levels of awareness and responsibility, along with significant information deficiencies. Overall, the conclusions emphasize the need for a coordinated approach that integrates education, communication, and regulation, involving academia, public authorities, producers, traders, mass media, and consumers, in order to reduce the risk of introduction and spread of invasive ornamental plants in Romania.

Key words*: awareness, horticulture, invasive ornamental plants, management, stakeholder perception.*

HIGH TEMPERATURE TOLERANCE IN FRAGRANT ROSE CULTIVARS

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Abstract

The rose, the most appreciated species in the world's floricultural industry, has become a prosperous business for those who cultivate and exploit this plant in our country, being widely used by landscapers due to its versatility and diversity of shapes, colors, and fragrance. This paper investigated the behavior and tolerance at high temperatures of nine cultivars of fragrant roses (`Acapella`, `Caprice de Meilland`, `Cristiana`, `Fisherman's Friend'`, `Nobilia`, `Pasiune în mov`, `Romstar`, `Sandra` and `Snow Owl`), existing in the UASVM - HRS Cluj-Napoca field collection, in the context of climate change. Biometric measurements highlight, in addition to the genetic characteristics of the cultivars, the significant negative influence of temperatures above 30°C, which affect the vegetative tips by 37% in the `Fisherman's Friend' cultivar compared to the other cultivars. Chlorophyll biosynthesis occurs optimally at 26°C, while at temperatures below 16°C and above 32°C the photosynthesis process is affected. Among the alcoholic extracts, determined at 24 h from rose petals, the `Fisherman's Friend' cultivar presents the most intense fragrance and the highest degree of persistence, followed by `Cristiana'. As a result, in scented roses, high summer temperatures reduce the persistence of the fragrance while also affecting the overall health of the flowers.

Key words*: morpho-biometrical measurements, chlorophyll, alcoholic extracts, rose scent.*

BIO-ECOLOGICAL CHARACTERISTICS OF NEW CULTIVARS OF *BUDDLEJA DAVIDII* FRANCH. IN THE "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE)

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Abstract

The Buddleja L. genus comprises approximately 100 species and numerous cultivars, distributed across the tropical and subtropical regions of Asia, America, and Africa. In recent years, 23 ornamental cultivars of Buddleja davidii Franch., originating from various European centers, have been introduced and acclimatized at the "Alexandru Ciubotaru" National Botanical Garden (Institute). These cultivars need a detailed study and evaluation under the new environmental conditions to assess their potential for cultivation and further utilization. The studied cultivars of Buddleja davidii Franch. ('Pink Micro Chip' PBR, 'White Chip' PBR, 'Pink Delight', and 'White Profusion') are characterized by a diverse range of flower and foliage colors, abundant blooming, extended flowering periods, persistent fruiting, and variation in the shape and size of their habit, inflorescences, and annual growth.
These cultivars possess high tolerance to drought, frost, pollution, diseases, and pests. They require minimal maintenance, limited to the removal of damaged branches and light pruning in early spring. These cultivars are recommended for cultivation across all dendrological districts of the country.

Key words*: Buddleja davidii Franch., cultivars, flowers, growth, development.*

IMPACT OF GIBB A3 ON GROWTH PERFORMANCE OF TWO *EUSTOMA GRANDIFLORUM* VARIETIES

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Abstract

Eustoma grandiflorum (Raf.) Shinners has a significant role in the cultivation of ornamental plants, appearing as cut or sometimes potted ornamental plants. Commercial growers of ornamental plants incorporate plant growth regulators into their cultural practices. These regulators significantly affect both vegetative growth and flower yield in flowering crops. Notably, gibberellic acid is essential for improving flower production, quality, and yield in these crops. The aim of the study was to determine whether different concentrations of growth stimulators, notably GIBB A3 has a positive or negative effect on the production of cut flowers of two varieties of Lisianthus (Eustoma grandiflorum `Croma lavander` and E. grandiflorum `Rosita yellow`). `Croma lavender` has thick, strong petals and characteristic extra-double flowers, and `Rosita yellow` has double-flowered inflorescences, thick petals, and strong stems. GIBB A3 was applied to plants as a foliar fertilizer. During the experiment, the following treatments were used: control (seedlings did not receive any treatment), 25, 50, 100 and 150 mg/L of GIBB A3. Each treatment was carried out in four replicates, each replication containing 10 individual plants. The growth of the two varieties, the length and number of shoots, stem diameter, bush diameter, number of flowers, and flower diameter were measured and recorded during the experiment. Results indicated that the plants treated with 150 mg/L concentration of GIBB A3 reached the expected outcomes. Further-more, when comparing the control to the treated plants, statistically significant differences were determined for all the measured parameters. Also, significant differences were observed between the two studied Lisianthus varieties. From the results, it could be concluded that the GIBB A3 treatments influenced positively the flowering and development of the two Lisianthus varieties.

Key words*: cut flowers, growth hormones, GIBB A3, Lisianthus.*

PARKS CONDITION, ACCESSIBILITY AND OPPORTUNITY BASED ON RESIDENT OPINIONS - COMPARATIVE STUDY IN ROMANIA AND LITHUANIA

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Abstract

The study aimed to comparatively analyze the opinions of residents in Romania (RO) and Lithuania (LT) regarding public parks (Timisoara, 4 parks; Vilnius, 7 parks), their condition, accessibility, and the opportunities they offer. A Google Forms questionnaire, generated by the study authors, included five categories of questions (Cat1 to Cat5), each category had several questions (Q), Cat1 – Q1 to Q4; Cat2 – Q5 to Q7; Cat3 – Q8, Q9; Cat4 – Q10 to Q14; Cat5 – Q15 to Q20, and answer options. The study was conducted based on a flow chart. In the data series recorded for the five categories, as respondents' answers, no significant outlier values were recorded, except for Cat3 LT (an outlier, $p<0.05$). The degree of fit for each category (Cat1RO – Cat1LT, up to Cat5RO – Cat5LT) was analyzed and was described under conditions of statistical safety ($p<0.05$, or better). Multivariate analysis (PCA) explained the variance and the category loadings (as factors) in the principal components. Similarities, but also differences, were found in the comparative study, based on the respondents' opinions.

Key words: *comparative analysis; fitting degree; flow chart; multivariate analysis; parks status; respondents' opinions.*

FROM URBAN IMAGE TO URBAN LANDSCAPEVEGETATION AS A STRUCTURING ELEMENT OF PUBLIC SPACE

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Abstract

This article explores the quality of public space in a post-socialist Craiova without explicit aesthetic urban design regulations, advancing the hypothesis that the lack of control over urban edges undermines spatial identity and visual harmony. The study is grounded in direct perception and draws on the theory of urban image developed by Kevin Lynch, with a particular focus on the relationship between urban image and landscape structure. The methodology analyzes how the components of the urban image - paths, edges, districts, nodes, and landmarks - are perceived in relation to vegetated elements, understood as generators of rhythm, continuity, and spatial cohesion. Special attention is given to the role of vegetation in defining edges, mediating scale, and restoring visual balance in fragmented post-socialist contexts. The article further evaluates the impact of targeted urban and landscape instruments that prioritize green structure as a compositional framework rather than a decorative layer. The findings highlight the capacity of landscape and vegetation to re-establish perceptual order, reinforcing urban identity and harmony in the absence of rigid aesthetic regulation.

Key words*: urban landscape, post-socialist city, urban image.*

LANDSCAPE AS NEW TOWNS INFRASTRUCTURE FROM CANVAS TO URBAN IMAGE

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Abstract

The article presents the results of the New Towns/New Narratives international network project, led by the International New Town Institute, examining the landscape as a multi-dimensional reality in the context of the construction, in the 20th century, of Europe's New Towns. The project was developed under the 'Telling the story' theme as the backbone of the program and spin-off from other ongoing topics, such as green practices or the green transition. Starting from the creation, with the (pre)existing territory as a (regarded) white canvas, to the green space as the critical infrastructure of the new towns, green spaces were a central part of urban policy at the time. In the aftermath of the modernist movement, green infrastructure became the central topic in the survival and revival of the New Towns, as a resource for well-being. The article addresses the transformations of the landscape along the rise, the decay, and the (potential for) revitalisation of the New Towns, starting from the study-cases of the 16 new towns from 13 European countries that were part of the project.

Key words*: New Towns, modernist/socialist urbanism, green infrastructure, landscape transformations*

LANDSCAPING WITH UNDERUSED TREE SPECIES, A PLANT BASED SOLUTION FOR GREENER CITIES

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Abstract

Present paper, "Landscaping with underused tree species, a plant-based solution for greener cities," highlights the essential role of urban plant cultivation as a multifunctional strategy to address the major challenges of the 21st century. In the current context of rapid urban population growth, climate change, food crises, market inflation, and the degradation of the quality of urban life, the use of horticultural species is promoted as a Nature-Based Solution, offering multiple benefits in priority areas such as Food Security, Sustainability, and the Environment, with Socio-Economic Benefits. Because Urban Horticulture includes a wide range of activities, from small home gardens and community gardens to rooftop gardens, vertical farms, and park management, the use of a variety of horticultural species (fruits, vegetables, herbs, ornamentals, and medicinal plants) is presented not only as a food production activity, but as an integrated sustainable development strategy that improves the resilience of cities to climate change and increases the quality of life of citizens through the development of green spaces. The focus of this paper will be on using underused tree species for landscape design and as a main source of biodiversity and sustainability.

Key words*: urban; horticulture; plant-based; sustainability; education.*

MISCELLANEOUS

COMPARATIVE NUTRITIONAL ANALYSIS OF FRESH AND CANNED *AGARICUS BISPORUS*

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Abstract

Mushrooms, although they have a low energy value, contain antioxidants, vitamins, and minerals and are an important source of proteins and fibers. The aim of this study was to analyze the nutritional value of fresh and canned Agaricus bisporus using XRF analysis, completed with data from different scientific articles and databases. Fresh Agaricus bisporus generally have a slight nutritional advantage over the canned form, offering lower sodium content and higher levels of certain vitamins. Some protein content may decrease during canning. It is known that, during thermal processing, some minerals (such as potassium, phosphorus, copper, selenium, and zinc) leach into the canning liquid (brine), while others may increase if added during processing (e.g., sodium, calcium). Our results show that, in canned mushrooms, compared with the fresh ones, the potassium content decreases and the calcium content increases. Canned Agaricus bisporus have a longer shelf life and provide a better source of fiber and certain minerals, but they also contain significantly higher amounts of sodium, which might be a concern for individuals with cardiovascular conditions.

Key words*: XRF, minerals, thermal processing, health implications.*

MICROSCOPIC CHARACTERISTICS AND TOXICITY OF THE SPECIES *ARTEMISIA DRACUNCULUS* (TARRAGON)

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Abstract

Artemisia dracunculus L. (Tarragon) is a perennial herb in the Asteraceae family, which has been used since ancient times for its aromatic and medicinal properties. These properties are attributed to the presence of essential oils (with up to 82% estragole in some varieties), flavonoids, and coumarins. Two different tarragon varieties are cultivated: Artemisia dracunculus var. sativa, or French tarragon, and Russian tarragon, A. dracunculus. Tarragon leaves and flowers are used in the food industry for their distinctive spicy anise-like flavor, which has several culinary applications. Also, tarragon is used in the cosmetic industry for its scent, for example as an ingredient in perfumes and cosmetics. Moreover, recent studies have identified new potential pharmacological applications of tarragon, such as anti-inflammatory and analgesic, antidiabetic, antimicrobial, antioxidant, hepatoprotective, and anticancer activities. In the present study, a microscopic analysis of the tarragon leaf focuses on its cellular structures, which are used in the botanical identification of the tarragon herb, using optical microscopy, while safety concerns are discussed based on a review of the scientific literature regarding the toxicity of estragole and coumarins.

Key words*: Artemisia dracunculus, botanical identification, coumarins, estragole, optical microscope images, tarragon.*

PHENOLIC COMPOSITION OF WILD BLUEBERRIES AND WILD CRANBERRIES HARVESTED IN ROMANIA

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Abstract

Wild berries from spontaneous flora represent valuable plant resources due to their high content of phenolic compounds. The objective of this study was to determine the total phenolic content of wild blueberries (Vaccinium myrtillus L.) and cranberries (Vaccinium vitis-idaea L.) collected from different natural habitats in Romania, Cluj county. Total phenolic content was evaluated using spectrophotometric methods and expressed as mg gallic acid equivalents. The results revealed distinct differences between the two species. Blueberries showed the highest phenolic levels, with maximum concentrations of approximately 1154 mg GAE/100 g of plant material, whereas cranberries presented lower maximum values, reaching about 624 mg GAE/100 g. The findings underline the importance of Romanian wild blueberries and cranberries as natural sources of phenolic compounds and support their potential use in agriculture, food, and nutraceutical applications.

Key words*: wild berries, Vaccinium myrtillus, Vaccinium vitis-idaea, total phenolic content, antioxidant activity.*

RESEARCH ON THE FORTIFICATION OF A LOW-CARB BAKERY PRODUCT, FORTIFIED WITH A MICROALGAE MIX, TO INCREASE NUTRITIONAL VALUE AND ANTIOXIDANT POTENTIAL

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Abstract

In the case of patients suffering from diabetes mellitus, only low-carb bakery products, adapted to the metabolic disorders caused by this chronic condition, are allowed. The development of dietary products that retain the sweet taste without affecting the glycemic balance of diabetic patients is of real interest. This paper presents research on the development of a low-carb muffin fortified with a microalgae mix (Spirulina and Haematococcus pluvialis powder, with fortification levels of 2-6%), intended primarily for diabetics and obese individuals. The low-carb muffin fortified with 6% microalgae mix powder exhibits superior sensory qualities and has the lowest total carbohydrate content (34.22%) and available carbohydrates (26.27%). It stands out due to its protein content (17.53%), total fiber (7.95%), mineral elements (K = 385.57 mg/100g; Ca = 165.86 mg/100g; Mg = 87.44 mg/100g; Fe = 4.75 mg/100g), total polyphenols (486.25 mg GAE/100g), total carotenoids (7.12 mg/100g), β-carotene (5.38 mg/100g), and demonstrates antioxidant capacity (940.72 mg Trolox Equivalents/100g).

Key words*: fortification, Haematococcus pluvialis, muffins, Spirulina, diabetics.*

RESEARCH ON THE EXTRACTION OF POLYPHENOLS FROM BROCCOLI/CAULIFLOWER BY-PRODUCTS, USING A GREEN AND SUSTAINABLE TECHNOLOGY

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Abstract

Food processing inevitably generates by-products, and plant waste is rich in numerous bioactive compounds such as polyphenols, carotenoids, fibers, tannins, sterols, peptides, and carbohydrates. These bioactive compounds have multiple beneficial effects on the human body, including antioxidant, antibacterial, antidiabetic, anticancer, antihypertensive, anti-inflammatory, hypocholesterolemic, and cardiovascular protective effects. Broccoli and cauliflower waste is particularly notable for its content of polyphenols, glucosinolates, carotenoids, β-carotene, vitamin C, chlorophylls, and other bioactive substances. This paper presents the results of research on the extraction of polyphenols from powders obtained through the valorization of broccoli/cauliflower waste, using a green and sustainable technology. In the experiments carried out, an ultrasound-assisted extraction system for polyphenols from plant materials VCX 750 was used, and the extraction solvent was a 70% (v/v) ethanol solution. Optimal extraction parameters (amplitude, extraction time, extraction temperature, and plant material-to-solvent ratio) were established, and concentrated polyphenol extracts with antioxidant capacity were obtained. These polyphenol-rich extracts are sensorially, biochemically, and microbiologically stable and can be used in the development of functional foods.

Key words*: extraction, green technology, broccoli, cauliflower, by-products.*

APPLICATION OF *SPIRULINA* AS AN INNOVATIVE INGREDIENT IN LOW CARB COOKIES, FOR PEOPLE SUFFERING FROM DIABETES, OBESITY AND INSULIN RESISTANCE

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Abstract

National and international research has highlighted the beneficial effects of Spirulina consumption in individuals suffering from diabetes mellitus, obesity, and insulin resistance. At the same time, for these metabolic disorders, which are part of metabolic syndrome, diet plays an important role alongside pharmacological treatment and/or dietary supplements. Sweet products (cookies) permitted in the diet of these patients must be made from natural ingredients and should have a high content of proteins, total dietary fiber, and minerals, while having a low content of carbohydrates, particularly available carbohydrates. This paper presents research on the development of low-carbohydrate cookies fortified with Spirulina (fortification levels of 2, 4 and 6%), intended for the diet of individuals affected by these metabolic disorders. Cookies fortified with 6% Spirulina powder exhibit superior sensory qualities and have the lowest content of total carbohydrates (29.03%) and available carbohydrates (18.69%). They are notable for their protein content (24.63%), total dietary fiber (10.34%), mineral content (K = 398.90 mg/100 g; Ca = 98.67 mg/100 g; Mg = 59.75 mg/100 g; Fe = 3.54 mg/100 g; Zn = 1.79 mg/100 g), total polyphenols (465.78 mg GAE/100 g), total carotenoids (6.08 mg/100 g), β-carotene (4.05 mg/100 g), and antioxidant capacity.

Key words*: fortification, Spirulina, cookies, diabetics, insulin resistance.*

RESEARCH ON THE DEVELOPMENT OF A LOW-CARB BREAD WITH ANTIOXIDANT POTENTIAL, FORTIFIED WITH *SPIRULINA*, INTENDED FOR THE PREVENTION AND DIETOTHERAPY OF DIABETES MELLITUS AND OBESITY

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Abstract

The adoption of an unhealthy lifestyle (a diet high in sugars and fats, physical inactivity), genetic predisposition, chronic stress, and environmental factors are major causes of diabetes mellitus and obesity. The adoption of a healthy diet, including products adapted to the metabolic disorders associated with these chronic conditions, is of considerable interest. This paper presents research on the development of a low-carbohydrate bread fortified with Spirulina powder (fortification levels of 1-4%), with high nutritional value and antioxidant potential, intended for individuals with diabetes and obesity. This bread exhibits superior sensory qualities and has a low content of total carbohydrates (35.60%) and available carbohydrates (25.65 %). It is distinguished by its protein content (14.15%), total dietary fiber (9.95%), mineral content (K = 282.45 mg/100 g; Mg = 83.21 mg/100 g; Ca = 63.42 mg/100 g; Fe = 3.27 mg/100 g), total polyphenols (262.83 mg GAE/100 g) and antioxidant capacity (295.48mg mg Trolox equivalents/100 g). Due to its complex biochemical composition and low content of total and available carbohydrates, this type of bread is suitable for the diet of individuals with diabetes and obesity.

Key words*: bread, low carb, Spirulina, diabetics, obese individuals.*

ADVANCES IN GREEN AND CONVENTIONAL EXTRACTION METHODS FOR PHYTOCHEMICALS IN HALOPHYTIC PLANTS

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Abstract

Halophytes are plants adapted to grow in high-salinity environments such as salt marshes and coastal areas. Halophytic plants exhibit biochemically distinct metabolite profiles depending on various species (e.g., Salicornia sp., Suaeda sp.) and the extraction methodology; therefore, method selection must be tailored to the target compound class and the specific taxon studied. The modern green techniques as ultrasound-assisted extraction (UAE), microwave-assisted extraction (MAE), pressurized liquid extraction (PLE), supercritical fluid extraction (SFE) and natural deep eutectic solvent (NADES)/deep eutectic solvent (DES) based extractions, systematically increase mass transfer, reduce solvent consumption, and often improve the recovery and preservation of labile phenolics and lipophilic constituents relative to conventional maceration or Soxhlet extraction. In conclusion, rational extraction-process design enables the selection of efficient and sustainable extraction workflows that maximize the recovery of bioactive compounds while minimizing environmental degradation and solvent footprint.

Key words: *green extractions, halophytes, conventional extraction, phytochemicals, eco-friendly solvents.*

THE EFFECT OF SOME ABIOTIC FACTORS ON THE MORPHOLOGY AND SECONDARY METABOLISM OF *LEONTOPODIUM ALPINUM* CASS. CALLUS CULTURES

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Abstract

As static organisms, plants synthesize secondary metabolites in order to adapt to their changing environment and maintain their homeostasis. Light and temperature are important abiotic factors that can be manipulated to influence the secondary metabolism of plants. Leontopodium alpinum Cass. (Edelweiss) is an alpine species that generally grows at high altitudes in a harsh environment characterized by exposure to wind, high UV radiation, and low temperatures. These difficult conditions explain the nature and abundance of the synthesized secondary metabolites, such as phenolic acids, flavonoids, and terpenes. The aim of this study was to assess the impact of the absence of light, low temperatures, or orbital shaking on the growth parameters and secondary metabolism of L. alpinum callus cultures. The following experimental variants were established: A (control, 24±2°C, normal photoperiod), B (24±2°C, darkness), C (24±2°C, darkness, 40 rpm), D (4±2°C, darkness) and E (10±2°C, darkness). Morphometrical and gravimetrical parameters showed that lower temperatures and continuous orbital shaking affected callus growth, with a dehydration process being noticed. The biochemical investigations revealed that all tested factors negatively influenced the accumulation of total polyphenols and flavonoids; however, the production of triterpenes was stimulated, especially at 4°C (1 mg CAE/g DW). HP-TLC analyses showed that exposure to lower temperatures induced the accumulation of the main compounds (chlorogenic acid, leontopodic acids A and B), along with many other unidentified fluorescent metabolites. Our results highlighted a continuous morphological/metabolic adaptation of the callus culture as a result of changes in its environment.

Key words*: abiotic factors, secondary metabolism, Leontopodium alpinum, callus culture.*

BIOMORPHOLOGICAL PECULIARITIES OF THE MEDICINAL SPECIES *ORIGANUM LAEVIGATUM* BOISS. AND *ORIGANUM TYTTANTHUM* GONTSCH. UNDER *EX SITU* CONDITIONS

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Abstract

Origanum L. species, commonly named oregano, is a universal crop used in a variety of fields as medicinal, spicy-aromatic, and ornamental plants. This article refers to Origanum laevigatum Boiss. and Origanum tyttanthum Gontsch., two new medicinal species grown in the collections of the National Botanical Garden (Institute), Republic of Moldova. The study aimed to highlight the bio-morphological peculiarities of the plants and to identify the characteristics of their growth and development under ex situ conditions. The plants's general state, phenological aspects, and the main morphometric parameters were evaluated during the period 2023-2025. The plants demonstrated adequate growth and development performance under the new cultivation conditions, proving to be very promising and highly resistant. The investigated Origanum species can significantly contribute to the enrichment of the range of promising medicinal and spicy-aromatic plants, as an additional source of raw material for the pharmaceutical and food sectors.

Key words*: Origanum, biological peculiarities, Republic of Moldova.*

ADDING VALUE TO THE AGRI-FOOD SIDE-STREAMS – A REVIEW ON THE ROMANIAN APPROACH TO APPLE POMACE

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Abstract

Due to the industrialization of both fruits and vegetables, significant quantities of plant waste are generated annually, accounting for over 40% of the total processed plant products. An important by-product of this industrial process is apple pomace, which results from the processing of apples into products such as juice and fruit preserves, which are obtained through pressing, boiling, and fermentation processes. Although often perceived as a seemingly valueless by-product, apple pomace holds significant potential as a source of valuable compounds. Recent research on its use as a substrate in microbial processes has influenced the production of low-alcohol beverages that are richer in organic acids or single-cell proteins. Recent trends indicate a growing interest in using residues from apple processing as by-products in the food industry to extract value-added products, including dietary fibers, proteins, natural antioxidants, biopolymers, pigments, and compounds with unique properties. In this study, we focused on the methods of valorization of apple pomace from different varieties grown in Romania.

Key words*: bioeconomy side streams, apple pomace, organic acids, valorization, Romania.*

AROMATIC PROFILE AND ESSENTIAL OIL CONSTITUENTS OF FLOWERS AND BUDS OF FOUR *POLIANTHES TUBEROSA* L. CULTIVARS

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Abstract

Tuberose (Polianthes tuberosa L.), an ornamental bulbous plant native to Mexico and belonging to the Agavaceae family, is highly valued among cut flowers and has a long history of use in perfumery due to its elegant appearance, long vase life, and intensely fragrant floral spikes. Its fragrance is attributed to a complex mixture of volatile organic compounds, including terpenoids, fatty acid derivatives, benzenoids, phenylpropanoids, and various aliphatic compounds, which form the basis of essential oils widely used as natural raw materials in perfumery, cosmetics, aromatherapy, and phytotherapy. The present study aimed to obtain and characterize volatile oils from Polianthes tuberosa by analyzing four representative cultivars: La Perla, Double Pearl, Yellow Baby, and Pink Sapphire. Extractions were performed from fresh flowers harvested during the flowering period (July-October) using the hydrodistillation method. The biological material included both fully bloomed flowers and buds in order to highlight differences in chemical composition and aromatic intensity. GC-MS analysis revealed that 1,8-cineole, methyl benzoate, α-terpineol, farnesol, benzyl benzoate, and cis-methyl isoeugenol were present in higher amounts than other identified compounds.

Key words*: tuberosa, NeoClevenger, volatile oils, chemical composition, GC-MS.*

STUDY ON THE EFFECTIVENESS OF LAVENDER ESSENTIAL OIL FOR ANTIFUNGAL PROTECTION OF STRAWBERRIES IN POSTHARVEST

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Abstract

Post-harvest fungal decay, particularly caused by Botrytis cinerea (grey rot), is the primary source of economic losses in the strawberry supply chain for sales markets. The main objective of the study was to evaluate the use of lavender essential oil (LEO) Munstead cultivar to extend the shelf life of strawberries while monitoring antifungal activity and preserving nutritional quality over 12 days of storage. The chemical composition of LEO, as determined by GC-MS, highlights a predominant profile of esters and monoterpenols. The in vitro antifungal activity of Botritis cinerea using the „poisoned medium" method was determined for: 0.25; 0.5; 1; 2; 4; 8; 10; 12; 14(%). The results demonstrated a concentration-dependent inhibitory effect of LEO on mycelial growth. The minimum concentration with a fungistatic effect was 1%, and 8% had a fungicidal effect, providing the best efficacy and practical applicability. For the in vivo test, coating mixtures based on sodium alginate, enriched with LEO at 1 %, 2%, and 4%, were used. Treatments with LEO-enriched alginate reduced strawberry weight loss by 6.8%, decreased fungal incidence, and maintained firmness and ascorbic acid content.

Key words*: alginate nanoparticles; Botrytis cinerea; edible coatings; lavender essential oil; postharvest.*

RESEARCH ON OBTAINING FUNCTIONAL COOKIES USING BROCCOLI BY-PRODUCT POWDER AND DRIED PLUMS

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Abstract

Broccoli production (*Brassica oleracea* var. *italica) generates substantial agricultural waste, with approximately 60-75% of the total aboveground biomass being discarded during harvesting. Due to their complex biochemical composition, various studies have confirmed the beneficial effects of broccoli by-products, including anti-obesity, antioxidant, anti-inflammatory, anticancer, and antifungal effects. This paper presents the results of research conducted on the development of functional cookies fortified with broccoli leaf powder and dried plums. The functional cookies showed superior sensory qualities and are characterized by a high content of proteins (10.13-10.90%), dietary fiber (6.94-7.85%), minerals (K = 472.44-768.75 mg/100 g; Ca = 86.85-156.30 mg/100 g; Mg = 54.93-59.93 mg/100 g; Fe = 2.23-2.45 mg/100 g; Zn = 1.44-1.55 mg/100 g), and bioactive compounds (polyphenols = 348.45-425.75 mg GAE/100 g; glucosinolates = 12.27-49.68 μmol/100 g; total carotenoids = 2.60-7.20 mg/100 g; β-carotene = 1.20-2.17 mg/100 g). The cookies also demonstrated antioxidant capacity (6.39-7.86 mg Trolox equivalents/100 g).*

Key words*: cookies; functional; broccoli; by-product; powder.*

RESEARCH ON THE FORTIFICATION OF MINI-BAGUETTES WITH CAULIFLOWER STALKS POWDER TO INCREASE NUTRITIONAL VALUE AND ANTIOXIDANT CAPACITY

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Abstract

Bread and bakery products are staple foods in the Romanian diet; therefore, fortifying them with functional ingredients derived from plant waste rich in nutrients and bioactive compounds, with the aim of enhancing their nutritional value and antioxidant potential, is of real interest. This paper presents the results of research conducted on fortifying minibaguettes with cauliflower stalks powder (fortification levels 1.5-3.5%). The minibaguettes stand out due to their sensory properties and present high content in proteins (13.69-14.30%), total fibers (4.33-4.70%), total ash (1.86-2.22%), total polyphenols (81.85-117.57 mg GAE/100 g), glucosinolates (70.56-213.12 mmol/100 g), and α-tocopherol (0.509-0.557 mg/100 g). Additionally, the minibaguettes fortified with cauliflower stalks powder show antioxidant potential (1.55-1.72 Trolox equivalents/g). Fortified minibaguettes with cauliflower stalks powder have a complex biochemical composition, and their inclusion in the diet has beneficial effects on the human body (combating nutritional deficiencies and oxidative stress).

Key words*: cauliflower, stalks, minibaguette, antioxidant potential.*

GLOBAL RESEARCH TRENDS AND ECOLOGICA PERSPECTIVES ON *ANEMONE NEMOROSA* L. IN FORESTS

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Abstract

This study provides a comprehensive bibliometric and qualitative review of scientific research on Anemone nemorosa L., a characteristic understorey herb of temperate European forests. Using Scopus and Web of Science databases, 107 peer-reviewed publications (1975–2024) were identified and analysed according to PRISMA guidelines. Results show that research on A. nemorosa is concentrated in Environmental Sciences, Plant Sciences, and Forestry, with most contributions originating from Belgium, Sweden, Germany, and Poland. Major publication outlets include Forest Ecology and Management, Plant Ecology, and Annals of Botany. Thematic synthesis reveals that A. nemorosa is highly sensitive to environmental and anthropogenic factors such as soil acidification, nitrogen deposition, habitat fragmentation, and human disturbance. Its ecological performance is shaped by temperature, soil pH, litter accumulation, and light availability, while herbivory and pathogens significantly affect reproductive success. The species' limited dispersal capacity and genetic vulnerability underline its role as a key bioindicator of forest continuity. Overall, A. nemorosa represents an important model species for understanding forest understorey responses to climate and land-use change.

Key words*: articles, bibliometric research, databases, environment, human disturbance.*

RESEARCH ON THE USE OF GREEN CUTTINGS AS AN ALTERNATIVE METHOD OF PROPAGATION OF THE SPECIES *PHLOSTACHYS EDULIS*

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Abstract

Since establishing a moso bamboo plantation represents a real challenge for farmers, both due to the high costs of purchasing planting material and the species' specific gregarious flowering, the low viability of the seeds, and their low germination rate, identifying and implementing alternative propagation methods is a constant concern. The research results highlighted that the techniques used in the propagation process through cuttings, the conditions for collecting cuttings, treatments with rooting biostimulators, and the planting technique of the cuttings, had a direct influence on the rooting percentage of the cuttings as well as on the subsequent growth and development of the new bamboo plants. Cuttings with one or two nodes made from the basal area of stems with a diameter of 1 cm and planted horizontally performed the best, providing, within a relatively short period of time and under minimal input conditions, sufficient planting material for establishing new plantations.

Key words: *bamboo; biostimulation; cuttings; vegetative propagation.*

SECONDARY METABOLITES OF COMMON JUNIPER (*JUNIPERUS COMMUNIS* L.) SUITABLE FOR USE IN AGRICULTURE AND FOOD PRODUCTION. REVIEW

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Abstract

Juniperus communis (common juniper) is a shrub or small coniferous tree with certain botanical characteristics, including its evergreen nature and berries, which mature over a period of 2-3 years and may occur on the plant at different stages of ripeness simultaneously. This enables an extended availability of both needles and berries. This review summarises findings published over the last 20 years in scientific journals and monographs. The needles and berries of common juniper differ significantly in their secondary-metabolite profiles and in their applications in sustainable agriculture and healthy food products. The needles are characterised by elevated monoterpene content, and these compounds exhibit toxicity and repellent activity against certain pests in both field and warehouse conditions. Allelopathic suppression of weed seed germination by needle extracts of J. communis is regarded as a promising strategy for the development of natural bioherbicides. Berries accumulate substantial amounts of phenolic compounds and pigments, including proanthocyanidins, which exhibit antioxidant and antimicrobial activity. These properties are used to stabilize food matrices, impart a distinctive flavour, and extend the shelf life of products.

Key words*: Juniperus communis; needle; berry; secondary metabolite; application; horticulture.*

IMPACT OF REJUVENATION PRUNING ON *MONILINIA* SPP. INFECTION AND MULBERRY GROWTH

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Abstract

Mulberry is essential for sericulture, but aging super-intensive plantations become vulnerable to Monilinia spp., a pathogen causing brown rot, shoot blight, and branch cankers. As fungicides are toxic to Bombyx mori silkworm larvae, this review analyses radical rejuvenation pruning as a phytosanitary and physiological strategy. A synthesis of the literature demonstrates inoculum elimination and microclimate optimization, while statistical data from cited sources indicate a vigorous vegetative response, with shoot length reaching up to 282 cm and a significant increase in the number of leaves per shoot compared to unpruned controls. The quality of leaves from new shoots is far superior, showing a 25% increase in chlorophyll, a 1.6-fold increase in soluble protein, and a doubling of Ribulose-1,5-bisphosphate carboxylase content compared to leaves from old wood. It is concluded that rejuvenation pruning is a sustainable and indispensable biotechnical tool for the productive and sanitary revitalization of old mulberry plantations intended for sericulture.

Key words*: Morus spp., sericulture, phytopathology, brown rot, management.*

COMPARATIVE EVALUATION OF BIOMASS YIELD AND CHEMICAL COMPOSITION OF VOLATILE OILS IN *ORIGANUM VULGARE* L. UNDER CONVENTIONAL AND OPTIMIZED CULTIVATION TECHNOLOGIES

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Abstract

Origanum vulgare L. is an aromatic species of high economic and medicinal value, whose biomass production and essential oil quality are strongly dependent on cultivation technology. Conventional agricultural systems frequently rely on chemical inputs, raising sustainability and environmental concerns. This study evaluated optimized, eco-friendly cultivation technologies as alternatives to conventional practices. A comparative field experiment assessed the effects of conventional and optimized systems on green biomass yield and essential oil composition. The optimized technology included magnetized Davidonii-type fertilizer, magnetized water, and alkaline water (pH 9), while the control relied on chemical fertilization and tap water. Green biomass yield was quantified, and essential oils were extracted and analyzed qualitatively and quantitatively. Results showed a 15–25% increase in green biomass yield under optimized conditions. Essential oil profiles exhibited 10–20% variations in the relative abundance of major volatile compounds, indicating enhanced accumulation of bioactive constituents. These findings demonstrate that optimized cultivation technologies can improve both productivity and essential oil quality, supporting their integration into sustainable production systems for medicinal and aromatic plants.

Key words*: Origanum vulgare, optimized cultivation technology, magnetized fertilizer, biomass yield, essential oil.*

YIELD CHARACTERISATION AND PHENOLIC CONTENT OF SAFFRON (*CROCUS SATIVUS* L.) PETALS HARVESTED IN SUCEAVA AND NEAMȚ COUNTIES, ROMANIA

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Abstract

This study investigates the yield characteristics and polyphenolic content of saffron (Crocus sativus L.) petals from Neamț County (own production, 2024-2025) and Suceava County (external source, 2023-2024, Romania), in order to assess their potential for valorization in bakery products. Petal samples were collected using a stratified random sampling approach across multiple harvest days and field sectors. Following controlled drying and milling, they were analyzed using standardized methods. Total phenolic content (TPC) was determined using the Folin-Ciocalteu assay. TPC values ranged from 17.5-17.9 mg GAE/g DW in Suceava 2023 samples to 20.0-21.8 mg GAE/g DW in Suceava 2024. Neamț 2024 petals showed greater variability (15.9-25.0 mg GAE/g DW), with the highest levels in Neamț 2025 samples (27.9 mg GAE/g DW). These results support the potential use of saffron petals as functional ingredients in bakery products with enhanced antioxidant properties.

Key words*: saffron; petals; Crocus sativus; phenols; yield.*

CONTRIBUTIONS TO THE STUDY OF THE RARE PLANT SPECIES IN ORHEI NATIONAL PARK FROM REPUBLIC OF MOLDOVA

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Abstract

The territory of Orhei National Park is located in the central part of the Republic of Moldova and represents an area with valuable, but still insufficiently studied, natural heritage. Currently, based on the results of systematic research initiated in 2023 and the most recent published works, the spontaneous flora of Orhei National Park includes 822 species of vascular plants. The article presents updated data on 33 species of rare, highly endangered plants included in the 3rd edition of the Red Book of the Republic of Moldova, obtained as part of the research and monitoring of rare species and the conservation status of their populations on the territory of the protected area.

The researched species are protected by law at the national level, and some of them are also protected at the international level: Cypripedium calceolus L. and Galanthus nivalis L. by the Habitats Directive, and Cypripedium calceolus L., Fritillaria montana Hoppe by W.D.J. Koch, Genista tetragona Besser, Pulsatilla grandis Wender, and Schivereckia podolica (Bess.) Andrz. are protected by the Bern Convention.

Key words*: Orhei National Park, Republic of Moldova, rare taxa, conservation.*

MONITORING OF *TUTA ABSOLUTA* INFESTATION IN TOMATO CROPS UNDER PROTECTED CULTIVATION

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Abstract

Vegetable production in protected cultivation systems is expanding in Romania, particularly in Dolj County, a major national producer. In recent years, tomato crops grown under protected conditions have been severely affected by Tuta absoluta, a highly destructive pest and a key limiting factor for production. Given the severe infestations reported prior to 2025, this study aimed to monitor T. absoluta populations in three vegetable-growing centers in Dolj County (Apele Vii, Dăbuleni, and Perișor). Adult populations were monitored using AtraTUT-s pheromone traps, and the efficacy of registered plant protection products was evaluated. The lowest infestation levels were recorded in Perișor (1-3% of plants and 1-6% of leaves affected), while the highest were observed in Dăbuleni (8-31% of plants and 18-70% of leaves affected). Treatments with Bacillus thuringiensis (0.33kg/ha), Chlorantraniliprole (175 ml/ha), and Abamectin (0.8 l/ha) showed the highest efficacy when integrated with complementary protection measures. These results emphasize the importance of integrated pest management strategies for controlling T. absoluta in protected tomato crops.

Key words*: Tuta absoluta*, *monitoring, infestation, insecticides, efficacy.*

BIOTECHNOLOGIES FOR *IN VITRO* PROPAGATION OF *MENTHA PIPERITA* L.

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Abstract

Species of the genus Mentha are widely valued for their rich phytochemical composition and extensive therapeutic applications. Peppermint (Mentha piperita L.) is a key source of biologically active compounds used in the food, cosmetic, and pharmaceutical industries; however, field-grown plants are highly susceptible to viral and fungal pathogens, leading to reduced essential oil quality. This study aimed to develop an efficient in vitro propagation protocol for producing pathogen-free planting material with enhanced biological potential. Micropropagation was initiated from nodal segments and apical and adventitious buds cultured on Murashige and Skoog medium supplemented with growth regulators. A sterilization protocol using 30% potassium dichloroisocyanurate ensured approximately 70% viable explants. Shoot multiplication was optimized with 6-benzylaminopurine (0.3-0.7 mg/L), promoting axillary proliferation and biomass accumulation. Rooting was successfully achieved on hormone-free and auxin-supplemented media (indole-3-acetic acid, 0.1-0.3 mg/L). Regenerated plantlets were acclimatized ex vitro through gradual adaptation, ensuring successful establishment. The proposed protocol enables the production of vigorous, virus-free peppermint plants, supporting improved quality and sustainability of planting material.

Key words*: Mentha × piperita L., in vitro, biotechnology, explant, micropropagation.*

CHARACTERIZATION OF SEA BUCKTHORN AND ARONIA FRUITS BY FT-IR SPECTROSCOPY

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Abstract

Sea buckthorn (Hippophae rhamnoides) and aronia (Aronia melanocarpa) are well-known fruits appreciated for their high nutritional value and rich content of bioactive compounds. Due to their remarkable antioxidant properties, these fruits have gained increasing attention in the food, pharmaceutical, and nutraceutical industries. Fourier Transform Infrared (FT-IR) spectroscopy is a rapid and non-destructive analytical technique widely used to identify functional groups in biological materials. This method is particularly suitable for the characterization of fruits rich in bioactive compounds, such as sea buckthorn (Hippophae rhamnoides) and aronia (Aronia melanocarpa). Sea buckthorn is mainly characterized by lipid- and organic-acid-related functional groups, while aronia is distinguished by its high content of phenolic compounds with strong antioxidant activity. FT-IR spectroscopy proves to be an effective tool for the qualitative evaluation of the chemical composition of fruits with high functional value.

Key words*: sea buckthorn (Hippophae rhamnoides), aronia (Aronia melanocarpa) FT-IR (Fourier transform infrared).*

COMPARATIVE STUDY OF NATURAL AND COMMERCIAL LEMON JUICES BASED ON PHYSICOCHEMICAL PROPERTIES AND FT-IR SPECTRAL ANALYSIS

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Abstract

Lemon juice is one of the most consumed natural beverages worldwide due to its high content of vitamin C, phenolic compounds, and aromatic substances. Physico-chemical analyses represent an important stage in the quality control of food products. In this work, 4 types of commercially purchased lemon juice were analyzed, and a comparison was made between the results obtained from them and those from natural lemon juice. For samples of lemon juice, were carried out over three days, investigating parameters such as density, pH, sugar concentration, surface tension, and viscosity. The results revealed significant changes in density and viscosity, correlated with composition and sugar concentration. Surface tension varied significantly among the five types of juice. The study highlights the importance of physico-chemical characterization of juices in order to choose products that have a lower sugar content and help to properly hydrate the body. For a detailed physicochemical analysis of the samples, FT-IR spectroscopy was employed, and the characteristic spectrum of the lemon used to obtain the natural juice was recorded.

Key words*: Lemon juice, physicochemical analysis, density, viscosity, surface tension, sugar concentration.*

AN OVERVIEW OF THE DIVERSITY AND VARIABILITY OF SPONTANEOUS FLORA IN VITICULTURAL REGIONS

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Abstract

At the global level, studies concerning the variability of spontaneous flora in viticultural areas demonstrate the decisive influence of ecological, pedological, and anthropogenic factors. Monitoring spontaneous flora can provide valuable information regarding the ecological status of viticultural areas and the effectiveness of management methods. The composition of spontaneous vegetation contributes to the protection of soil against erosion, the optimization of soil structure and fertility, as well as the modification of soil moisture. The diversity and variability of spontaneous flora represent important indicators of ecological balance and ensure sustainable management measures for viticultural areas. The objective of the present study is to analyze the diversity and variability of spontaneous flora in viticultural areas from several countries in order to understand its contribution to maintaining ecosystem health, controlling climatic factors, conserving soil, and supporting biodiversity. The methodology applied is based on the review of specialized literature, using relevant bibliographic sources and scientific articles concerning spontaneous flora in viticultural areas. The data were consolidated and interpreted in order to highlight its ecological role, variability, and diversity.

Key words*: biodiversity, ecosystem, spontaneous vegetation,* viticultural region.

ANALYSIS OF SOME CHEMICAL PROPERTIES OF SOILS IN THE GREEN SPACES OF LUGOJ MUNICIPALITY

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Abstract

This paper presents partial results from a doctoral thesis addressing two priority research objectives: the use of by-products from urban trees in floral art and the reuse of plant material from tree cuttings to produce compost, supporting sustainable plant waste management. This topic is increasingly relevant in the context of climate change and the efficient use of natural resources. The study was conducted in Lugoj Municipality, Timiș County, and includes an analysis of the composition and structure of urban tree species. Eighteen species were selected for study, including eleven deciduous and seven coniferous species, along with soil analyses as a basis for compost production. Data from the green space register indicated that willow species were dominant in number, followed by lilac, hornbeam, and lime. In addition to ornamental trees, species with dual functionality - such as sour cherry, cherry, peach, mulberry, apple, and fig - were identified. Soil pH values varied widely, from acidic to slightly alkaline. Nitrogen content was highest in several coniferous and deciduous species, while others showed minimal levels overall.

Key words*: deciduous and coniferous tree species, nitrogen, pH, phosphorus, potassium*.

UPDATE ON WHITEFLIES OF ROMANIA, INCLUDING TWO NEW SPECIES FOR THE ROMANIAN FAUNA (HEMIPTERA: ALEYRODIDAE)

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Abstract

This paper presents the results of whitefly findings in parks and urban areas from Bucharest and Ilfov County between 2024 and 2025. Aleuroclava aucubae (Kuwana), native to the East Paleartic is recorded for the first time in Romania. Individuals of the aforementioned species were found on different ornamental plants, including Celtis occidentalis, Cotoneaster spp., Kerria japonica, Morus alba, Morus spp., Pyracantha coccinea, and Syringa vulgaris. The other newly found species is Tetraleurodes hederae Goux, a pest that feeds exclusively on Hedera helix and has been recorded in Europe, in France, Italy, and Malta. Data are also presented on other native whitefly species observed in the same period on different host plants. This communication contributes to Romania's whitefly fauna and insect biodiversity.

Key words: *Aleuroclava aucubae*, *first record, non-native, Tetraleurodes hederae, whiteflies*.

SYNTHETIC MICROBIOMES' INFLUENCE ON TOMATO PLANTS UNDER THERMAL STRESS CONDITIONS

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Abstract

Synthetic microbiomes, after inoculation in the rhizosphere, promote root growth and plant development under abiotic (heat) and biotic (pathogen) stress conditions, activating their defense mechanisms against stress agents. The influence of selected microbiomes was analyzed in an experiment in which tomato plants (Solanum lycopersicum L.) were grown on Mollic Gleysol inoculated with microbiomes (M1, M4, M5, M7). After 60 days of vegetation, the plants were experimentally subjected to temperatures generating thermal stress (35°C and 45°C). Synthetic microbial consortia demonstrated a significant influence through the M7 and M5 microbiomes, both compared with the other microbiomes and with the non-inoculated control, on root growth, biomass, phytohormone content (IAA), oxidative stress (catalase), citric acid content, and rhizosphere respiration levels. Under thermal stress conditions, microbiomes sustained increased activity in plants, improving nutrition, ensuring growth, development, inducing resistance, and health

Key words: *thermal stress; synthetic microbiome; tomato; biomass; induced resistance.*

EXPLORING THE ANTIMICROBIAL POTENTIAL OF PLANT EXTRACTS DERIVED FROM *IN VITRO* TISSUE CULTURES

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Abstract

For a long time, plants have represented a valuable source of natural compounds used for maintaining human health. The antimicrobial activity of plant extracts plays a significant role in complementary therapeutic treatments, due to the presence of secondary metabolites involved in the defence mechanism. The aim of this paper was to evaluate the antimicrobial potential of plant extracts originated from in vitro cultures against several human pathogenic bacteria: Staphylococcus aureus, Listeria monocytogenes, Escherichia coli and Salmonella enterica. Methanol or ethanol dry extracts dissolved in water, saline solution or phosphate buffer were tested for antimicrobial activity. The plant material was represented by callus cultures of Cotinus coggygria Scop., Glycyrrhiza glabra L., Leontopodium alpinum Cass., Rosa x damascena Mill., Lavandula angustifolia Mill. var. Hidcote or fern sporophytes and gametophytes from Osmunda regalis L., Asplenium trichomanes L., Polypodium vulgare L. and Athyrium filix-femina Roth. Our results showed antibacterial activity against S. aureus for the methanolic extracts of R. damascena calli, O. regalis gametophytes and sporophytes, A. tricomanes and A. filix-femina sporophytes, and P. vulgare gametophytes, and ethanolic extracts from O. regalis sporophytes and gametophytes and A. filix-femina sporophytes. The methanolic extracts of O. Regalis gametophytes and A. filix-femina sporophytes exhibited antibacterial activity against L. monocytogenes.

Key words*: methanolic/ethanolic plant extracts, antimicrobial activity, callus and tissue culture, pathogenic bacteria.*

CURRENT STAGE AND FUTURE PERSPECTIVES OF *EX SITU* PLANT GERMPLASM CONSERVATION IN ROMANIA

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Abstract

Human-induced pressure significantly accelerates the species extinction rate. It is estimated that 27% of European plant species are threatened with extinction. This highlights the urgent need for the conservation of plant genetic resources, which can be achieved through in situ and ex situ methods. Although in situ conservation is preferred, it's not always feasible due to habitat destruction or other environmental or anthropic stresses. Ex situ conservation methods, including germplasm collections in gene banks, are essential for preserving plant genetic diversity. Romania's ex situ conservation efforts are conducted mainly for crop plants and are concentrated in only two gene banks. For wild flora, ex situ conservation is limited to only a few botanical gardens and research institutes. This work aims to assess the current state of ex situ plant conservation in Romania and discusses the opportunities and advantages associated with establishing a National Germplasm Bank for both wild and cultivated species.

Key words*: anthropic pressure, ex situ conservation, gene banks, germplasm collections.*

MORPHOLOGICAL ANALYSIS OF DAFFODIL POPULATION FROM THE NATURAL RESERVE "FÂNAŢELE CU NARCISE NUCŞOARA – 2.506"

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Abstract

In Romania, there are over 20 places with wild daffodils (Narcissus poeticus subsp. radiiflorus (Salisb.) Baker), most being part of the Natura 2000 network. This paper presents morphological data on daffodils from Nucşoara, a botanical reserve within the community importance site Strei-Haţeg (ROSCI0236). The daffodil population is considered a post-glacial relict, coexisting with other remarkable species, such as Peucedanum rochelianum Heuff. Biometric measurements indicated an aerial stem height ranging from 14 to 36.5 cm and a flower diameter between 1.9 and 5 cm. Statistical analysis (Pearson's R) revealed a weak correlation between perigon and coronule diameter. Compared with other populations in Romania, the Nucşoara daffodils display distinct morphological traits: the plants are smaller; the length of the leaves and the diameter of the flower are also smaller. These variations may be attributed to the population's isolation and specific local environmental conditions, highlighting the scientific importance of this reserve.

Key words*: botanical reserve; Nucşoara; Narcissus poeticus subsp. radiiflorus (Salisb.) Baker; biometric measurements; morphological traits.*

EVALUATION OF THE AGRONOMIC POTENTIAL OF THE NEW *SIDERITIS HYSSOPIFOLIA* CULTIVAR DEVELOPED THROUGH BREEDING AT BRGV BUZAU

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Abstract

Since 2019, researchers at BRGV Buzău have intensified acclimatization and breeding efforts within the genus Sideritis, with a special focus on Sideritis hyssopifolia. Genetic resources from native areas were introduced and evaluated in comparative field trials to assess adaptability, genetic stability, and uniformity. Among the six cultivars studied, genotype G17 showed superior ecological plasticity and excellent adaptation to Romania's climatic conditions. The breeding program was completed in 2024, and G17 was proposed for official registration under the provisional name Enescu, with certification expected in 2026. The Enescu cultivar demonstrated a high green biomass yield of 6.46 t/ha and the absence of pathogens, recommending it for organic farming systems. Biomorphological evaluations highlighted valuable traits, with maximum plant dimensions recorded in the fourth year of cultivation (49.4 cm diameter and 44.02 cm height). SFurther studies will focus on biochemical characterization to assess the medicinal and therapeutic potential specific to Sideritis species. In the long term, the Enescu cultivar is intended for introduction into cultivation and promotion as a medicinal, aromatic, ornamental, and entomophilous species.

Key words*: acclimatization, genotype, germplasm, medicinal, entomophilous.*

DISTRIBUTION AND ECOLOGY OF *TULIPA SYLVESTRIS* SUBSP. *AUSTRALIS* IN ROMANIA: A NATIONAL SYNTHESIS AND LOCAL CASE STUDY AT CRÂNG FOREST, BUZĂU COUNTY

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Abstract

Tulipa sylvestris subsp. australis is a rare and fragmented taxon in Romania. Although historical records document its presence in several regions, contemporary data on its distribution, population size, and habitat conditions are limited. This study synthesises national-scale information and presents a detailed case study from Crâng Forest (Buzău County) to advance ecological and conservation knowledge of this subspecies. Nationally, literature and herbarium records indicate a discontinuous distribution across southern and eastern Romania, with most local populations remaining small and vulnerable. Field surveys in Crâng Forest identified a substantial population within thermophilous oak forests, corresponding to habitat type 91I0. Transect and plot sampling estimated the population at over 500.000 individuals, occupying more than 25.000 m². Habitat analysis indicates a preference for partially open canopy areas and a diverse herbaceous layer. These findings highlight the ecological importance of this site and demonstrate that local, field-based assessments can substantially improve national understanding of rare plant taxa and support more effective biodiversity management strategies.*

Key words*: Tulipa sylvestris subsp. australis, population size, habitat assessment, Crâng Forest.*

DIVERSITY AND DISTRIBUTION OF THE *AMARANTHUS DEFLEXUS* L. (AMARANTHACEAE) IN THE HABITATS OF OLTENIA (ROMANIA)

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Abstract

Worldwide, the genus Amaranthus L. (Amaranthaceae Juss.) includes 75 species, most of which are anthropogenic species that negatively influence natural ecosystems. Amaranthus deflexus is one of the invasive species that contributes significantly to the disruption of natural ecosystems and also the properties of the soil on which it grows. In southern Oltenia, perennial pigweed is frequently found in the floristic composition of ruderal, segetal, prairie, shrub, forest, and agricultural plant communities, as well as in urban areas in numerous localities. As for urban areas, populations of Amaranthus deflexus have been recorded in urban centers, such as the city of Craiova, Calafat, Segarcea, Bechet, Corabia, Caracal, Dăbuleni, Băileşti, Poiana Mare in the Oltenia region, Romania, which indicates that it can easily establish itself in these environments due to its ability to invade areas disturbed from an ecological, pedological, and climatic point of view. In this study, we tried to pay special attention to the ecological and phytosociological diversity, distribution, and degree of invasiveness of this species in the southern part of Oltenia.

Key words*: Amaranthus deflexus, habitats, phytosociological diversity, distribution, invasive species.*

GENETIC AND BIOCHEMICAL REGULATION OF CAPSAICIN BIOSYNTHESIS IN *CAPSICUM* SPP.

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Abstract

Peppers (Capsicum spp.) are widely cultivated and consumed worldwide, with uses ranging from fresh vegetables in human diets to condiments, natural colorants, and medicinal products. Their sensory appeal is largely defined by pungency, a trait perceived differently among individuals but highly valued for both culinary and health-related properties. Pungency in peppers is primarily determined by the accumulation of capsaicin and related capsaicinoids in the fruit. Understanding the biochemical pathways responsible for capsaicinoid biosynthesis and the genetic mechanisms regulating this process has therefore been a major focus of Capsicum research. Advances in this area have provided critical insights into key biosynthetic enzymes, regulatory genes, and transcription factors controlling capsaicin production. Such knowledge is essential for pepper breeding programs, as it enables the selection of parental lines with targeted pungency levels. This review synthesizes recent progress in capsaicin biosynthesis, including pathway regulation, associated genes and transcriptional networks, and the development of molecular markers linked to pungency in pepper fruits.

Key words*: bioactive compounds, hot pepper, pungency, spiciness.*

ASSESSING THE CONSERVATION STATUS OF *CRAMBE TATARIA* SEBEÓK IN ROMANIA: DISTRIBUTION PATTERNS AND POPULATION EVALUATION METHODS

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Abstract

Crambe tataria Sebeók (Brassicaceae family) is a rare and vulnerable perennial steppe species with a fragmented distribution in Central and Eastern Europe. It is listed as vulnerable on the IUCN Red List, protected under national legislation, and included in Annex II of the Habitats Directive (92/43/EEC). Our field studies and literature review indicate that the species occurs mainly in steppe and forest-steppe regions in southern and eastern Romania. Population assessments in Romania show a favorable conservation status over three reporting periods to the European Commission. However, our field observations and monitoring reveal considerable variability in monitoring methods among experts, underscoring the need for standardized protocols to ensure accurate population evaluation and more effective conservation of the species. We can specify that, due to the fragility of habitats integrating Crambe and their multiple threats, the over-dimensioned population assessment does not take into account the growing strategies of the species. Therefore, the species remains at risk at the national level, and its conservation status requires urgent clarification to guide effective management measures.

Key words*: Crambe tataria, Brassicaceae, conservation status, distribution pattern, population evaluation methods.*

INFLUENCE OF PHENOLOGICAL STAGE ON BIOACTIVE COMPOSITION IN *MENTHA* × *PIPERITA* L. CULTIVARS 'CORDIAL' AND 'CRISTAL'

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Abstract

Mentha × piperita L. is a valuable aromatic species rich in bioactive volatile compounds. This study evaluated the influence of phenological stage and genotype on biomass, essential oil composition, total phenolic content, total flavonoid content, and antioxidant capacity in two cultivars, 'Cordial' and 'Cristal'. Plants were harvested at vegetative growth (BBCH 31–39), bud stage (BBCH 51–59), and full flowering (BBCH 65). Essential oils were analyzed by GC–MS, and antioxidant capacity was related to phenolic content. Results showed that both factors significantly influenced all parameters. 'Cristal' exhibited higher biomass production, while 'Cordial' showed greater accumulation of secondary metabolites and higher antioxidant capacity. Antioxidant activity strongly correlated with total phenolics. These findings highlight the importance of cultivar selection and harvest stage depending on whether biomass yield or phytochemical quality is targeted.

Key words*: essential oil, antioxidant capacity, phenolic content, Mentha x piperita, phenological stage, GS-MS.*

DEVELOPMENT AND CHARACTERISATION OF AN INNOVATIVE JAM OF HOT PEPPER

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Abstract

Our research consists of developing an innovative new recipe to obtain a special sweetness made from hot peppers. To obtain the hot pepper jam, we started from a classic recipe (fruit jam) in which ginger and anise. We have developed a manufacturing process and technological stages to obtain this sweetness prototype. Our work has focused on the evaluation of the main nutritional components and sensory characteristics. Our product, hot pepper sweetness, is rich in vitamins and minerals, and it does not contain artificial preservatives or flavour enhancers. To establish the quality of this product, comparisons between it and other products on the market have been made.

Key words*: sweetness, jam, hot pepper, organic product.*

GERMINATION DYNAMICS AND CONSERVATION STRATEGIES FOR THE *CISTUS LADANIFER* L. SPECIES

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Abstract

Cistus ladanifer L. is a Mediterranean species well adapted to fire-prone ecosystems through a persistent soil seed bank. Its seeds exhibit strong physiological dormancy caused by a hard, impermeable seed coat that prevents germination. Since 2020, the species has been conserved at the Plant Genetic Resources Bank (BRGV) Buzău mainly through vegetative propagation, which presents limitations for long-term conservation. Seed germination is difficult, as dormancy is naturally broken only by exposure To improve germination, combined dormancy-breaking treatments were tested under controlled conditions. Thermal shock, cold stratification, and gibberellic acid application were followed by germination at optimal temperatures. Germination occurred within 10–30 days. The highest germination percentages were obtained using thermal treatments. Nevertheless, approximately 60% of viable seeds failed to germinate, indicating strong dormancy control influenced by external environmental factors.

Key words: *gum rockrose, germination, seeds, ecosystem, seed dormancy.*

AREAL LIMIT ON THE ROMANIAN TERRITORY: *HORDEUM BULBOSUM*

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Abstract

Hordeum bulbosum L. is a critically endangered species, which has a northern range limit in the territory of Romania. It is a Mediterranean element that finds its habitat in the southern part of the country, in the plains and hilly regions. This paper includes all the information related to the spread of the species in Romania, as well as some considerations regarding the ecology and coenology of this species. Research into the places occupied by Hordeum bulbosum led to the identification of areas where this species forms compact phytocoenosis in Oltenia. Processing the data collected from the field led to the grouping of plants from the analyzed surveys into higher coenotaxonomic units. The classification of these phytocoenosis into a specific association is quite cumbersome. However, some discussions are presented regarding the classification of the meadows built by Hordeum bulbosum in an association.

Key words*: Hordeum bulbosum, chorology, eco-coenology, areal, Romania.*

QUANTITATIVE ANALYSIS OF HUMAN PRESSURE AND CLIMATE ARIDITY IN THE PESCEANA RIVER BASIN, SOUTHWEST OLTENIA, ROMANIA

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Abstract

Quantitative analysis of aridity and drought at the local and regional levels has gained significance in recent years due to the impacts of global warming and variable precipitation, as well as their impact on the quality of life. In this study, a quantitative analysis of the temporal evolution of aridity conditions was performed in the Pesceana River Basin, Southwest Oltenia, Romania, using the De Martonne aridity index (AI_{DM}). Statistical data on the number of inhabitants in 2024 and the area occupied by forest in 2014 are taken from the Tempo online database, and data on temperature and precipitation for the period 2015-2024 are taken from the National Meteorological Administration (ANM) and other sources. According to the results of the AI_{DM} investigation, the Pesceana River Basin exhibits the very and extremely humid climatic types, characterizing this location as having high humidity, abundant vegetation, and, often, high temperatures, which creates a suffocating environment. At the same time, the I_{nat} results show that the basin's rural area is mostly characterized by landscapes with a balance moderately affected by anthropogenic intervention over time. Specifically, I_{nat} values between 20% and 40% were obtained for the six administrative-territorial units in this area.

***Key words**: AI_{DM}, I_{nat}, precipitation, temperature, human pressure on the environment.*

BIOLOGICAL, MORPHOLOGICAL AND ANATOMICAL CHARACTERIZATION OF ROOT, STEM AND LEAF OF *CERATONIA SILIQUA* L.

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Abstract

Ceratonia siliqua L. (Carob), from the Fabaceae family, subfamily Caesalpinioideae, is native to the Mediterranean region and the Middle East. The species is cultivated in various parts of the world for its fruits and seeds, rich in various phytochemical compounds, and has multiple uses in the food, pharmaceutical, and cosmetic industries. It can also be grown as an ornamental tree in parks. In this study, 7-year-old seeds from Spain (Malaga) were used as biological material, with the aim of propagating, acclimatizing, and diversifying plant species from the Bucharest area, Romania. During the study, certain biological aspects were investigated, including seedling emergence and plant growth under laboratory conditions, as well as organ micromorphology and anatomy of 1-year-old plants. The emergence occurred after 2 months from sowing, at a rate of 30-40%. The root and stem anatomy shows a secondary structure. The leaves are paripinnate compound, with 1-2 pairs of elliptic-obovate leaflets with entire margins. The leaflets are hypostomatic with anomocytic stomata. The epidermis of the leaflets is thick. The leaf mesophyll is bifacial, with palisade and spongy tissue.

Key words*: anatomy, biology, Ceratonia siliqua*, *morphology.*

MANAGEMENT OF BIODIVERSITY IN AGRICULTURAL SYSTEMS IN ROMANIA

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Abstract

Biodiversity plays a fundamental role in maintaining the stability, productivity, and resilience of agricultural systems. In Romania, agricultural landscapes are characterized by a combination of traditional farming practices and modern intensive systems, which generate both opportunities and pressures on agroecosystems. This paper aims to analyze the importance of biodiversity management in agricultural systems, with a focus on sustainable farming practices that support ecosystem functions and long-term agricultural viability. The study highlights the role of environmentally friendly agricultural practices, diversified cropping systems, and landscape elements in conserving biodiversity and enhancing ecosystem services. By promoting balanced management strategies that integrate agricultural production with environmental protection, biodiversity-friendly farming can contribute to food security, climate change adaptation, and sustainable rural development in Romania.

Key words: *agriculture; biodiversity; ecosystem; services; sustainable.*

THE SPHAGNUM SPECIES FROM THE PADIȘ AREA, APUSENI NATURAL PARK

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Abstract

The Padiș area in Apuseni Natural Park is one of the richest in peat bogs in Romania, having identified over 10 Sphagnum bogs. The aim of this research is to better understand the distribution patterns of Sphagnum species. The studies on bryophytes in the Padiș area indicate a lack of recorded data on peat mosses (Sphagnum). In this study, we report new data based on the field trip in October 2025. Rare species of Sphagnum have been identified in the Padis area, as Sphagnum balticum (Russow) C.E.O. Jensen, S. cuspidatum Ehrh. ex Hoffm., S. denticulatum Brid., S. majus (Russow) C.E.O. Jensen, S. papillosum Lindb., S. riparium Ångstr., and S. tenellum (Brid.) Pers. ex Brid.

Key words*: Sphagnum, peat bog, threatened species, EU Habitats Directive, Romania.*

THE BRYOPHYTES OF FĂGĂRAȘ AND IEZER-PĂPUȘA MOUNTAINS

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Abstract

This study presents the bryophytes of the Făgăraș and Iezer-Păpușa Mountains, from where 524 bryophyte species were reported, representing one of the richest areas, with 52.88% of the total number of bryophytes in Romania. Of these species, one is a hornwort, 147 are liverworts, and 376 are mosses. A total of 111 threatened bryophyte species were identified in the studied area (21.18% of the threatened bryophytes at national level), 4 species included in Annex II of the EU Habitats Directive: Mannia triandra (Scop.) Grolle, Buxbaumia viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl., Hamatocaulis vernicosus (Mitt.) Hedenäs and Meesia longiseta Hedw.

Key words*: Bryophyte, threatened species, EU Habitats Directive, Mountains, Romania.*

IN SITU AND *EX SITU* CONSERVATION MEASURES FOR THE THREATENED SPECIES *POTENTILLA ASTRACANICA* JACQ. IN THE REPUBLIC OF MOLDOVA

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Abstract

This study of in situ and ex situ activities aims at the effective protection of populations of Potentilla astracanica Jacq. - an endangered Eurasian species, which grows spontaneously in countries such as Romania, Bulgaria, Turkey, southern Ukraine, and southeastern Russia. In the Republic of Moldova, it is at the northern limit of its distribution area and is protected by law and by its inclusion in the Red Book of the Republic of Moldova, 3rd edition. Potentilla astracanica was identified in the local flora only in the southeast and southwest of the country. Our investigations in the species' habitat have demonstrated that the numerical strength of the populations is very low and consists mainly of mature specimens, which grow solitary, but also in small groups of 2-3 specimens. In order to have viable and sustainable populations of Potentilla astracanica, it is necessary to grow an effective species through conservation actions in natural habitats, but also by strengthening existing populations. Therefore, a series of measures to improve in situ conditions is imperative, as well as the identification of new specific habitats for its repatriation actions.

Key words*: Potentilla astracanica, rare taxa, habitat, repatriation, population.*

RESEARCH ON THE VALORIZATION OF WATERMELON RIND IN MIXTURES WITH APPLE VARIETIES FOR DIVERSIFYING THE FOOD ASSORTMENT

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Abstract

*On a large scale worldwide, watermelons and apples are highly appreciated by consumers. Watermelon (*Citrullus lanatus*) is an excellent source of vitamins A, B1, B6, and C. It is consumed for its health benefits and low caloric value. Watermelon rind mainly contains carbohydrates rich in pectic substances. The present study demonstrated the possibility of valorizing watermelon rind in combination with apples through the development of* watermelon rind and apple jam*, representing a challenge and an opportunity for diversifying the range of preserved food products in the food industry. Laboratory-scale experimental trials demonstrated that such valorization enables the production of food products with valuable nutritional compounds. In line with current trends aimed at meeting consumer demand for healthy and sustainable products, the natural ingredients used-apples and watermelon rind-made it possible to obtain products without the addition of food additives, as these ingredients can act as natural substitutes. Apples are an excellent source of nutrients, with a high content of antioxidants, dietary fiber, and vitamins.*

Key words*: apple varieties, by-product, source of nutrients, valorization, watermelon rind.*

FOREST VEGETATION DYNAMICS MONITORING USING INDICES DERIVED FROM SATELLITE IMAGERY

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Abstract

This study analyzed the state of forest vegetation by integrating GIS and remote sensing techniques, using Landsat satellite images were determined. Based on NDVI, SAVI, GNDVI, NDMI, and NBR indices, the spatial variation of vegetation density, plant moisture, chlorophyll content, and biomass potential was evaluated during the study period (2016–2017). High values of NDVI, SAVI, and GNDVI indicated areas with dense and healthy vegetation, while areas with low values reflected low vegetation density or exposed soil. The NDMI index allowed the identification of humidity differences, correlated with fire risk, and the NBR index highlighted the sectors affected by forest degradation. The integration of topographic data through the digital terrain model and slope contributed to understanding the influence of altitude and relief on the indices' variation. The results demonstrated a heterogeneous distribution of vegetative parameters, with high values in the central and northern areas, in contrast to the southern regions characterized by steep slopes and restrictive conditions.

Key words*: forest area, GIS techniques, integrated analysis, Landsat satellite system, spatial variability.*

NITRITES AND NITRATES CONTENT OF SOME VEGETABLES HARVESTED IN 2024-2025 FROM DÂMBOVIȚA COUNTY, ROMANIA

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Abstract

In this work, the level of contamination with nitrates and nitrites in 102 fresh vegetables and 15 fresh fruits harvested during 2024-2025 from the southern area of Dâmbovița County was determined using the spectrometric method. In 68.37% of the analyzed samples, nitrite values were below the detection limit of 1.7 mg/kg, indicating low contamination. In 29.06% of samples, nitrates were not detected; however, the content exceeded 100 mg/kg in some crops, such lettuce (138.84 mg/kg), parsley (113.73 mg/kg), and lovage (155.73 mg/kg). Fruits, in general, showed low levels of nitrite contamination, with red cherries (6.98 mg/kg) and strawberries (8.99 mg/kg) recording the highest values. Overall, a slight increase in nitrogen values was observed in 2025 compared with 2024, especially in vegetables with edible leaves, possibly due to the intensification of fertilization during the vegetation period. The results showed low to moderate contamination with nitrates in the studied area, with a pronounced tendency for accumulation in leafy vegetables. Regular monitoring of these contaminants remains essential to ensure the compliance of local agri-food products with food safety standards and regulations.

Key words*: nitrates, nitrites, lettuce, parsley, lovage.*

IN VITRO CALLUS CULTURE OF *LAVANDULA ANGUSTIFOLIA* MILL. VAR. *HIDCOTE* (LAMIACEAE) AND ITS ANTIOXIDANT CAPACITY

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Abstract

This study established an optimized protocol for callus induction and biomass production in Lavandula angustifolia Mill. var. Hidcote using six Murashige and Skoog (MS) medium variants supplemented with different auxins, cytokinins, and organic additives. Callus was initiated from in vitro-derived plantlets and young shoots. All media supported dedifferentiation, with the combination of 5 mg/L 2,4-D and 2.5 mg/L BAP producing the highest fresh callus mass (5.14 g on average). The addition of 2 g/L casein hydrolysate stimulated the release and accumulation of blue pigments during early subcultures. Mannitol-containing media (30–70 g/L), combined with kinetin and IBA, enhanced long-term culture maintenance and favored secondary metabolite production. After 35 days, callus reached an average fresh weight of 3.50 g and a dry weight of 0.16 g across all variants. Antioxidant activity was highest in the medium containing 4 mg/L BAP and 0.04 mg/L 2,4-D, while total phenolic content peaked in mannitol-based variants. These results highlight the strong influence of growth regulators and organic additives on callus biomass and metabolite profiles in lavender.

Key words*: Lavandula angustifolia; callus culture; plant growth regulators; secondary metabolites; antioxidant activity.*

IN VITRO CULTURE OF *ALTHAEA OFFICINALIS* L. (BIG MALLOW): OPTIMIZATION OF GERMINATION, SHOOT MULTIPLICATION AND CALLUS INDUCTION

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Abstract

Althaea officinalis L. is a medicinal plant valued for its mucilaginous polysaccharides and bioactive compounds. Efficient in vitro propagation systems are essential for producing uniform plant material and supporting conservation and phytochemical studies. This work aimed to optimize in vitro germination, shoot multiplication, and callus induction using MS medium supplemented with different plant growth regulators. Seeds sterilized with ethanol and mercuric chloride achieved 90% germination on basal MS medium within eight days. Supplementation with GA_3 enhanced seedling elongation. Shoot multiplication was most efficient on MS medium containing BAP and IAA, producing vigorous shoots with extended subculture intervals. Rooting was successfully induced with IBA. Callus formation occurred on MS medium supplemented with either BAP + NAA or 2,4 D + BAP, the latter producing a compact white callus. Regenerated plants acclimatized successfully in a mixture of soil:perlite 1:1. The results confirm that A. officinalis responds strongly to in vitro culture conditions and provide a reliable protocol for micropropagation and callus production.

Key words*: Althaea officinalis, micropropagation, gibberellic acid, BAP, callus induction.*

IN VITRO REGENERATION OF GLACIAL RELICT *VIOLA PALUSTRIS* L. SUPSP. *PALUSTRIS* AS GROUNDWORK FOR SUSTAINABLE USE AND GERMPLASM CONSERVATION

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Abstract

Climate change and increasing anthropogenic pressures have accelerated the degradation of European peatlands, leading to the decline of specialist wetland flora. Viola palustris L., a glacial relict and indicator of peatland ecosystem health, is currently listed as critically endangered in Romania. To support future conservation and sustainable use of this species, we developed an in vitro regeneration protocol based on aseptic germination of immature embryos and subsequent shoot and root development on optimized culture media. A custom sterilization procedure effectively eliminated fungal contamination typical of wetland-derived material, enabling reliable culture initiation. Although germination percentages were modest, regenerated plantlets exhibited normal morphology, vigorous growth, and strong multiplication capacity, particularly on media supplemented with balanced cytokinin–auxin–gibberellin combinations. Root induction with indole-3-butyric acid produced dense, healthy root systems, and acclimatized plants remained vigorous under ex vitro conditions. This protocol provides a practical foundation for establishing germplasm collections, supporting peatland restoration efforts, and facilitating the horticultural or phytochemical valorization of V. palustris.

Key words*: anthropic pressure, endangered plants, ex situ conservation, Viola palustris.*

GENETIC POLYMORPHISM AND PRODUCTION CAPACITY OF SOME ROMANIAN-NATIVE WILD ISOLATES OF *PLEUROTUS OSTREATUS*

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Abstract

Pleurotus ostreatus is a globally significant edible mushroom. Its ecological versatility and rapid growth make it essential for sustainable agriculture, waste valorization, and functional food production. The aim of this study is to explore the genetic variability and fruiting potential of seven Romanian-native wild isolates of P. ostreatus compared with some commercial strains of P. ostreatus, P. columbinus, and P. citrinopileatus from the RDIVFG Vidra collection. Genetic variability was assessed using the RAPD technique. Results showed a high degree of genetic divergence among isolates, highlighting intraspecific variability and clear genetic structuring within the analyzed P. ostreatus isolates. In mushroom farm testing for fruiting potential, the seven wild isolates of P. ostreatus were outperformed in mushroom production by the commercial P. ostreatus strains PoM-421 and PoM-77. However, differences were not very large in terms of quantity and, especially, quality. Among the wild isolates, the highest average yield was recorded at Po5C, 567.4 g of mushrooms per 2.6 kg of lignocellulosic substrate (21.82%). This value was only 20.4 g lower than the PoM-77 control, revealing a statistically insignificant difference.

Key words*: macromycetes; oyster mushroom; RAPD; wild isolates.*

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