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Faculty of Horticulture

International Conference

"Agriculture for Life, Life for Agriculture"

BOOK OF ABSTRACTS

Section 2

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2025

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SUMMARY

FRUIT GROWING

1. EFFECT OF FERTILIZATION ON THE GROWTH, NUTRITIONAL AND PHYSIOLOGICAL STATUS OF APPLE PLANTING MATERIAL (*MALUS DOMESTICA* BORKH.) GROWN IN CONTAINERS - **Vanya AKOVA, Irina STANEVA, Lilyana NACHEVA, Nataliya DIMITROVA, Angel DIMITROV, Plamen IVANOV, Stefan GANDEV**..... 26
2. BIOCOMPATIBLE MANAGEMENT ON POSTHARVEST DISEASES - **Diyana ALEKSANDROVA, Gabor ZSIVANOVITS** 27
3. APPLICATION OF BIOPOLYMERS FOR FUNGAL PATHOGEN CONTROL IN THE STORAGE OF FRUITS - **Diyana ALEKSANDROVA, Sashka SAVCHOVSKA, Gabor ZSIVANOVITS** ……..... 28
4. THE HISTORY OF PALM CULTIVATION IN IRAQ - **Imad Jabbar Wadi AL-SUWAID, Ana Cornelia BUTCARU, Cosmin MIHAI, Florin STĂNICĂ** 29
5. VEGETATIVE AND REPRODUCTIVE POTENTIAL OF BLACKBERRY CULTIVARS 'HULL THORNLESS' GROWN IN DIFFERENT REGIONS OF BULGARIA - **Stanislava ATANASOVA, Diyan GEORGIEV, Maria GEORGIEVA** 30
6. DETECTION OF PHYTOPLASMA INFECTIONS IN VARIOUS FRUIT TREES IN BULGARIA 2018-2024 - **Zhelyu AVRAMOV, Iliyana ATANASOVA, Dora PANAYOTOVA** 31
7. TRAINING SYSTEMS FOR ORCHARDS HIGH-DENSITY CHERRIES FROM THE REPUBLIC OF MOLDOVA - **Valerian BALAN, Inna BÎLICI, Stanislav RUSSU, Vasile ȘARBAN, Igor IVANOV, Corneliu BUZA, Dumitru TALPALARU** 32
8. THE INFLUENCE OF PRUNING ON VEGETATIVE GROWTH, YIELD AND QUALITY OF CHERRY FRUITS OF THE 'KORDIA' VARIETY GRAFTED ON 'MAXMA 14' (*PRUNUS AVIUM*). - **Inna BÎLICI, Valerian BĂLAN, Vasile ȘARBAN, Corneliu BUZA, Dumitru TALPALARU** 33
9. BEHAVIOR OF SOME ALMOND CULTIVARS IN THE FRUIT SETTING PROCESS - **Mihaela BĂLUȚĂ, Florin STĂNICĂ** 34
10. POSTHARVEST EFFECTS ON ORGANIC `REGINA` STRAWBERRIES: QUALITY AND BIOACTIVE COMPOUNDS IN FREEZE-DRYING VS. FREEZING - **Andreea BARBU, Violeta Alexandra ION, Mihai FRÎNCU, Andrei PETRE, Mihaela Maria ZUGRAVU, Liliana BĂDULESCU** 35
11. EFFECTS OF BAGGING ON FRUIT DEVELOPMENT AND QUALITY IN 'KANZI' APPLES - **Orsolya BORSAI, Andrei CRISTEA, Sándor RÓZSA, Tincuța-Marta GOCAN, Cosmin Alexandru MIHAI, Viorel MITRE, Lehel LUKÁCS** 36
12. COMPARISON OF MULTIANNUAL CLIMATIC DATA IN NORTH BUCHAREST REGION, ROMANIA, WITH DISCUSSION ON ORCHARD INFLUENCE - **Ana Cornelia BUTCARU, Cosmin Alexandru MIHAI, Adrian ASĂNICĂ, Florin STĂNICĂ** 37
13. PRELIMINARY RESEARCH ON THE INFLUENCE OF CERTAIN AGROTECHNICAL MEASURES ON THE GROWTH OF THE 'ANNA SPÄTH' PLUM VARIETY UNDER THE CONDITIONS OF THE MOARA DOMNEASCĂ EXPERIMENTAL STATION, ILFOV COUNTY - **Cristian Marian CALINITA, Andreea Mihaela UDREA BRASLA, Catalin-Viorel OLTENACU, Mihai BOTU** …..... 38

14. DIGITAL MANAGEMENT OF ARONIA CROP: THE BENEFITS OF HUMIDITY AND TEMPERATURE MONITORING THROUGH SPECIFIC SENSORS - **Anca Maria CHIOREAN, Zsolt JAKAB-ILYEFALVI, Ioan ZAGRAI, Smaranda ROȘU-MAREȘ, Georgeta Maria GUZU, Claudiu MOLDOVAN, Adrian ASĂNICĂ** 39
15. THE SPECIFICS OF ROOTING, GROWTH OF SOME APPLE VARIETIES IN THE CONDITIONS OF THE SOUTH OF THE COUNTRY - **Mihai CICHI, Radu Lucian PÂNZARU** 40
16. RESEARCH ON THE QUALITY OF APPLE PRODUCTION DEPENDING ON THE APPLIED HERBICIDES - **Răzvan Daniel COȚIANU, Alina Maria POPÂRLAN** 41
17. REACTION OF NEW INTRODUCED WALNUT CULTIVARS TO ANTHRACNOSE AND BACTERIOSIS IN BULGARIA - **Angel DIMITROV, Diyana ALEKSANDROVA, Stefan GANDEV** 42
18. FRUIT CHARACTERISTICS OF DIFFERENT AUTOCHTHONOUS CHERRY GENOTYPES SELECTED FOR THE INTERACTION WITH THE PLUM POX VIRUS - **Florentina DOBRINESCU, Viorel Cătălin OLTENACU, Ligia ION** 43
19. RESEARCH ON THE INFLUENCE OF THE SOIL MAINTENANCE SYSTEM ON THE QUALITY OF CURRANT FRUITS - **Maria Marinela DRAGNEA, Cătălin Viorel OLTENACU, Mihai GÎDEA** 44
20. STUDY ON THE IMPACT OF SEMI-TRANSPARENT PHOTOVOLTAIC PANELS IN HORTIVOLTAIC SYSTEMS ON MICROCLIMATE AND STRAWBERRY PRODUCTION IN ROMANIA - **Damian DRAGOMIR, Catalin-Viorel OLTENACU, Dragos Vasile OFRIM, Cristian CALINITA, Bogdan Alexandru OFRIM, Dragos Mihai OFRIM** 45
21. THE IMPACT OF CLIMATE CHANGES ON THE PHENOLOGICAL DYNAMICS OF SOME PEAR VARIETIES IN THE MARACINENI AREA, ROMANIA - **Eugenia GHERGHINA (MARESI), Madalina MILITARU, Madalina BUTAC, Dorel HOZA** 46
22. EVAPOTRANSPIRATION AND INTERACTIVE EFFECTS OF IRRIGATION AND FERTIGATION ON WHITE STRAWBERRY FRUITS - **Elena GRANCHAROVA, Blagoj ELENOV, Petya IVANOVA, Emilija ELENOVA, Georgi KOSTADINOV** …….. 47
23. EFFECTIVENESS OF PREPLANT TRENCH ORGANIC FERTILIZATION IN A PLUM ORCHARD - **Denitsa HRISTOVA, Diyan GEORGIEV, Maria GEORGIEVA** 48
24. GENETIC DIVERSITY AND RELATIONSHIP ASSESSMENT OF ROMANIAN BLUEBERRY CULTIVARS USING SRAP MARKERS - **Mihaela IORDĂCHESCU, Maria OJOG, Amalia UDRIȘTE, Liliana BĂDULESCU** 49
25. STUDY ON THE POSSIBILITY OF PROCESSING WHITE STRAWBERRY (*FRAGARIA* × *ANANASSA* 'SNOW WHITE') FRUITS INTO PRODUCTS FOR MASS CONSUMERS AND AS COMPONENT COMPOSITIONS IN THE BAKERY AND CONFECTIONERY INDUSTRY - **Petya IVANOVA, Elena GRANCHAROVA, Blagoj ELENOV, Velichka YANAKIEVA** 50
26. INVESTIGATION OF THE POTENTIAL FOR PROCESSING WHITE STRAWBERRY FRUITS INTO CONSUMER PRODUCTS AND AS COMPONENTS FOR THE BAKERY AND CONFECTIONERY INDUSTRY - **Petya IVANOVA, Blagoj ELENOV, Elena GRANCHAROVA, Emilija ELENOVA, Georgi KOSTADINOV** 51
27. EFFECTS OF DWARFING ROOTSTOCKS ON THE VEGETATIVE AND GENERATIVE DEVELOPMENT OF SEVERAL CHERRY CULTIVARS IN PEDOCLIMATIC CONDITIONS OF BISTRITA FRUIT REGION - **Zsolt JAKAB-ILYEFALVI, Daniela-Larisa VLASIN, Anca Maria CHIOREAN, Georgeta-Maria GUZU, Claudiu MOLDOVAN, Smaranda ROSU-MARES** 52
28. CLUSTERING QUINCE (*CYDONIA OBLONGA* MILL) CULTIVARS ACCORDING TO THEIR RESPONSE TO ECONOMICALLY IMPORTANT VIRUSES - **Neli KERANOVA, Yonko YONCHEV** 53

29. *DIOSPYROS KAKI*, *DIOSPYROS VIRGINIANA* AND *DIOSPYROS LOTUS*, NEW FRUIT SPECIES FOR ROMANIA. A REVIEW - **Emanuela Diana LORENTZ (CRINTEA), Florin STĂNICĂ** 54
30. POMOLOGICAL AND CHEMICAL CHARACTERIZATION OF SOME SWEET CHERRY VARIETIES GROWN IN URBAN ORCHARD - **Lehel LUKACS, Gabriela Maria ROMAN, Ioana MOLDOVAN, Sándor RÓZSA, Tincuța-Marta GOCAN, Orsolya BORSAI** 55
31. MULTIVARIATE ANALYSIS OF GENOTYPE BY YEAR INTERACTION FOR SOME FRUIT TRAITS IN ROSEHIP *(ROSA CANINA* L.) - **Adina Gabriela MARIȘ, Sorin CIULCA** 56
32. DYNAMICS OF CLIMATIC ACCIDENTS DURING PEACH, APRICOT, AND CHERRY DORMANCY AND FIRST GROWTH STAGES IN THE LAST 20 YEARS IN ROMANIA - **Ivona Cristina MAZILU, Emil CHITU, Mirela CALINESCU, Florin PLAIASU, Leinar SEPTAR, Zsolt JAKAB-ILYEFALVI, Sorina SIRBU, Calin-Viorel OLTENACU** 57
33. THE REACTION OF SOME APRICOT CULTIVARS AND SELECTIONS TO THE ATTACK OF SOME PATHOGENS AND FROST - IN THE CONTEXT OF CLIMATE CHANGE - **Cristina MOALE, Vladuț Alexandru OPRITA, Leinar SEPTAR, Ion CAPLAN, Ioan STOLI** 58
34. COMPARISON OF QUALITY CHARACTERISTICS OF FRESH AND PROCESSED STRAWBERRIES - **Ioana MOLDOVAN, Lehel LUKÁCS, Gabriela Maria ROMAN, Sándor RÓZSA, Tincuța-Marta GOCAN, Orsolya BORSAI** 59
35. *IN SITU* SELECTION OF LOCAL SOUR CHERRY VARIETIES RESISTANT TO THERMOHYDRIC STRESS - **Silvia NICOLAE, Corina GAVĂȚ, Mihai CHIVU, Adelina Ioana STAN** 60
36. THE ACTION OF PRODUCTS BASED ON NAD, ANA AND BA ON THE FRUIT LOAD CONTROL IN GOLDEN REINDERS APPLE TREES - **Ananie PEȘTEANU, Oleg CALESTRU** 61
37. PHOSPHORUS AND IRON CONTENT IN APPLES IN DIFFERENT SALES CHANNELS - **Marko PETEK, Matilda POVODNIK, Tomislav KARAŽIJA, Mihaela ŠATVAR VRBANČIĆ, Mile MARKOSKI, Tomaš LOŠAK, Goran FRUK** 62
38. VEGETATIVE AND REPRODUCTIVE CHARACTERISTICS IN RASPBERRY HYBRIDS - **Zornitsa PETKOVA, Diyan GEORGIEV** 63
39. PERSIMMON (*DIOSPYROS KAKI*) FRUIT: QUALITY PHYSICO-CHEMICALS UPON DIFFERENT STAGE OF MATURITY - **Amelia PETRESCU, Monica STURZEANU, Loredana VÎJAN** 64
40. THE GROWTH SEASON FOLLOWING BBCH SCALE AND THE GDD REQUIREMENT FOR *RUBUS IDAEUS* VAR. PROMYK. DURING THE ADAPTATION PERIOD, PLACED IN THE URBAN GARDEN - **Alin Laviniu POPA, Anamaria VÂTCĂ, Valentina STOIAN, Mădălina TRUȘCĂ, Ștefania GÂDEA, Sorin VÂTCĂ** 65
41. MORPHOLOGICAL AND BIOCHEMICAL PROPERTIES OF FRESH FRUITS OF THE GERMAN PLUM CULTIVARS, TOP SERIES IN THE CONDITIONS OF THE TROYAN, MOUNTAINOUS REGION (BG) - **Georgi POPSKI, Boryana STEFANOVA** 66
42. THE EFFECT OF ALTERNATIVE TREATMENT METHODS ON THE EVOLUTION OF THE *PHILAENUS SPUMARIUS* POPULATION IN GOOSEBERRY CULTIVATION - **Liliana-Aurora RĂDULESCU (NICHIFOR), Dorel HOZA** 67
43. ADVANCED CHARACTERIZATION OF PLUM FRUITS (*PRUNUS DOMESTICA* L.) BY FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR) AND SCANNING ELECTRON MICROSCOPY (SEM): IMPACT OF APPLIED TREATMENTS ON QUALITY AT DIFFERENT PHENOLOGICAL STAGES - **Mariana RUSU, Iuliana MOTRESCU, Irina-Gabriela CARA, Denis ȚOPA, Gerard JITĂREANU** 68

44. PRELIMINARY DATA ON THE ADAPTABILITY OF NATIVE ALMOND VARIETIES IN SOUTH-EASTERN ROMANIA - **Nicoleta-Claudia SANDU, Mihaela-Cecilia DOGARU, Damian DRAGOMIR, Viorel Cătălin OLTENACU, Mihaela OLARU, Andreea Mihaela BRASLĂ, Vlăduț HOLT** 69
45. VARIABILITY OF BIOMETRIC AND BIOCHEMICAL CHARACTERISTICS IN SOME APPLE VARIETIES - **Daniela Nicoleta SCEDEI, Olimpia IORDANESCU, Casiana MIHUT, Renata SUMALAN, Ramona STEF, Carmen DURAU, Antonela COZMA, Vlad Dragoslav MIRCOV, Maria Mihaela MOATAR, Dacian LALESCU** 70
46. BLOSSOMING PHENOPHASE AT SOME APRICOT AND PEACH CULTIVARS DEPENDING ON AIR TEMPERATURE IN SOUTH-EASTERN AREA OF ROMANIA - **Leinar SEPTAR, Corina GAVAT, Vladut Alexandru OPRITA, Cristina MOALE, Ion CAPLAN, Ioan STOLI** 71
47. THE EFFECT OF SPRAYING WITH GROWTH REGULATOR (ATONIC) AND THE BIOLOGICAL FUNGUS *TRICHODERMA VIRIDE* IN IMPROVING THE PHYSICAL PROPERTIES OF BUCKTHORN FRUITS *(ZIZIPHUS MAURITIANA* L. CV. TUFAHI) - **Mahmood SHAKIR, Mohammed Naithel RADHI** 72
48. EFFECT OF ULTRA AND DISPER CHLOROPHYLL ON THE CHARACTERISTICS OF *PHOENIX DACTYLIFERA* L. - **Hadi Hoobi SHALLAL, Mohammed JASIM MOHAMMED** 73
49. NITROGEN CONTENT IN APPLE LEAVES UNDER VARIOUS FERTIGATION TREATMENTS IN YOUNG, SEMI-YOUNG AND OLD LEAVES - **Antun ŠOKEC, Goran FRUK, Tomislav KARAŽIJA, Martina SKENDROVIĆ BABOJELIĆ, Mihaela ŠATVAR VRBANČIĆ, Kristijan KONOPKA, Boris LAZAREVIĆ and Marko PETEK** 74
50. THE EFFECT OF EXTRACTION TIME ON TOTAL POLYPHENOLS AND TOTAL FLAVONOIDS CONTENTS IN HAWTHORN FRUITS (*CRATAEGUS MONOGYNA* JACQ. AND *CRATAEGUS PENTAGYNA* WALDST. & KIT.) - **Florin Daniel STAMIN, Loredana Elena VIJAN, Sina Niculina COSMULESCU** 75
51. FLORAL BIOLOGY OF SOME AUTOCHTHONOUS SOUR CHERRY GENOTYPES FROM THE GERMPLASM FUND - **Ioana Adelina STAN (ZOICAN), Mădălina BUTAC, Dorel HOZA** 76
52. REPRODUCTIVE MANIFESTATIONS OF APPLES BY CONVENTIONAL FARMING - **Vera STEFANOVA, Galya DOBREVSKA, Manol DALLEV**..... 77
53. PRELIMINARY ASSESSMENT OF SOME MORPHOLOGICAL TRAITS OF JUJUBE FRUITS PRODUCED IN SOUTHERN OLTENIA - **Ana-Maria STOENESCU, Florin STĂNICĂ** 78
54. ORGANIC FOLIAR FERTILISERS INFLUENCE ON SOME PEACH VARIETIES - **Alina STOICHESCU, Ionuț DASCĂLU, Tamara Edina GAL, Daniela Nicoleta SCEDEI, Olimpia Alina IORDĂNESCU** 79
55. DAMAGES ON FRAGARIA ANANASSA VAR. 'SNOW WHITE' CAUSED BY *ERWINIA AMYLOVORA* AND POTENTIAL OF *CHAENOMELES* EXTRACT FOR DISEASE CONTROL - **Mariya STOYANOVA, Elena GRANCHAROVA, Miroslava VALKOVA, Teodora MIHOVA** 80
56. TOWARDS *IN VITRO* CONSERVATION OF SEVERAL PLUM CULTIVARS (*PRUNUS DOMESTICA* L.) - **Larisa-Daniela STRÎMBU (VLAȘIN), Luminița-Antonela ZAGRAI, Zsolt JAKAB-ILYEFALVI, Ioan ZAGRAI, Georgeta Maria GUZU, Mirela Irina CORDEA** 81
57. EVALUATION OF SOME QUALITY PARAMETERS OF 'ENROSADIRA' RASPBERRY VARIETY UPON DIFFERENT GROWING SYSTEMS - **Monica STURZEANU, Oana HERA, Loredana VÎJAN, Adrian ASĂNICĂ** 82

58. MOTHS AND FLIES (INSECTA: LEPIDOPTERA, DIPTERA) ASSOCIATED WITH WALNUT (*JUGLANS REGIA* L.) FRUITS IN BULGARIA - **Rumen TOMOV, Boryana PLASHKOVA** 83
59. THE INFLUENCE OF ORGANIC AND CONVENTIONAL CULTIVATION SYSTEMS ON SOME QUALITY AND PRODUCTIVITY INDICES OF THREE PEACH VARIETIES GROWING IN SOUTHEASTERN ROMANIA - **Andreea Mihaela UDREA-BRASLĂ, Mihaela OLARU, Cătălin-Viorel OLTENACU, Nicoleta OLTENACU, Ailin MOLOȘAG, Damian DRAGOMIR, Vlăduț HOLT** 84
60. THE EFFECT OF PHOTOVOLTAIC SYSTEMS ON BERRIES PRODUCTION. A REVIEW - **Lavinia-Mihaela UDREA (ILIESCU), Mirela Florina CĂLINESCU, Ivona Cristina MAZILU, Emil CHIȚU, Florin PLĂIAȘU** 85
61. PROXIMATE COMPOSITION AS A FORM OF NUTRITIONAL QUALITY ASSESSMENT OF BANANA PEEL - **Ariana-Bianca VELCIOV, Antoanela COZMA, Georgeta-Sofia POPESCU, Virgil-Dacian LALESCU, Daniela STOIN, Laura RĂDULESCU, Maria RADA** 86
62. EFFECTS OF SALICYLIC ACID (SA) AND MICROELEMENT SUBSTITUTION ON CELLULAR SENESCENCE AND MORPHOGENESIS IN *LONICERA CAERULEA* - **Oana VENAT, Ioana-Cătălina NICOLAE, Maria TABĂRA, Nina CIORCHINĂ, Liliana BĂDULESCU** 87
63. PLANT MATERIAL IN SOME STONE FRUIT SPECIES ROOTSTOCKS - **Elena Andreea VOCHIN (DUMITRESCU), Valentina ISAC, Florin STĂNICĂ** 88
64. GRAFTING EFFICIENCY OF APPLE TREES IN THE NURSERY BY APPLYING DIFFERENT TECHNOLOGY ELEMENTS - **Adelina VENIG, Florin STĂNICĂ, Adrian PETICILĂ** 89
65. PLANT PROTECTION EFFECT OF FLOWER CROPS IN ORGANIC ORCHARDS - **Veselka VLAHOVA** 90
66. UGA BLUEBERRY BREEDING PROGRAM UPDATE **- Chu YE** 91

VITICULTURE AND OENOLOGY

1. STUDIES ON THE EVALUATION OF THE PHENOLIC POTENTIAL OF GRAPE POMACE FOR RED WINES - **Victoria ARTEM, Cristina CIOBANU, Arina Oana ANTOCE, Ancuta NECHITA, Georgeta TUDOR** 94
2. CURRENT STATUS OF GRAPEVINE *FLAVESCENCE DORÉE* AND *BOIS NOIR* IN BULGARIA (2022–2024) - **Zhelyu AVRAMOV, Iliyana ATANASOVA** 95
3. INVESTIGATING THE IMPACT OF CLUSTER LOAD ON THE CHARACTERISTICS OF TWO WHITE WINE GRAPE VARIETIES (`KIRÁLYLEÁNYKA`/`FETEASCĂ REGALĂ` AND `KERNER`) – **Géza BALLA, Zsolt SZEKELY-VARGA, Attila BANDI, Csaba MOLDOVAN, Endre KENTELKY** 96
4. AGROBIOLOGICAL CHARACTERISTICS OF SOME AUTOCHTHONOUS TABLE GRAPE VARIETIES UNDER TERMOHYDRIC STRESS IN SOUTHERN ROMANIA – **Georgeta Mihaela BUCUR, Elena DELIAN, Marinela Vicuța STROE, Roxana Mihaela FILIMON** 97
5. CONSUMER PREFERENCES IN LOW-SULPHUR WINE QUALITY – **Ioana BUȚERCHI, Liviu Mihai IRIMIA, Gabriela IGNAT, Ioan PRIGOREANU, Valeriu COTEA** 98
6. SECONDARY METABOLITES ACCUMULATION IN LONG-TERM CALLUS CULTURES OF *VITIS VINIFERA* CV. 'NEGRU VÂRTOS' UNDER DIFFERENT STRESS CONDITIONS – **Rodica CATANĂ, Raluca MIHAI, Larisa FLORESCU, Monica MITOI** 99

7. COMPARISON OF THE PHENOLIC COMPOSITION OF MAMAIA, BABEASCA NEAGRA AND PINOT NOIR BLACK GRAPES IN THE MURFATLAR WINE CENTER – **Iulia-Cristina CIOBANU, Traian Stefan COSMA, Victoria ARTEM, Arina Oana ANTOCE** 100
8. CONSUMER ACCEPTANCE OF SWEET WINES PRODUCED BY STOPPING FERMENTATION WITH OCTANOIC AND DECANOIC ACIDS – **George Adrian COJOCARU, Arina Oana ANTOCE** 101
9. ELICITORS IN VITICULTURE AND THEIR EFFECT IN WINEMAKING: A SUSTAINABLE APPROACH TO CLIMATE RESILIENCE – **Traian Stefan COSMA, Aurora RANCA, Anamaria TANASE, Iulia Cristina CIOBANU, Sergiu Ayar ENE, Arina Oana ANTOCE** 102
10. ORGANIC VITICULTURE – CURRENT STATE AND TRENDS – **Traian Ștefan COSMA, Traian Ciprian STROE, Aurora RANCA** 103
11. RESEARCH ON THE REACTION OF THE CABERNET SAUVIGNON GRAPEVINE VARIETY TO THE VARIABILITY OF CLIMATIC CONDITIONS – **Dorin Constantin COSTEA, Daniela Doloris CICHI, Constantin BĂDUCĂ-CÎMPEANU** 104
12. EVALUATION OF SOME WHITE WINES' DYNAMIC VISCOSITY AND CORRELATION WITH OTHER PHYSICAL PARAMETERS – **Iuliana CRETESCU, Giancarla VELICEVICI, Mihaela MĂLĂESCU, Oana MUNTEANU, Raluca HORHAT** 105
13. THE INFLUENCE OF CLIMATE VARIABILITY ON GRAPE RIPENING AND QUALITY IN A VINEYARD LOCATED IN MINIS-MĂDERAT AREA – **Alina Georgeta DOBREI, Eleonora NISTOR, Daniela DOBROMIR, Simion ALDA, Marcel DANCI, Daniela SCEDEI, George Dragoș CONSTANTINESCU, Alin DOBREI** 106
14. INFLUENCE OF TREATMENT WITH BIOSTIMULANTS ON THE CHEMICAL COMPOSITION OF GRAPES AND WINE IN CONDITIONS OF CENTRAL SOUTH BULGARIA – **Ferihan EMURLOVA, Aneta CHOLAKOVA** 107
15. TECHNOLOGICAL CHARACTERISTIC OF CABERNET SAUVIGNON WINES PRODUCED IN AN INTEGRATED SYSTEM – **Laura ENACHE, Liliana PÎRCĂLABU, Cristian BURLACU, Georgeta TUDOR** 108
16. OPTIMIZING PRODUCTIVITY AND FRUIT QUALITY OF 'MUSCAT HAMBURG' CULTIVAR THROUGH PRUNING INTENSITY – **Sergiu-Ayar ENE, Ionica DINA, Ana-Maria TĂNASE, Traian-Ștefan COSMA, Aurora RANCA, Razvan-Ionut TEODORESCU** 109
17. ASSESSMENT OF GENETIC DIVERSITY OF GRAPEVINE GENOTYPES USING SIMPLE SEQUENCE REPEATS (SSR) MARKERS AND SSR-BASED DNA BARCODE DESIGN – **Monica HÂRȚA, Rodica POP, Liliana ROTARU, Lucia Cintia COLIBABA, Alin DOBREI, Steliana Paula BARBU, Doina CLAPA** 110
18. TECHNOLOGICAL SOLUTIONS TO REDUCE THE DISTURBING EFFECT OF CLIMATE CHANGE IN THE DEALU MARE VINEYARD – **Marian ION, Liliana PÎRCĂLABU, Cristian BURLACU** 111
19. THE INFLUENCE OF THE ROOTSTOCK PARTNER FROM THE GRAFTING COMBINATION ON THE QUANTITY AND QUALITY OF GRAPE PRODUCTION OF THE FETEASCĂ NEAGRĂ VARIETY IN THE DEALU MARE VINEYARD – **Marian ION, Liliana PÎRCĂLABU, Cristian BURLACU** 112
20. INVESTIGATION OF THE NDVI CORRELATION IN A *VITIS VINIFERA* CV. MERLOT VINEYARD GROWN WITH DIFFERENT NUTRIENT REGIMES UNDER NON-IRRIGATED CONDITIONS – **Hristo KOZAROV, Zhulieta ARNAUDOVA, Boyan STALEV** 113
21. APPLICATION OF CANOPY MANAGEMENT ON THE QUALITY OF REPRODUCTIVE ORGANS IN PINOT NOIR CLONE 777 GROWED UNDER NON-IRRIGATION CONDITIONS IN SLIVEN REGION, BULGARIA – **Marko MIHAYLOV** 114

22. INVESTIGATION OF THE PHENOLOGICAL PHASES OF THE PINOT NOIR CLONE 777 UNDER THE INFLUENCE OF CLIMATE CHANGE IN THE SOUTHERN VINE-GROWING REGION IN BULGARIA – **Marko MIHAYLOV, Boyan STALEV** 115
23. DEVELOPMENT OF THE WINE SECTOR IN THE REPUBLIC OF MOLDOVA, BASED ON SMALL AND MEDIUM PRODUCERS – **Gheorghe NICOLAESCU** 116
24. POTASSIUM INFLUENCE ON VICTORIA AND PERLA DE CSABA TABLE GRAPES QUALITY – **Eleonora NISTOR, Alina DOBREI, Dragos George CONSTANTINESCU, Gabriel CIORICA, Marcel DANCI, Simion ALDA** 117
25. OPTIMIZATION OF THE EXTRACTION OF PHENOLIC COMPOUNDS FROM GRAPE POMACE USING SUPERCRITICAL LIQUID (CO_2) METHODOLOGY – **Petronela-Anca ONACHE, Irina Elisabeta GEANA, Corina Teodora CIUCURE, Dorin Ioan SUMEDREA, Victoria ARTEM, Catalin Marian DUCU, Georgiana CÎRSTEA** 118
26. EVALUATION OF THE TECHNOLOGICAL POTENTIAL OF WINE GRAPE VARIETIES IN THE CONTEXT OF CLIMATE CHANGE IN THE DEALU MARE VINEYARD – **Liliana PÎRCĂLABU, Steliana Paula BARBU, Marian ION, Georgeta TUDOR, Alexandra BUCUR** 119
27. THE BEHAVIOR OF GRAPE VARIETIES FOR RED WINE IN THE VALEA CALUGAREASCA WINE CENTER – **Liliana PÎRCĂLABU, Marian ION, Steliana Paula BARBU, Georgeta TUDOR, Alexandra BUCUR** 120
28. INVESTIGATION OF THE RELATIONSHIP BETWEEN SPECTRAL VEGETATION INDICES AND CHLOROPHYLL CONTENT IN THE LEAVES OF SYRAH CULTIVAR VINES – **Anelia POPOVA, Zhulieta ARNAUDOVA, Zhivko GAVAZOV** 121
29. RESEARCH ON THE AGROBIOLOGICAL AND TECHNOLOGICAL VALUE OF SOME OLD ROMANIAN VINE VARIETIES IN THE CONTEXT OF CLIMATE CHANGES IN THE ODOBESTI VINEYARD, VRANCEA COUNTY – **Marioara PUȘCALĂU, Ionica BOSOI, Alina Camelia DÎRLOMAN** 122
30. COMPARATIVE ANALYSIS OF THE PRODUCTION OF DESSERT GRAPES GROWN ON STEM GUYO AND PERGOLA FORMATION IN SOUTHERN BULGARIA – **Nevena SHULEVA, Boyan STALEV** 123
31. INFLUENCE OF SOME SOIL HERBICIDES ON THE VEGETATIVE MANIFESTATIONS OF GRAFTED CUTTINGS OF SIYANA VINE VARIETY – **Svetlana STOYANOVA, Galina DYAKOVA, Ralitsa MINCHEVA, Evgeniya ZHEKOVA** 124
32. STUDY ON THE IDENTITY OF A WINE BETWEEN VARIETY AND GEOGRAPHICAL SPACE – **Marinela STROE, Diana Gabriela STAICU** 125
33. STUDY ON THE BEHAVIOR AND DEGREE OF ADAPTABILITY OF THE MATILDE VARIETY IN THE CLIMATE CONDITIONS IN ROMANIA – **Marinela Vicuța STROE, Georgeta Mihaela BUCUR, Steliana Paula BARBU** 126
34. RESEARCH ON THE TECHNOLOGICAL CHARACTERISTICSOF SELECTED CLONAL ELITES FROM TWO POPULATIONS OF TABLE GRAPE VARIETIES UNDER THE CONDITIONS OF THE MURFATLAR VINEYARD – **Anamaria TĂNASE, Aurora RANCA, Ana NEGRARU, Traian Ștefan COSMA, Ayar-Sergiu ENE, Ionica DINA, Traian Ciprian STROE** 127
35. CLIMATE CHANGE A SERIOUS THREAT ON FETEASCĂ NEAGRĂ GRAPE VARIETY BEHAVIOR SITUATED IN THE SOUTH-EASTERN PART OF ROMANIA – **Mihai TUDOR, Gabriel TABARANU, Aurel CIUBUCA, Viorica ENACHE, Ionela Daniela FERTU** 128
36. CHEMICAL WEED CONTROL IN FRUIT-BEARING TABLE GRAPE VINEYARDS (*VITIS VINIFERA* L.) – **Iliyan ZHELYAZKOV** 129

VEGETABLE GROWING

1. RESEARCH ON FEED BACK REACTIONS OF PLANTS SUBJECTED TO EXTERNAL FREQUENCY FIELDS FROM AN EPIGENETICAL POINT OF VIEW - **Maria ADOCHIȚEI, Adrian CHIRA, Daniel NAGY, Constantin PĂUN, Ligia ION** 132
2. COMPARATIVE STUDY OF THE NUTRITIONAL COMPOSITION OF MAJOR LEGUME SPECIES - **Ovidia Loredana AGAPIE, Elena BARCANU TUDOR, Ion GHERASE, Eliza TEODORESCU** 133
3. FRUIT QUALITY AND BIOACTIVE COMPOUND ACCUMULATION IN ROMANIAN PEPPER CULTIVARS - **Ovidia Loredana AGAPIE, Elena BARCANU TUDOR, Ion GHERASE, Eliza TEODORESCU** 134
4. IDENTIFYING CULTIVARS FOR ORGANIC FARMING: A CASE STUDY ON SOLANACEOUS VEGETABLES IN ROMANIA - **Elena BARCANU TUDOR, Ion GHERASE, Ovidia Loredana AGAPIE, Eliza TEODORESCU** 135
5. EFFECT OF CULTIVAR AND GROWING SYSTEM ON THE PHENOLOGICAL AND QUALITY ATTRIBUTES OF TOMATO - **Andreea ANTAL-TREMURICI, Creola BREZEANU, Alexandru BUTE, Claudia BĂLĂIȚĂ, Mariana CALARA, Vasile STOLERU** 136
6. EVALUATION OF THE INTEGRATED EFFECTS OF SOIL MANAGEMENT AND FERTILIZATION STRATEGIES ON THE GROWTH, YIELD AND QUALITY OF SWEET PEPPER (*CAPSICUM ANNUUM* L.) CULTIVATED IN POLYETHYLENE GREENHOUSES - **Dan-Ioan AVASILOAIEI, Claudia BĂLĂIȚĂ, Carmina BENCHEA, Gabriel-Alin IOSOB, Emilian MIREA, Mariana CALARA** 137
7. EFFECT OF VARIOUS FERTILIZATION REGIMES ON THE GROWTH AND PHYSIOLOGICAL CHARACTERISTICS OF ROUND PEPPER (*CAPSICUM ANNUUM* L.) SEEDLINGS IN CONTROLLED GREENHOUSE CONDITIONS - **Dan Ioan AVASILOAIEI, Mariana CALARA, Claudia BĂLĂIȚĂ, Denisa SEVERIN, Andreea-Beatrice IGNAT, Carmina BENCHEA** 138
8. MATHEMATICAL MODELING IN THE APPLICATION OF BIOFERTILIZERS IN BELL PEPPER CROPS - **Claudia BĂLĂIȚĂ, Mariana CALARA, Ionuț STOICA, Ana-Maria GEORGESCU, Dumitra RĂDUCANU, Elena Maria DRĂGHICI** 139
9. THE INFLUENCE OF FERTILIZERS ON THE DEVELOPMENT OF THE ROOT SYSTEM AND PRODUCTION CAPACITY OF SWEET PEPPER *(CAPSICUM ANNUUM* L.) - **Claudia BĂLAIȚĂ, Dan Ioan AVASILOAIEI, Andreea ANTAL TREMURICI, Mariana CALARA, Gabriel-Alin IOSOB, Elena Maria DRĂGHICI** ……..…… 140
10. GROWING ONION IN ROMANIA: CHALLENGES AND OPPORTUNITIES - **Elena BARCANU, Ovidia Loredana AGAPIE, Ion GHERASE, Eliza TEODORESCU** 141
11. THE RESPONSE OF SOME CHERRY TOMATO HYBRIDS TO FOLIAR FERTILIZATION - **Alexandra BECHERESCU, Gheorghița HOZA, Florin SALA** 142
12. THE PERSPECTIVES OF HYDROPONICS CULTIVATION SYSTEM: A REVIEW - **Mihaela Carmina BENCHEA, Dan-Ioan AVASILOAIEI, Mariana CALARA, Claudia BĂLĂIȚĂ, Creola BREZEANU** 143
13. CRAFTING UNIQUE BLENDS: EXPLORING COMBINATIONS OF ONION, GARLIC, WILD GARLIC AND LEEK - **Viorica BOACĂ, Despina Maria BORDEAN, Codruța GAVRILĂ, Laura RĂDULESCU, Alexandra BAN-CUCERZAN, Narcis Gheorghe BĂGHINĂ** 144
14. THE ALLECOSYS PROJECT. AGROECOLOGY LIVING LABS AS DRIVERS OF RESILIENT AND THRIVING AGRI-FOOD SYSTEMS - **Roxana CICEOI, Lene SIGSGAARD, Daniel PLEISSNER, Stine KRAMER JACOBSEN, Junbin ZHAO, Achim SCHMALENBERGER, Essaid AIT BARKA, Ole GREEN, Thibault DEVILLE, Véronique FLEURY, Martin ALMENDINGER, Oana BUJOR** 145

15. CULTIVATION MODEL OF URBAN PROTECTED HORTICULTURE IN CHINA - **Ruifeng CHENG, Yuxin TONG, Kun LI, Qichang YANG** 147
16. THE EFFECT OF GROWING CONDITIONS ON THE YIELD AND QUALITY OF LETTUCE CULTIVATED IN THE NFT SYSTEM - **Emanuela COJOCARU (JERCA), Sovorn CHAN, Elena Maria DRĂGHICI** 148
17. ENHANCING FRUIT YIELD AND QUALITY IN PEPPER AND EGGPLANT: THE ROLE OF MULCHING TECHNIQUES - **Delia-Cristina CONSTANTIN, Mihaela PARASCHIV**..... 149
18. GENETIC DIVERSITY ANALYSIS OF TOMATO VARIETIES BY SCoT MARKERS - **Mirela Irina CORDEA, Doina CLAPA, Mihaiela CORNEA-CIPCIGAN, Ioana MOLDOVAN, Lehel LUKACS, Rodica SIMA, Alexandru-Ioan APAHIDEAN, Rodica POP, Costel VINATORU, Bianca MUSAT, Camelia BRATU, Monica HÂRȚA** 150
19. ASSESMENT OF VARIOUS CONCENTRATION OF SALICYLIC ACID IN TISSUE CULTURE *IN VITRO* SYSTEMS FOR THEIR EFFECT ON MODULATING ABIOTIC STRESS TOLERANCE MECHANISMS IN PEPPER *(CAPSICUM ANNUUM* L.) PLANTS - **Tina Oana CRISTEA, Gabriel-Alin IOSOB, Creola BREZEANU, Petre Marian BREZEANU, Claudia BĂLĂIȚĂ, Mariana CALARA, Dan Ioan AVASILOAIEI** 151
20. CARBON FOOTPRINT OF LETTUCE GROWED WITH MINERAL AND BIOLOGICAL FERTILIZATION IN GREENHOUSES - **Dimitar Dimitrov, Kostadin KOSTADINOV, Stoyan FILIPOV** 152
21. CARBON FOOTPRINT OF SPINACH GROWED WITH MINERAL AND BIOLOGICAL FERTILIZATION IN GREENHOUSES. - **Dimitar Dimitrov, Stoyan FILIPOV, Kostadin KOSTADINOV**..... 153
22. RESEARCH ON WEED CONTROL IN ONION AND GARLIC CROPS - **Marian DOBRE** 154
23. THE IMPACT OF DROUGHT STRESS ON PHYSIOLOGICAL AND BIOCHEMICAL PROCESSES IN LEGUMES - **Aurora DOBRIN, Aurora DOBRIN, Liliana BĂDULESCU, Carmen-Gabriela CONSTANTIN, Mihaela IORDĂCHESCU, Maria OJOG** 155
24. INFLUENCE OF FERTILIZATION ON FRUIT MORPHOLOGICAL CHARACTERISTICS AND YIELD OF PEPPER VARIETIES - **Georgi DOCHEV** 156
25. THE INFLUENCE OF MICROORGANISMS ON THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF TOMATO FRUITS - **Claudia-Loredana DRAGOMIR, Gheorghita HOZA, Alexandra BECHERESCU, Mihaela PARASCHIV, Claudia NICOLA, Mihai FRINCU, Liliana BADULESCU, Dorel HOZA** 157
26. RESEARCH ON THE INFLUENCE OF FERTILIZATION ON TOLERANCE TO ABIOTIC STRESS IN THE CASE OF SOME TOMATO GENOTYPES CULTIVATED IN THE SOUTHERN AREA OF ROMANIA - **Simona Ana FORTAN, Giancarla VELICEVICI, Dumitru Dorin CAMEN** 158
27. PHYSICO-CHEMICAL CHARACTERISTICS OF WATERMELON FRUITS (*CITRULLUS LANATUS*) OF GENOTYPES CULTIVATED ON SANDY SOILS IN SOUTHWESTERN ROMANIA - **Felicia-Constantina FRĂTUȚU, Ștefan NANU, Cristina BÎRSOGHE, Alina-Nicoleta PARASCHIV, Loredana-Mirela SFÎRLOAGĂ, Maria-Diana ILINA** 159
28. STUDY OF THE POSSIBILITIES OF USING COMPOST AS A SUBSTRATE FOR GROWING *BRASSICA OLERACEA* L. VAR. *CAPITATA* L. - **Bilyana GRIGOROVA-PESHEVA, Boyka MALCHEVA, Asen PESHEV** 160
29. STUDY ON THE IMPACT OF ELECTROMAGNETIC FIELDS ON THE GROWTH AND DEVELOPMENT OF CERTAIN VEGETABLE PLANT SPECIES - **Roxana Ioana GABOR ILIESCU, Elena DOBRIN, Adrian PETICILĂ, Elena Maria DRĂGHICI**..... 161
30. STUDY ON THE IDENTIFICATION OF *AMARANTHUS* VARIETIES FOR FRESH CONSUMPTION - **Luminița GĂITĂNARU, Costel VÎNĂTORU, Elena DOBRIN, Elena Maria DRĂGHICI** 162

31. EXPLORING THE SYNERGISTIC EFFECTS OF CALCIUM NITRATE AND BIOSTIMULANTS ON SEED YIELD IN *CAPSICUM ANNUUM* L. VAR. *GROSSUM* - **Mariana Cristiana GHEORGHE, Delia Cristina CONSTANTIN, Mihaela PARASCHIV, Maria DINU** 163
32. NUTRITIONAL AND BIOLOGICAL VALUE OF NEW CULTIVARS OF PUMPKIN (*CUCURBITA MAXIMA*) GROWN IN BULGARIA - **Dimka HAYTOVA, Petya IVANOVA, Nadejda PETKOVA** 164
33. CONVENTIONAL AND BIOLOGICAL CONTROL OF PESTS IN PEPPERS AND EGGPLANTS CROPS IN THE GREENHOUSE. A REVIEW - **Simona HOGEA, Gabriela ŞOVĂREL** 165
34. PARAMETRIC EVALUATION OF POD YIELD STABILITY IN bushing SNAP BEAN *(PHASEOLUS VULGARIS* L.) - **Corneliu IACOB, Sorin CIULCA** 166
35. CORRELATION BETWEEN CLIMATIC FACTORS AND DYNAMICS OF PATHOGENS AND PESTS: A CASE STUDY IN CABBAGE CROPS - **Gabriel-Alin IOSOB, Tina Oana CRISTEA, Petre Marian BREZEANU, Claudia BĂLĂIȚĂ, Alexandru BUTE, Dan Ioan AVASILOAIEI** 167
36. ENVIRONMENTAL FACTORS CONTROL AND ENERGY EFFICIENCY IN PROTECTED SPACES - **Bogdan ILIE, Ionut Ovidiu JERCA, Oana Alina NITU**..... 168
37. COMPARATIVE STUDY OF INTRODUCED SWEET CORN VARIETIES - **Neli KERANOVA, Kostadin KOSTADINOV, Nadezhda SHOPOVA, Radoslav CHIPILSKI** 169
38. RESPONSE OF TARRAGON (*ARTEMISIA DRACUNCULUS* L.) TO THE APPLICATION OF ZINC SULFATE AND GLYCINE BETAINE UNDER WATER STRESS CONDITIONS - **Soheil KHANCHI, Asad ROKHZADI, Sirwan MOHAMMDIAZAR, Elena Maria DRĂGHICI** 170
39. STUDY ON THE BEAN LOSSES AND CONSUMPTION IN COUNTRIES OF THE BALKAN PENINSULA - **Kostadin KOSTADINOV, Neli KERANOVA** ……. 171
40. MEDICINALS AND CHEMICAL PROPERTIES OF SOME SPECIES OF THE CUCURBITACEAE FAMILY: A REVIEW - **Claudia-Sorina LUNGU, Costel VINATORU, Bianca MUSAT, Camelia BRATU, Florin BURLAN, Viorica LAGUNOVSCHI-LUCHIAN** 172
41. ADVANCEMENTS IN CARROT GROWTH TECHNOLOGIES: ENHANCING YIELD, QUALITY, AND SUSTAINABILITY - **Alexandra MARTIE, Violeta Alexandra ION, Liliana BADULESCU, Mihaela IORDACHESCU, Mehmet S. UNLUTURK, Viorica LAGUNOVSCHI-LUCHIAN** 173
42. DIVERSITY AND RELATIONSHIPS IN KEY TRAITS IN PEPPER COLLECTION OF NATIONAL GENEBANK OF BULGARIA - **Veselina MASHEVA, Katya UZUNDZHALIEVA** 174
43. GENE EFFECTS INVOLVED IN THE MANIFESTATION OF GROWTH CHARACTERISTICS AND RESISTANCE TO THERMAL STRESS - **Nadejda MIHNEA, Galina LUPAŞCU, Vadim RUSU** 175
44. INFLUENCE OF ORGANIC FERTILIZERS ON THE MORPHOLOGICAL DEVELOPMENT AND PRODUCTIVITY IN GREENHOUSE TOMATO - **Roksana MINEVA** 176
45. PRODUCTION OF POLYPHENOLIC COMPOUNDS WITH HIGH ANTIOXIDANT ACTIVITY IN *MELISSA OFFICINALIS* L. CALLUS LINE - **Elena Monica MITOI, Alexandra Gabriela CIOCAN, Florentina ALDEA, Irina HOLOBIUC** …..... 177
46. IMPACT OF COMPOST APPLICATION ON SOIL AND ZUCCHINI YIELD - **Gergana MLADENOVA, Boriana PLASHKOVA, Vera PETROVA, Milena YORDANOVA, Tsvetelina NIKOLOVA** 178

47. RESPONSE OF CATALASE TO MICROBIOLOGICAL AND CHEMICAL SOIL INDICATORS IN SOLE AND INTERCROPPED CABBAGE CULTIVATION - **Gergana MLADENOVA, Boyka MALCHEVA, Milena YORDANOVA** 179
48. THE INFLUENCE OF CERTAIN AGROTECHNICAL MEASURES APPLIED IN CARROT TECHNOLOGY UNDER PEDOCLIMATIC CONDITIONS OF VERESTI COMMUNE, SUCEAVA COUNTY - **Andreea MORARIU, Vasile STOLERU, Teodor RUSU** 180
49. EFFECT OF VERMICOMPOST AND SPRAYING WITH AMINO ALEXIN IN IMPROVING THE VEGETATIVE AND YIELD PROPERTIES OF CUCUMBER IN PROTECTED AREA - **Mohammed MOHAMMED, Nisreen AL SHEWAILI** 181
50. EFFECTS OF MONTMORILLONITE-ENRICHED HYDROGELS ON LETTUCE MORPHOLOGY UNDER DROUGHT STRESS - **Ion NIȚU, Elisabeta Elena POPA, Amalia Carmen MITELUȚ** 182
51. INFLUENCE OF CONVENTIONAL AND BIOLOGICAL CONTROL ON POSTHARVEST QUALITY OF TOMATOES - **Mihaela PARASCHIV, Gabriela ȘOVĂREL** 183
52. EVALUATION OF PHYSIOLOGICAL PROCESSES IN SOME POTATO GENOTYPES CULTIVATED ON SANDY SOILS IN SOUTHERN OLTENIA - **Alina-Nicoleta PARASCHIV, Aurelia DIACONU, Gheorghe COTEȚ, Ștefan NANU, Floriana Maria ȘTEFAN, Cristina BÎRSOGHE** 184
53. *ALLIUM CEPA* SEEDLINGS RESPONSE TO STRESS GENERATED BY CHEMICALS - **Andreea Adriana PETCOV, Florin SALA** 185
54. CONTENT OF MICROELEMENTS IN FRENCH BEAN PODS FROM DIFFERENT CULTIVATIONS - **Marko PETEK, Ema KLARIĆ, Sanja FABEK UHER, Antun ŠOKEC, Szilvia VERES, Šic Žlabur JANA**..... 186
55. ANALYSIS OF SOME ROMANIAN CUCUMBER GENETIC RESOURCES - **Ionela Filona RĂDUCU, Aurora DOBRIN, Liliana BĂDULESCU, Elena Maria DRĂGHICI** 187
56. STUDY ON THE IDENTIFICATION OF CUCUMBER VARIETIES DEVELOPED IN ROMANIA. A REVIEW - **Ionela Filona RĂDUCU, Liliana BĂDULESCU, Elena Maria DRĂGHICI**..... 188
57. PARASITOID NATURAL ENEMIES OF LEPIDOPTERAN PESTS ON KALE *(BRASSICA OLERACEAE* L. VAR. *ACEPHALA*) IN URBAN ENVIRONMENT - **Boryana PLASHKOVA** 189
58. SCREENING OF GENE EXPRESSION ASSOCIATED WITH SALINITY AND UVB TOLERANCE IN LOCAL TOMATO LANDRACES - **Lia ȘERBAN (MLADIN), Oana SICORA, Tunde JAKO, Cosmin SICORA, Monica HÂRȚA, Mirela Irina CORDEA** 190
59. ENZYMATIC AND ANTIOXIDANT ACTIVITIES OF SEVERAL EDIBLE MUSHROOMS SPECIES - **Rodica SOARE, Maria DINU, Cristina BĂBEANU** …….. 191
60. THE INFLUENCE OF GENOTYPE AND ENVIRONMENTAL FACTORS ON THE NUTRITIONAL COMPOSITION OF *ROSA CANINA* L FRUITS - **Rodica SOARE, Cristina BĂBEANU, Maria DINU** 192
61. MORPHOLOGICAL AND AGRO-BIOLOGICAL CHARACTERIZATION OF LOCAL AND INTRODUCED GERMPLASM OF COMMON BEANS (*PHASEOLUS VULGARIS* L.) - **Tsvetelina STOILOVA, Hristina RANGELOVA** 193
62. THE INFLUENCE OF SOIL TYPES ON SEEDS GERMINATION AND PLANTS HEALTH TO DIFFERENT SPECIES OF VEGETABLES - **Gabriela ȘOVĂREL, Marcel COSTACHE, Ana-Emilia CENUȘĂ, Simona HOGEA, Marius VELEA** 194
63. PRESERVING BELL PEPPER QUALITY THROUGH FREEZING BY ASSESSMENT OF PRE-TREATMENT CONDITIONS AND FREEZE-DRYING EFFECT - **Cristian-Alexandru TOADER**..... 195
64. PHYSIOLOGICAL REACTION OF CABBAGE *(BRASSICA OLERACEA* L.) TO HEAT STRESS - **Elena TOPALOVA, Galina ANTONOVA**……..... 196

65. IMPROVING PLANT CANOPY MICROENVIRONMENT CONDITIONS BY USING DOUBLE CHANNEL AERATION CULTIVATION SYSTEM IN A PLANT FACTORY: SIMULATION ANALYSIS AND EXPERIMENTAL STUDY - **Yuxin TONG, Yihan ZHANGYI, Florin STĂNICĂ, Ruifeng CHENG** 197
66. IMPACT OF HEAT AND DROUGHT STRESS ON THE RESPONSE OF THE PHOTOSYNTHETIC APPARATUS OF POTATO PLANTS *(SOLANUM TUBEROSUM* L.) **- Elena TOPALOVA, Emilia NACHEVA** 198
67. RESEARCH OVER THE INFLUENCE OF LED LIGHT RECIPES ON THE MORPHOLOGICAL AND BIOCHEMICAL ATTRIBUTES OF BASIL PLANTS - **Cristian-Alexandru TUDOR, Viorica LAGUNOVSCHI-LUCHIAN, Liliana BADULESCU, Cosmin VELEANU, Aurora DOBRIN, Victor POTRA, Ailin MOLOSAG, Roxana CICEOI** 199
68. OPTIMIZING TOTAL RNA EXTRACTION PROTOCOLS FROM YOUNG LEAVES FOR ENHANCED GENE EXPRESSION ANALYSIS - **Amalia UDRISTE, Mihaela IORDACHESCU, Liliana BADULESCU** 200
69. EVALUATION OF THE COMBINING ABILITY AND HETEROSIS IN EGGPLANT PARENTS FROM BRGV BUZĂU FOR OBTAINING VALUABLE F1 HYBRIDS - **Costel VÎNĂTORU, Adrian PETICILĂ, Bianca MUȘAT, Camelia BRATU, Geanina NEGOȘANU, Matilda POPESCU** 201
70. PRODUCTIVITY PARAMETERS OF SWEET CORN CULTIVATED UNDER METEOROLOGICAL CONDITIONS OF PLOVDIV - **Violeta VALCHEVA, Kostadin KOSTADINOV, Nadezhda SHOPOVA, Radoslav CHIPILSKI** 202
71. APPLICATION OF WEB-BASED TOOLS FOR DOCUMENTATION OF HORTICULTURE LOCAL VARIETIES -- BULGARIAN AND SLOVAKIAN EXAMPLE - **Nikolaya VELCHEVA, Asya STOYANOVA-DOYCHEVA, Pencho MALINOV, Sebiha MADANSKA, Ľubomír MENDEL, René HAUPTVOGEL** 203
72. INNOVATIVE TECHNIQUES FOR MONITORING AND EFFICIENT MANAGEMENT OF THE BULGARIAN GENEBANK - **Nikolaya VELCHEVA, Gergana DESHEVA, Katya UZUNDZHALIEVA, Asya STOYANOVA-DOYCHEVA, Lyubka DOUKOVSKA, Valko NESHEV**..... 204
73. ALLELOPATHIC EFFECT OF WEED SPECIES ON TOMATO *(SOLANUM LYCOPERSICUM* L.) - **Veselka VLAHOVA**..... 205

FLORICULTURE, ORNAMENTAL PLANTS, DESIGN AND LANDSCAPE ARCHITECTURE

1. THE EFFECT OF FOLIAR APPLICATION OF POTASSIUM SILICATE AND NANOSILICON ON GROWTH, PHYSIOLOGICAL AND BIOCHEMICAL PROPERTIES OF (*FRANKENIA THYMIFOLIA* DESF.) PLANTS UNDER DIFFERENT IRRIGATION REGIMES - **Khalid ABBAS, Dr. Sepideh KALATEJARI, Imad AL SUWAID** 208
2. *IN VITRO* MULTIPLICATION AND ACCLIMATIZATION OF THE ROYAL FERN, *OSMUNDA REGALIS* L. - **Florentina ALDEA, Florența-Elena HELEPCIUC, Elena Monica MITOI** 209
3. ENVIRONMENTAL FACTORS AFFECTING THE CONDITION OF *PLATANUS ACERIFOLIA* (AITON) WILLD. URBAN STREET TREES IN SOFIA - **Svetlana ANISIMOVA, Elena TSVETKOVA, Gergana ZAEMDZHIKOVA, Aneliya PENCHEVA** 210
4. EFFECT OF SOME STIMULANTS ON SEED GERMINATION OF *CANNA × GENERALIS* 'CANOVA SCARLET' - **Maria APOSTOL, Petronica AMISCULESEI, Raluca CHIRITA, Alina-Stefana OZARCHEVICI, Roberto BERNARDIS, Lucia DRAGHIA** ... 211

5. BUTTERFLIES IN THE URBAN LANDSCAPE – CASE STUDY: TEILOR PARK FROM BUCHAREST, ROMANIA - **Monica Luminița BADEA, Eugenia PETRESCU, Alexandru ȘTEFAN-FOTIN** 212
6. FRACTAL ANALYSIS IN THE COMPARATIVE STUDY OF *GINKGO BILOBA* L. TREES - **Cristian BERAR, Cristina TOTA, Florin SALA** 213
7. STUDIES ON THE DEVELOPMENT OF A *PAULOWNIA* PLANTATION IN ROMANIA - **Roberto Renato BERNARDIS, Adrian NISTOR, Daniela Sabina POȘTA** 214
8. REVIEW ON THE CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *LAVENDER* SPP. AND ITS APPLICATIONS - **Gabriela BUTNARIU, Monica Luminița BADEA, Adina NICHITA, Doru Ioan MARIN** 215
9. SALT-TOLERANT CROPS: A KEY TO RESILIENT AND SUSTAINABLE CROP SYSTEMS - **Carmen CONSTANTIN, Aurora DOBRIN, Mugurași Florin CONSTANTIN, Florin TOMA, Burçin ATILGAN TÜRKMEN, Maria Marilena PARASCHIV** 216
10. STUDY REGARDING THE IDENTIFICATION OF THE FUNGUS *PESTALOTIOPSIS FUNEREA* (DESM.) STEYAERT ON THUJA FROM TIMIȘ AREA, ROMANIA - CASE STUDY - **Otilia COTUNA, Mirela PARASCHIVU, Veronica SĂRĂȚEANU, Elena PARTAL, Alin CĂRĂBEȚ** 217
11. *CARULASPIS JUNIPERI* (BOUCHÉ) (DIASPIDIDAE: CARULASPIS), PEST OF THUJA FROM TIMIȘ COUNTY - CASE STUDY - **Otilia COTUNA, Mirela PARASCHIVU, Veronica SĂRĂȚEANU, Alina Maria SURDULESCU, Ramona ȘTEF** 218
12. INNOVATIVE FORESTRY SOLUTIONS APPLIED IN URBAN GREEN AREAS FOR MICROECOSYSTEMS REGENERATION - **Elisabeta DOBRESCU, Cristina MANESCU, Mihai ENESCU, Cosmin MIHAI** 219
13. EVALUATION OF *PHYLOSTACHY PUBESCENS* SPECIES IN TERMS OF SUITABILITY FOR PROPAGATION BY AERIAL MARCOTTING - **Ricuța Vasilica DOBRINOIU, Silvana Mihaela DĂNĂILĂ-GUIDEA** 220
14. THE BEHAVIOR OF *ARUM ITALICUM* MILL. IN IAȘI ECOLOGICAL CONDITIONS (NORTHEASTERN ROMANIA) - **Lucia DRAGHIA, Maria CANTOR, Maria APOSTOL, Roberto-Renato BERNARDIS, Iulia MINEATA** 221
15. MORE THAN JUST AESTHETICS: QUANTIFYING THE MONETARY VALUE OF TREE ALIGNMENTS IN "CATACUZIONO" PARK FROM FLORESTI – PRAHOVA COUNTY - **Cristina DRĂGHICI, Diana Lavinia CULESCU** 222
16. CENOLOGY, ECOLOGY AND DISTRIBUTION OF POPULATIONS OF *VIOLA HYMETTIA* BOISS. & HELDR. (VIOLA, SECT. MELANIUM) ON THE SANDS OF SOUTHERN OLTENIA, ROMANIA - **Paula IANCU, Mariana NICULESCU** 223
17. RESULTS OF THE INTRODUCTION OF SPECIES OF THE GENUS SALIX L. IN UKRAINE - **Liubov ISHCHUK, Volodymyr HRABOVYI, Halyna ISHCHUK** 224
18. THE ROLE OF RESIDENTIAL GREEN SPACES IN ENHANCING WELL-BEING, BIODIVERSITY, AND SUSTAINABILITY: A CASE STUDY OF IASI, ROMANIA - **Ana-Maria-Roxana ISTRATE, Clara-Teodora BALAN, Mirela COJOCARIU** 225
19. *DENDROBIUM ANTENNATUM* LINDL. MICROPROPAGATED UNDER THE INFLUENCE OF VARIOUS CONCENTRATIONS OF FERBANAT L® - **Endre KENTELKY, Zsolt SZEKELY-VARGA, Csanád Tas SZABÓ, Andrea TILLYNÉ-MÁNDY** 226
20. RESEARCH ON THE USE OF MOLECULAR MARKERS TO IDENTIFY THE NPTII GENE INVOLVED IN GENETIC MUTATION PROCESSES. - **Ioana KLEE, Lenuța CHIRA, Daniel NAGY, Constantin PĂUN, Ligia ION** 227

21. THE EFFECT OF GROWTH STIMULANTS ON THE ROOTING OF CUTTINGS OF PLANTS OF THE GENUS *COTONEASTER* MEDIC. ON DIFFERENT SUBSTRATES - **Tetiana KOPYLOVA, Volodymyr HRABOVYI, Olha POROKHNIAVA, Yuriy O. RUMIANKOV, Alla KONOPELKO, Larisa NOVAK**. 228
22. LAVENDER GROWTH AND FLOWERING IN COMPARATIVE PLANTING METHODS - **Cristina Rodica MANESCU, Elisabeta DOBRESCU, Ilona LICSANDRU** 229
23. RESILIENCE OF URBAN TREES TO EXTREME WEATHER IN BUCHAREST, ROMANIA - **Cristina Rodica MANESCU, Elisabeta DOBRESCU, Ana VITA** 230
24. DESIGNING A PRIVATE GARDEN WITH AN ORNAMENTAL AND UTILITARIAN CHARACTER - **Manuela MANDA, Carmen NICU, Ruxandra BALUTA, Andreea TRIF** 231
25. THE AUTUMN LEAF CHROMATICS OF FRUIT TREE SPECIES AND THEIR AESTHETIC EFFECT - **Andreea MELINESCU, Sina COSMULESCU** 232
26. COMPARATIVE FLOWER MORPHOLOGY ANALYSIS BETWEEN *IRIS SUAVEOLENS* BOIS. & REUT. AND *IRIS PUMILA* L. - **Elena MELUȚ** 233
27. *TULIPA HUNGARICA* BORBÁS – CONSERVATION STATUS, SPECIES DISTRIBUTION AND POTENTIAL THREATS - **Luiza Silvia MIHAI, Marilena ONETE, Tiberiu SAHLEAN, Minodora MANU, Simona MIHĂILESCU** 234
28. INFLUENCE OF SOME FERTILIZERS ON GROWTH AND FLOWERING OF *CROSSANDRA INFUNDIBULIFORMIS* (L.) NEES PLANTS - **Carmen NICU, Manuela MANDA** 235
29. THE INFLUENCE OF SUBSTRATE TYPE ON THE MORPHOLOGICAL AND ORNAMENTAL CHARACTERS OF SOME VARIETIES OF *IPOMOEA BATATAS* GROWN IN CONTAINERS - **Alina-Stefana OZARCHEVICI, Irina CARA, Gerard JITAREANU, Bogdan-Ionel CIOROIU, Maria APOSTOL, Lucia DRAGHIA** 236
30. SPREAD AND STABILITY OF ORNAMENTAL ALIEN PLANT SPECIES ON URBAN AND PERI-URBAN RIVERBANKS OF BUCHAREST, ROMANIA - **Maria RAICU, Mihaela URZICEANU, Petronela CAMEN-COMĂNESCU, Florin TOMA** 237
31. BIOECOLOGICAL FEATURES AND PECULIARITIES OF VEGETATIVE PROPAGATION OF SOME *BERBERIS THUNBERGII* DC. CULTIVARS IN THE "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE) - **Ion ROȘCA, Elisaveta ONICA, Alina CUTCOVSCHI-MUȘTUC, Maria TABĂRA, Tatiana TANACHI** 238
32. BIOECOLOGICAL FEATURES OF SEVERAL NEW TAXA OF *CORNUS ALBA* L. GROWN AT THE "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE) - **Ion ROȘCA, Elisaveta ONICA, Alina CUTCOVSCHI-MUȘTUC, Maria TABĂRA, Natalia ONICA** 239
33. ONTOGENETIC ASPECTS OF *EX SITU* CONSERVATION OF THE SPECIES *PAEONIA PEREGRINA* MILL - **Tatiana SÎRBU** 240
34. THE MORPHOLOGICAL STRUCTURE OF THE RENEWAL BUD IN *KNIPHOFIA NELSONII* MAST. - **Irina SFECLĂ** 241
35. BIOLOGICAL, ECOLOGICAL AND MORPHOLOGICAL FEATURES OF SAKURA *(PRUNUS SERRULATA* L.) CULTIVATION FOR FURTHER USE IN LANDSCAPING OF UKRAINE - **Yuliya STRUTYNSKA, Olena OLESHKO, Tetiana LOZINSKA, Vladyslav MASALSKYI, Mykola GRABOVSKYI, Valentyn POLISHCHUK, Anatolii BALABAK, Iryna KOZACHENKO** 242
36. EFFICACY OF BIO-INSECTICIDES AGAINST THRIPS (THYSANOPTERA: THRIPIDAE) AS A PEST OF PELARGONIUM CROPS IN A COMMERCIAL GREENHOUSE IN WESTERN ROMANIA - **Ana-Maria VÎRTEIU, Marius BOLDEA, Ramona ȘTEF, Florin PRUNAR, Silvia PRUNAR, Ioana GROZEA** 243

37. PROTECTING *GALANTHUS NIVALIS* L. THROUGH CONSERVATION STRATEGIES AND *IN VITRO* MULTIPLICATION TECHNIQUES - **Oana VENAT, Melania GHEREG, Ioana-Cătălina NICOLAE, Nina CIORCHINĂ** 244
38. FROM NEGLECT TO VITALITY: LANDSCAPE DESIGN APPROACHES FOR RECONVERTING LOST URBAN SPACES - **Ina VLADIMIR (ASIMINEI), Mirela COJOCARIU** 245
39. RESEARCH ON THE IMPACT OF THE GROWING MEDIUM ON PRODUCTION AND QUALITY OF *GERBERA HYBRIDA* FLOWERS IN PROTECTED CULTIVATION - **Ioana Andra VLAD, Laviniu Ioan Nuțu BURESCU, Szilard BARTHA, Călin Gheorghe PĂȘCUȚ, Goji GYOZO, Florin Alexandru REBREAN**..... 246
40. GARDENS DESIGN AS OUTDOOR EVENT SPACES - **Cristina ZLATI, Măriuca ȘTIRBAN, Alice CHIHAIA, Roxana PAȘCU** 247

MISCELLANEOUS

1. CHARACTERIZATION OF FOREST TREE SEEDS USING VIBRATIONAL SPECTROSCOPY – **Luisa ANDRONIE, Ioana POP, Florica MATEI, Iulia COROIAN, Adina TRUȚĂ, Aurelia COROIAN, Stefania ANDRONIE** 250
2. ANATOMICAL AND BIOCHEMICAL RESEARCHES OF *ARTEMISIA ABSINTHIUM* L. (ASTERACEAE) SPECIES IN ROMANIA – **Monica BADEA, Vasilica LUCHIAN, Liliana BĂDULESCU, Elena DELIAN, Elena SĂVULESCU** 251
3. CONSERVATION CHALLENGES FOR *LIPARIS LOESELII* (L.) RICH.: A CRITICALLY ENDANGERED ORCHID IN ROMANIA – **Constantin-Ciprian BÎRSAN, Marilena ONETE, Sorin ȘTEFĂNUȚ, Roxana-Georgiana NICOARĂ, Tiberiu SAHLEAN, Attila MÁTIS, Anna SZABÓ, Simona MIHĂILESCU** 252
4. STUDY ON THE STRUCTURE, DYNAMICS, ABUNDANCE AND OTHER ECOLOGICAL INDICATORS OF ARTHROPOD SPECIES IN PEA CROPS IN NORTH-EAST ROMANIA – **Răducu Ionuț BALINT, Monica HEREA, Nela TĂLMACIU, Ionela MOCANU, Ion MITREA, Mihai TĂLMACIU**..... 253
5. RESEARCH ON THE STRUCTURE, ROLE AND ECOLOGICAL INDICATORS OF EPIGEIC ARTHROPOD SPECIES FOUND IN SOME SWEET CHERRY ORCHARDS IN THE RĂDUCĂNENI AREA, IAȘI COUNTY, DEPENDING ON THE APPLIED CHEMICAL TREATMENTS – **Romeo Ciprian BALINT, Monica HEREA, Ion MITREA, Renate SIPOS, Mihai TĂLMACIU**..... 254
6. BENEFICIAL MEDICINAL EFFECTS OF *ROSA* SP. EXTRACTS – **Florentina Vinica BARBU, Amelia PETRESCU, Petronela MUNTEANU, Dorel HOZA** 255
7. COMPARATIVE RESEARCH ON THE SITUATION, STRUCTURE AND ECOLOGICAL INDICES OF ARTHROPOD SPECIES ENCOUNTERED IN SOME FOREST AND APPLE ORCHARDS IN THE NECHIT AREA, NEAMȚ COUNTY –**BARDAN Vasile, Nela TĂLMACIU, Ionela MOCANU, Renata SIPOS, Mihai TĂLMACIU, Monica HEREA** 256
8. MINERAL CONTENT IN FRUITS AND NON-EDIBLE PARTS OF *ARONIA MELANOCARPA* (MICHX.) ELLIOT CULTIVATED IN THE REPUBLIC OF MOLDOVA – **Iulia BOZBEI, Tatiana CALALB, Livia UNCU, Andrei MOT, Aurora DOBRIN, Violeta ION, Oana-Crina BUJOR, Liliana BADULESCU** 257
9. MINERAL COMPOSITION OF WILD CRANBERRIES HARVESTED FROM APUSENI MOUNTAINS, ROMANIA – **Gabriela BRAD, Adrian PETICILĂ, Corina PREDESCU, Nicoleta HĂDĂRUGĂ, Liliana TUDOREANU** 258

10. ENERGY CONSUMPTION OF A SOLAR GREENHOUSE WITH NOCTURNAL THERMAL PROTECTION USING DOUBLE LAYERS COMPARED TO A CONVENTIONAL POLYCARBONATE SOLAR - CASE STUDY: FEBRUARY 2025 – **Ilie BOGDAN, Ionuț Ovidiu JERCA, Yuxin TONG, Florin STĂNICĂ**..... 259
11. THE EFFECTIVENESS OF SOME BIOLOGICAL PRODUCTS USED TO CONTROL *CYDIA POMONELLA* L. POPULATIONS AND THEIR POTENTIAL FOR INTEGRATED PEST MANAGEMENT IN APPLE ORCHARDS – **Cecilia BOLBOSE, Maria IAMANDEI, Daniel Florin ȚONE, Cezarina NECULA** 260
12. ANALYTICAL METHODS FOR THE DETERMINATION OF ORGANIC ACIDS IN HORTICULTURAL PRODUCTS - A REVIEW – **Oana Crina BUJOR-NENITA, Andreea BARBU, Mihai FRÎNCU, Violeta Alexandra ION, Anis BERTELLA, Liliana BĂDULESCU** 261
13. RESEARCH ON THE DEVELOPMENT OF A LOW CARB MINI-BAGUETTE FORTIFIED WITH *SPIRULINA* POWDER, INTENDED FOR DIABETICS AND OBESE INDIVIDUALS - **Luminița CATANĂ, Monica CATANĂ, Anda-Grațiela BURNETE, Monica-Alexandra DÂRĂ, Florica CONSTANTINESCU, Gabriela CRIVEANU, Adrian ASĂNICĂ** 262
14. RESEARCH ON THE UTILIZATION OF NUTRIENTS AND BIOACTIVE COMPOUNDS FROM CAULIFLOWER STALKS, THROUGH THE DEVELOPMENT OF A FUNCTIONAL INGREDIENT WITH HIGH NUTRITIONAL VALUE AND ANTIOXIDANT CAPACITY **- Monica CATANĂ, Luminița CATANĂ, Adrian ASĂNICĂ, Monica-Alexandra DÂRĂ, Anda-Grațiela BURNETE, Florica CONSTANTINESCU** 263
15. RESEARCH ON THE FORTIFICATION OF A LOW CARB BAKERY PRODUCT, FORTIFIED WITH A MICROALGAE MIX, TO INCREASE NUTRITIONAL VALUE AND ANTIOXIDANT POTENTIAL – **Anda-Grațiela BURNETE, Luminița CATANĂ, Monica CATANĂ, Monica-Alexandra DÂRĂ, Florica CONSTANTINESCU, Adrian ASĂNICĂ** 264
16. HOLOSEU: ADVANCING CLIMATE-RESILIENT AGRICULTURE THROUGH INTEGRATED DECISION-SUPPORT TOOLS – **Ana Cornelia BUTCARU, Roxana CICEOI, Cristian MOISE, Valta OTSO, Anna WALKIEWICZ, Tugrul YAKUPOGLU, Jan Pau LINDNER, Ariane VOGLHUBER-SLAVINSKY, M.I. KHALIL** 265
17. THE CHEMICAL COMPOSITION OF THE ESSENTIAL OIL AND ASSOCIATED HYDROSOL OBTAINED FROM TWO PLANTS OF THE ASTERACEAE FAMILY, *SANTOLINA CHAMAECYPARISSUS* L. AND *TANACETUM VULGARE* L. – **Raluca CIUBOTĂRAȘU, Monica Luminița BADEA, Oana LIVADARIU, Mihaela PARASCHIV, Dorel HOZA** 266
18. EFFECTIVENESS OF META-TOPOLIN IN *IN VITRO* PROPAGATION AND GENETIC STABILITY ASSESSMENT OF MEDICINAL AND AROMATIC PLANTS – **Doina CLAPA, Monica HÂRȚA, Ana Maria RADOMIR, Adrian George PETICILĂ, Dorin Ioan SUMEDREA** 267
19. TRACING MINERAL PATHWAYS IN HALOPHYTES: FROM ROOTS TO AERIAL PARTS – **Carmen CONSTANTIN, Aurora DOBRIN, Andrei MOȚ, Andrei PETRE, Mihaela Maria ZUGRAVU, Mugurași Florin CONSTANTIN, Loubna HADHOUM, Maria Marilena PARASCHIV** 268
20. STRUCTURAL CHARACTERISTICS OF TREES OBTAINED THROUGH THE TRANSFORMATION OF SILVOPASTORAL SYSTEMS – **Ghiță Cristian CRAINIC, Florin Lucian COVACI** 269

21. RESEARCH ON THE FORTIFICATION OF MINI-BAGUETTES WITH CAULIFLOWER STALKS POWDER TO INCREASE NUTRITIONAL VALUE AND ANTIOXIDANT CAPACITY – **Monica-Alexandra DÂRĂ, Monica CATANĂ, Anda-Grațiela BURNETE, Luminița CATANĂ, Florica CONSTANTINESCU, Denisa-Eglantina DUȚĂ, Adrian ASĂNICĂ** 270
22. O*XALIS ACETOSSELA* IN FORESTS. A SYSTEMATIC BIBLIOMETRIC STUDY OVER THE LAST 47 YEARS. – **Lucian DINCA, Vlad CRIŞAN, Gabriel MURARIU, Eliza TUPUl** 271
23. EFFECT OF ESSENTIAL OILS ON QUALITY AND SHELF LIFE OF STRAWBERRIES DURING COLD STORAGE – **Sorina DINU, Lavinia-Diana-Nicoleta BUTURUGĂ-BARBU, Maria-Cristina LUMÎNARE, Daniel-Nicolae COJANU, Viorel FĂTU, Oana-Alina BOIU-SICUIA** 272
24. CRAFTED BARREL - AGED BEER: TRADITION AND INNOVATION IN FLAVOR EVOLUTION - REVIEW – **Mihai FRÎNCU, Corina DUMITRACHE, Diana-Iuliana BĂRBULESCU, Mihaela BEGEA, Carmen-Rodica VRÎNCEANU, Răzvan-Ionuț TEODORESCU** 273
25. RHIZOSPHERE, PHYLLOSPHERE, AND CARPOSPHERE MICROBIAL COMMUNITIES OF GRAPES *(VITIS VINIFERA* L.) – **Andrei-Mihai GAFENCU, Andreea-Mihaela FLOREA, Florin-Daniel LIPȘA, Eugen ULEA** 274
26. THE INFLUENCE OF HORTICULTURAL BY-PRODUCTS IN BAKERY PRODUCTS - A REVIEW **– Diana-Alexandra GHEORGHIU, Liviu GACEU, Adrian PETICILĂ, Dana TĂPĂLOAGĂ, Nicoleta HĂDĂRUGĂ, Gabriela BRAD, Liliana TUDOREANU** 275
27. RESEARCH ON THE APPEARANCE AND EVOLUTION OF *MONARTHROPALPUS BUXI* (LABOULBÈNE) IN THE BOXWOOD PLANTATIONS OF IASI COUNTY – **Iuliana Elena GOLACHE, Iulia MINEAȚĂ, Ionel PERJU, Ionuț Vasile UNGUREANU, Monica HEREA, Mihai TĂLMACIU** 276
28. ECOSYSTEMS IN BALANCE: HORTICULTURE, CLIMATE CHANGE, AND PEAT REDUCTION - **Nazim S. GRUDA** 277
29. *LEONTOPODIUM NIVALE* SSP. *ALPINUM* (CASS.) BIOTECHNOLOGY APPLIED FOR ECONOMIC AND CONSERVATIVE PURPOSE **– Mihaela Irina HOLOBUIC, Alexandra-Gabriela CIOCAN, Rodica CATANA** 278
30. *EX SITU* CONSERVATION OF *SERRATULA BULGARICA* Acht. & Stoj. IN THE REPUBLIC OF MOLDOVA – **Olga IONIȚA, Elena TOFAN-DOROFEEV** 279
31. VARIATION AND CORRELATION OF TEXTURAL AND FRUIT MATURITY PARAMETERS DURING STORAGE OF DALINBEL, JONAFREE, AND REAL APPLE CULTIVARS – **Ionuț ISTRATE, Florin STĂNICĂ, Adrian ASĂNICĂ, Ana-Cornelia BUTCARU, Liliana TUDOREANU**..... 280
32. INFLUENCE OF MEDIA COMPOSITION ON IN VITRO SEEDLING DEVELOPMENT OF SOME HOT PEPPER *(Capsicum annum)* VARIETIES – **Teodora-Elena KISS, Catalina-Ioana NICOLAE, Adrian George PETICILĂ** 281
33. TESTING BIOLOGICAL FERTILIZERS USEFUL FOR SUSTAINABLE AGRICULTURE – **Oana-Alexandra LUȚU, Nicolae-Alin VINTILĂ, Liliana Cristina SOARE, Codruța Mihaela DOBRESCU** 282
34. *IN VITRO* ANTIFUNGAL EFFECT OF *ROSMARINUS OFFICINALIS* L. ESSENTIAL OILS AGAINST *FUSARIUM* SPP. – **Ionuț-Daniel MARIN, Elena Ștefania IVAN, Monica-Luminița BADEA** 283
35. *IN VITRO* ANTIFUNGAL EFFECT OF *ROSMARINUS OFFICINALIS* L. ESSENTIAL OILS AGAINST *BOTRYTIS* SPP. – **Ionuț Daniel MARIN, Elena Ștefania IVAN, Monica Luminița BADEA** 284
36. CARBON STABILIZATION AND SEQUESTRATION PROCESSES IN SOIL THROUGH SYNTHETIC MICROBIOMES – **Sorin MATEI, Gabi Mirela MATEI, Sorina DUMITRU, Victoria MOCANU, Monica DUMITRAȘCU** 285

37. DIFFERENCES IN MICROBIAL DIVERSITY AND COMMUNITY STRUCTURE AMONG TWO VERMICOMPOST GRANULATIONS – **Gabi Mirela MATEI, Sorin MATEI, Laurențiu Liviu URECHESCU, Elena Maria DRĂGHICI** 286
38. CLIMATE TRENDS IN OLTENIA. CASE STUDY: DĂBULENI WINE CENTRE – **Cristian MĂRĂCINEANU, Maria BĂJENARU, Aurelia DIACONU, Nicolae GIUGEA, Ramona CĂPRUCIU** 287
39. SURVIVAL AND QUALITIES OF *STEVIA* SEEDLINGS DEPENDING ON THE METHOD OF REPRODUCTION – **Ahmed MEHMED, Stanimir ENCHEV, Tzvetan KIKINDONOV** 288
40. THE EVOLUTION OF CLIMATE CHANGE IN THE WESTERN REGION OF ROMANIA AND THEIR INFLUENCE ON CROPS – **Vlad Dragoslav MIRCOV, Carmen Claudia DURAU, Veronica SĂRĂȚEANU, Casiana MIHUT, Daniela Nicoleta SCEDEI, Anisoara DUMA COPCEA, Marius BOLDEA** 289
41. *PORTULACA* GENOTYPES BREEDED AND BIOBANKED AT BRGV BUZAU – **GEANINA NEGOSANU, Costel VÎNĂTORU, Bianca MUȘAT, Camelia BRATU, Matilda POPESCU, Adrian George PETICILĂ** 290
42. UMBRELLA EFFECT OF EUROPEAN PROTECTED SPECIES OVER NATIONAL RED LISTED *BETULA HUMILIS* SCHRANK - "MESTECĂNAȘUL DE LA COȘNA" AS A NEW NATURA 2000 SITE – **Roxana NICOARĂ, Constanța-Mihaela ION, Gabriela TAMAS, Ana-Maria MOROȘANU, Florența-Elena HELEPCIUC, Tiberiu SAHLEAN, Constantin-Ciprian BÎRSAN, Minodora MANU, MIHAELA CIOBOATĂ, Sanda MAICAN, Viorel-Dumitru GAVRIL, Miruna-Maria ȘTEFĂNUȚ, Daniel Ioan MAFTEI, Mirela-Mădălina MOLDOVEANU, Anca MANOLE, Sorin ȘTEFĂNUȚ** 291
43. INFLUENCE OF CULTURE MEDIUM ON *IN VITRO* MICROTUBER PRODUCTION IN *SOLANUM TUBEROSUM* – **Ioana-Catalina NICOLAE, Oana VENAT, Adrian George PETICILĂ, Vlad STANCU, Dorel HOZA** 292
44. ECOLOGY AND PHYTOSOCIOLOGY OF THE SPECIES *CIRSIUM CANDELABRUM* GRISEB. (SECT. CIRSIUM, ASTERACEAE, CYNAREAE) IN THE UPPER BASIN OF THE GILORT RIVER, CARPATHIANS MOUNTAINS – **Mariana NICULESCU, Paula IANCU** 293
45. SOME ASPECTS OF THE MORPHO-ANATOMICAL FEATURES OF THE MEDICINAL PLANT *Arnica montana* L. – **Sorina NIȚU (NĂSTASE), Vasilica LUCHIAN, Monica TOD, Paul ZEVEDEI, Tudor ENE, Virgil NIȚU, Adrian BLAJ** 294
46. METHODS OF COMBATING AND CONTROL REGARDING FALSE INDIGO-BUSH IN CLOSE CORRELATION WITH INVASIVE CAPACITY IN THE FORESTRY PLANT COMMUNITIES IN THE JIU-DANUBE CONFLUENCE ZONE – **Silvestru Ilie NUȚĂ, Mariana NICULESCU, Călin SĂLCEANU, Paula IANCU, Marin SOARE** 295
47. STUDIES REGARDING THE CYTOTOXICITY OF A BIOPRODUCTS BASED ON POLYSACCHARIDES DERIVED FROM *PLANTAGO* SP. – **Marilena-Gabriela OLTEANU ZAHARIE, Nicoleta RADU, Narcisa Elena BABEANU, Marinela BOSTAN, Viviana ROMAN** 296
48. MODELLING THE DISTRIBUTION OF THE RARE, ENDEMIC, TERTIARY RELICT AND VULNERABLE SPECIES *SYRINGA JOSIKAEA* JACQ. FROM APUSENI MOUNTAINS (WESTERN ROMANIAN CARPATHIANS) – **Marilena ONETE, Florian Paul BODESCU, Roxana NICOARĂ, Minodora MANU, Simona MIHAILESCU** 297
49. LOW TEMPERATURE PASSIVE STORAGE OF SOLAR ENERGY USING MACROENCAPSULATED PHASE CHANGE MATERIAL FOR GREENHOUSE HEATING – **Hasan Huseyin OZTURK, Hasan Kaan KÜÇÜKERDEM** 298

50. ANTIOXIDANT CAPACITY AND SEASONAL MINERAL COMPOSITION VARIATION IN *ARONIA MELANOCARPA* FRUITS – **Laura POP (CARPESCU), Rui COSTA, Adrian ASĂNICĂ, Stelica CRISTEA, Corina PREDESCU, Dana TAPALOAGA, Liliana TUDOREANU** 299
51. A COMPREHENSIVE REVIEW OF MINT ESSENTIAL OILS -- COMPOSITION, QUALITY AND APPLICATIONS – **Sabina PINTILIA, Elena PETCU, Niculina IONESCU, Violeta Alexandra ION, Liliana BĂDULESCU** 300
52. DEVELOPMENT AND CHARACTERISATION OF AN INNOVATIVE JAM OF HOT PEPPER – **Georgeta Sofia POPESCU, Florina RADU, Ariana VELCIOV, Antoanela COZMA, Manuel AMZOIU, Lia Sanda ROTARIU, Emilia AMZOIU, Ansoara IENCIU, Despina BORDEAN** 301
53. NEW GENOTYPES OF COTTON (*GOSSYPIUM HIRSUTUM*) BRED AT BRGV BUZĂU – **Matilda POPESCU, Costel VÎNĂTORU, Bianca MUȘAT, Camelia BRATU, Geanina NEGOȘANU, Adrian PETICILĂ** 302
54. CONTRIBUTIONS TO THE KNOWLEDGE OF THE DISTRIBUTION OF SOME RARE TAXA IN THE FLORA OF OLTENIA (ROMANIA) – **Daniel RĂDUȚOIU** 303
55. DISCUSSIONS ON SOME ALIEN SPECIES FROM THE FLORA OF OLTENIA (ROMANIA) – **Daniel RĂDUȚOIU** 304
56. PRECISION AGRICULTURE EXTENSION MODEL BASED ON INTERDISCIPLINARY COLLABORATION – **Dragoș-Ioan SĂCĂLEANU, Adrian ASĂNICĂ, Abigail BORRON, Daniela FAUR, Horia-Nicolae CIOCAN, Gary L. HAWKINS, Ioan-Ștefan SACALĂ, Dan POPESCU, Mihai-Gabriel MATACHE** 305
57. FRUITING BIOLOGY OF *STAPHYLEA PINNATA* L. (STAPHYLACEAE) IN THE REPUBLIC OF MOLDOVA – **Irina SFECLĂ, Elena TOFAN-DOROFEEV, Victor SFECLĂ, Vasilii SLIVCA** 306
58. THE GERMPLASM COLLECTION "RARE PLANTS OF THE REPUBLIC OF MOLDOVA" IN THE "Al. Ciubotaru" NATIONAL BOTANICAL GARDEN (INSTITUTE) OF THE STATE UNIVERSITY OF MOLDOVA – **Irina SFECLĂ** 307
59. DISTRIBUTION OF INVASIVE SPECIES *METCALFA PRUINOSA* IN GREEN FOREST OF WESTERN ROMANIA – **Denisa-Daliana SFIRCULUS, Ioana GROZEA** 308
60. ASSESSMENT OF *BUXBAUMIA VIRIDIS* FROM TWO NATURA 2000 SITES: RETEZAT (ROSCI0217) AND RUSCA MONTANĂ - ȚARCU - RETEZAT CORRIDOR (ROSCI0292) – **Sorin ȘTEFĂNUȚ, Ana-Maria CORPADE, Claudia DANAU, Miruna-Maria ȘTEFĂNUȚ** 309
61. DEVELOPMENT OF PLANT TISSUE CULTURE AND IN DOOR FARMING SYSTEMS IN A CONTROLLED ENVIRONMENTAL CONDITIONS USING LIGHT-EMITTING DIODES (LEDs) FOR THE PRODUCTION OF HIGH VALUE CROPS – **Sreeramanan SUBRAMANIAM** 310
62. CREATING A CLIMATE CAMERA FOR GROWING MICROGREENS: DESIGN, PARAMETERS AND POSSIBILITIES FOR APPLICATION – **Hristo TANKOV, Manol DALLEV, Dimka HAYTOVA** 311
63. RESEARCH ON THE VALORIZATION OF MELONS AND THEIR BY-PRODUCTS – **Toma (Vapor) CRISTINA, Gheorghița HOZA, Radu-Andrei STERIAN, Popescu SIMONA, Dorel HOZA** 312
64. STUDY ABOUT THE INFLUENCE OF GIBBERELLIC ACID AND NAPHTHYL ACETIC ACID ON *IN VITRO* DEVELOPMENT OF FOUR ROMANIAN POTATO VARIETIES – **Andreea TICAN, Mihaela CIOLOCA, Monica POPA** 313
65. GLOBAL DEVELOPMENT TRENDS AND STRATEGIC OUTLOOK OF VERTICAL AGRICULTURE - **Qichang YANG, Florin STĂNICĂ, Yuxin TONG, Bateer BAIYIN** 314

FRUIT GROWING

EFFECT OF FERTILIZATION ON THE GROWTH, NUTRITIONAL AND PHYSIOLOGICAL STATUS OF APPLE PLANTING MATERIAL (*MALUS DOMESTICA* BORKH.) GROWN IN CONTAINERS

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Abstract

The study was conducted at the Fruit Growing Institute in Plovdiv to establish the influence of different fertilizer rates on the growth, nutritional and physiological status of apple plants of the Florina cultivar, grafted on M9 rootstock, grown in containers (10 l). Variants of the experiment are Variant I - Control (not fertilized), Variant II – $N_{1.3}P_{0.3}K_{0.7}Mg_{0.1}$, Variant III – $N_{2.7}P_{0.7}K_{1.3}Mg_{0.3}$ and Variant IV – $N_{4.3}P_{1.1}K_{2.1}Mg_{0.4}$. In fertilized variants, plants with a height of 144.11 to 152.14 cm and a stem diameter of 9.63 to 10.09 mm were obtained. The plants of the control variant reached average values for height of 92.38 cm and 6.95 mm for stem diameter. The plants of low fertilizer rate were distinguished by the largest volume of the root system (99.44 cm^3). There is a pronounced tendency for a direct increase in nitrogen with increasing fertilizer rate. The experimental data obtained showed that the low fertilizer rate ($N_{1.3}P_{0.3}K_{0.7}Mg_{0.1}$) was optimal and led to the production of high-quality apple planting material suitable for establishing fruit orchards.

Key words*: apple, containers, fertilization, planting material.*

BIOCOMPATIBLE MANAGEMENT ON POSTHARVEST DISEASES

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Abstract

In recent years, there has been a trend to research alternative methods for controlling post-harvest fungal pathogens. Using biopolymers and plant extracts is an innovative method that includes many advantages, with human health as a priority. The research includes the efficiency of biopolymer chitosan and extract of grape seed and a combination of them used to control the fungal pathogens Alternaria spp. and Penicillium spp. in vitro conditions. Grape seed extract has antimicrobial activity, manifested by phenolic compounds that cause oxidation of the cell membranes of pathogens without affecting the plants. As a biological agent, chitosan is a biopolymer natural polysaccharide that has several amino groups, determining its activity against plant pathogens. The best percentage of mycelial inhibition varied according to the two pathogens. The pathogen Alternaria spp. was influenced by the combination of chitosan (1%) and grape seed extract (1.5%), the experiment has significant differences between different variants in research. The mycelia of Penicillium spp. showed the best result with inhibition by applying chitosan (1%) with a 1 % solution of grape seed extract. The highest percentage of mycelia growth inhibition was achieved on the sixth day of measurement 20.18% in the pathogen Alternaria spp. According to the control variant, Penicillium spp. has been highest suppressed on the fourth day 15.21% of cultivation of fungal pathogen.

Key words*: biopolymers, chitosan, grape seed extract, antimicrobial activity.*

APPLICATION OF BIOPOLYMERS FOR FUNGAL PATHOGEN CONTROL IN THE STORAGE OF FRUITS

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Abstract

The edible coatings of biopolymers such as alginate and chitosan offer promising opportunities for improving the storage of fruits by reducing losses due to fungal diseases. However, it is important to conduct further research to optimize the conditions for their application and ensure their safety and effectiveness in real-world conditions. Nectarine fruits were artificially inoculated with Monilinia spp. and, one day later, coated with 1% chitosan and alginate films. Characterisation of the differently coated fruit was traced during refrigeration. The inhibitory effect of coatings was monitored by measuring the diameter of the lesions on fruits over ten days, and the water loss by measuring milligrams of the fruits. The highest percentage of repression of fungal disease was observed in chitosan coating. The alginate coating has shown a positive effect on fruits during storage to save water contained and extend shelf-life time. The results obtained were compared with the control fruits which were not-application of biopolymer film.

Key words*: Monilinia spp. chitosan, alginate, peach, post-harvest, waste reducing.*

THE HISTORY OF PALM CULTIVATION IN IRAQ

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Abstract

The date plant with the scientific name of Phoenix dactylifera L. has a history of cultivation of more than 5000 *years. The date palm tree is used for various purposes such as food, shelter, fibers and fuel. Dates are one of the top 5 products produced in the world and after wheat, tomatoes and barley it is the fourth product produced in the world. Arab countries have more than 70% of date palm trees. More than* 67*% of dates are produced in Arab countries. The cultivation of dates in Iraq has a long history. Iraq has been one of the top ten date producing countries for a long time (the last two decades). Dates are Iraq's second export product. However, various factors such as war, sanctions, environmental tensions, and pests and diseases reduced the production of dates and destroyed a wide area of date orchards. Fortunately, nowadays, according to various management programs for the production and export of this product, as well as various research conducted with the aim of increasing the productivity and quality of the fruit, date production in Iraq has been progressing. So, in* 2022*, Iraq was the first exporter of dates in the world.*

Key words*: export, fertilization, pollination, production.*

VEGETATIVE AND REPRODUCTIVE POTENTIAL OF BLACKBERRY CULTIVARS 'HULL THORNLESS' GROWN IN DIFFERENT REGIONS OF BULGARIA

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Abstract

The vegetative and reproductive traits of the blackberry cultivar Hull Thornless, grown in different agro-ecological conditions of Bulgaria, was monitored. The study was conducted during the period 2022-2024 in a collection plantation of the Research Institute of Mountain Stockbreeding and Agriculture, Troyan and the Experimental Field at the Faculty of Agriculture of Trakia University - Stara Zagora. The indicators of average number, average height (m) and thickness of shoots (mm) of two linear meters of the inter-row area were monitored. The results show that the studied parameters were influenced by environmental factors during the study. Regarding vegetative indicators, the number of shoots (17 ± 6.34), the thickness of the shoots (14.85 mm ± 2.36) and the height of the shoots (3.49 m ± 0.32) are greater in the blackberry grown in the conditions of Troyan. During the tested period, the highest average yield (1666.33 g/m^2) and average fruit weight (5.63 g) was recorded by the plants in the plantation of Stara Zagora.

Key words*: berry fruits, fruit weight, vegetative indicators, yield.*

DETECTION OF PHYTOPLASMA INFECTIONS IN VARIOUS FRUIT TREES IN BULGARIA, 2018-2024

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Abstract

This article covers research conducted between 2018 and 2024 aimed at detecting phytoplasma infections in various fruit crops in Bulgaria. Phytoplasma diseases, such as 'Candidatus Phytoplasma mali', 'Candidatus Phytoplasma pyri', and 'Candidatus Phytoplasma prunorum', represent a serious threat to agriculture, leading to significant losses in yields and fruit quality. The studies described in the article include the diagnosis of phytoplasma infections in different fruit crops. Molecular methods, including PCR (Polymerase Chain Reaction) and RT-RFLP analysis, were performed to identify pathogens, enabling precise and rapid detection of phytoplasmas in affected plants. More than 3,294 samples were analyzed, of which 4 tested positive for 'Candidatus Phytoplasma prunorum' and 6 for 'Candidatus Phytoplasma pyri', while 'Candidatus Phytoplasma mali' was not detected. The article emphasizes the importance of early detection and management of phytoplasma infections in fruit growing to minimize economic losses and ensure sustainable fruit production in the future.

Key words*: phytoplasma infections, fruit trees, Bulgaria.*

TRAINING SYSTEMS FOR ORCHARDS HIGH-DENSITY CHERRIES FROM THE REPUBLIC OF MOLDOVA

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Abstract

The study was conducted between 2010 and 2024 in the central and northern fruit growing area of the Republic of Moldova to evaluate the effect of the cherry (Prunus avium L.) training system on fruit growth, yield and quality, comparing four training systems (Thin spindle; Cup; Kym Green Bush; Improved thin spindle) to five varieties (Early Star, Samba, Black Star, Kordia and Regina) grafted on Gisela 6 rootstocks, with trees planted at a distance of 4x1m and 4x2m. The crowns of the trees, at the age of 6-7 years, formed continuous rows in the direction of the row, covering the soil with the projection of the crown at 61-63.7%, having the lateral area of the crown of 21300-22450 thousand m^2/ha and the volume of the crown of 158 m^3/ha 153858-22450. During the fruiting period the trees have a slower growth rate compared to the growing period. The cumulative yield of the varieties Samba 8.43-10.88 t/ha and Black Star 7.66-9.84 t/ha, grafted on Gisela 6, during the period of growth and fruiting of the trees was higher for the cherries formed according to the thin spindle crown.

Key words*: sweet cherry variety, crown shap, density, productivity, quality.*

THE INFLUENCE OF PRUNING ON VEGETATIVE GROWTH, YIELD AND QUALITY OF CHERRY FRUITS OF THE 'KORDIA' VARIETY GRAFTED ON 'MaxMa 14' (*PRUNUS AVIUM*)

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Abstract

The paper refers to the influence of tree pruning on vegetative growth, harvest and fruit quality of the Kordia cherry variety grafted onto the 'MaxMa 14' rootstock. Investigations at SRL "StarAgro Group" (Ustia village, Criuleni district) were organized in the central fruit-growing area of the Republic of Moldova, with the 'Kordia' variety, grafted onto the 'MaxMa 14' rootstock. The trees were planted in the fall of 2012 at a distance of 5x3 m, using the naturally improved crown shape with reduced volume. In the orchard of SRL "StarAgro Group" drip irrigation is used, in experiments, in the first two years after planting the trees, the soil was maintained as a cultivated field, in the following years the distance between the rows remained grassed naturally or artificially. The structure of the vegetative ensemble, the number of bunch branches, the distribution of buds along the length of the branches and the fruit harvest of the 'Kordia' cherry variety grafted on the 'MaxMa' 14 rootstock were studied.

Key words*: variety, rootstock, harvest.*

BEHAVIOR OF SOME ALMOND CULTIVARS IN THE FRUIT SETTING PROCESS

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Abstract

The almond (Prunus dulcis (Miller) D.A. Webb) crop started to regain interest for farmers in Romania, offering interesting and economically sustainable prospects. In this study, the fruit setting of two Romanian and two Italian almond cultivars, grown in an experimental orchard of very high density in Valu lui Traian, Constanța county, is presented. The study was carried out in the 2022 and 2023 growing seasons to determine the behaviour of the cultivars in the fruit setting process. The results of the determinations showed that the Supernova and Tuono cultivars performed well in terms of fruit setting, with 36% and 29%. They are followed by Veronica. The Mirela cultivar recorded the lowest percentage (15%). This study presents data that could be of interest for scientists but also for farmers whom need to know the behaviour of cultivars in order to improve fruit quality and production.

Key words*: Prunus dulcis, fruit evaluation, fruit evolution.*

POSTHARVEST EFFECTS ON ORGANIC `REGINA` STRAWBERRIES: QUALITY AND BIOACTIVE COMPOUNDS IN FREEZE-DRYING VS. FREEZING

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Abstract

Strawberries are seasonal fruits with a limited shelf life due to their delicate skin and soft flesh. Beyond their naturally sweet flavor, organic strawberries are favored by consumers due to the absence of harmful pesticides and chemicals. This study investigates the storage efficiency of `Regina` cultivar strawberries under two conditions: frozen at -80°C and freeze-dried. Quality indicators, including pH, total titratable acidity (TTA), dry matter content (DM), ascorbic acid content, total phenolic content (TPC), and antioxidant activity (AA), were assessed after harvest and at 2, 4, 6, 8, 10, and 12 months post-harvest. The results showed that storage at -80 °C was as effective as freeze-drying in preserving TPC and AA after 12 months. However, differences in ascorbic acid content were observed, with frozen storage (-80°C) retaining a higher amount (5.03 mg ascorbic acid/g DM) compared to freeze-dried storage (3.35 mg ascorbic acid/g DM) after 12 months. These findings suggest that freeze-drying offers a more economical and practical alternative for the long-term storage of organic strawberries compared to continuous low-temperature storage at -80°C followed by periodic freeze-drying.

Key words*: long-term storage, nutritional composition, quality assessment, seasonal fruits, strawberry.*

EFFECTS OF BAGGING ON FRUIT DEVELOPMENT AND QUALITY IN 'KANZI' APPLES

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Abstract

Bagging is a widely used horticultural practice to modify the microenvironment surrounding developing fruit, with the goal of improving fruit quality and reducing external damage. This study investigates the effects of bagging on the growth, development, and quality of 'Kanzi' apples (Malus domestica Borkh.). Waxed paper bags were applied at early developmental stages, and their impact on fruit size, weight, skin coloration, firmness, and biochemical composition were assessed at harvest. The findings indicate that bagging significantly influenced fruit development, leading to reduced exposure to sunlight and enhanced protection against pests and environmental stressors. While bagging improved skin coloration uniformity it slightly delayed fruit maturity. Non-bagged fruits developed an attractive red colour while bagging suppressed the yellow/red colour development leading to a lower content of total phenolic and flavonoid content. Fruit damage caused by cracking was increased in bagged fruits.

Key words*: firmness, flavonoids, fruit cracking, phenolic compounds TSS.*

COMPARISON OF MULTIANNUAL CLIMATIC DATA IN NORTH BUCHAREST REGION, ROMANIA, WITH DISCUSSION ON ORCHARD INFLUENCE

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Abstract

Temperature, precipitation, and light are essential climatic parameters for fruit tree life and productivity, and they have a consistent and specific influence on each plant`s growing stage. Considering the whole ecosystem, strong linkages between those parameters are highlighted. The present study analyses multiannual climatic data (more than 50 years) regarding precipitation and solar radiation at the International Meteorological Station Băneasa – Bucharest, Romania. A comparative synthesis of the local meteorological station`s records in the orchard of the University of Agronomic Sciences and Veterinary Medicine of Bucharest, located at 5 km distance from Băneasa station but in the urban microclimate. The study results are essential to understand the area`s climate changes more closely and to include them in future strategies for orchard management.

Key words*: meteorological station, sensors, automatization, irrigation.*

PRELIMINARY RESEARCH ON THE INFLUENCE OF CERTAIN AGROTECHNICAL MEASURES ON THE GROWTH OF THE 'ANNA SPÄTH' PLUM VARIETY UNDER THE CONDITIONS OF THE MOARA DOMNEASCĂ EXPERIMENTAL STATION, ILFOV COUNTY

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Abstract

The study (2022-2023) at Moara Domnească Experimental Base, affiliated with the Research and Development Station for Pomology Băneasa, Ilfov County, evaluated the effects of land shaping, localized irrigation, and two rootstocks on the growth of the 'Anna Späth' plum cultivar using a split-plot experimental design. Planting on ridged terrain did not significantly enhance growth parameters. In 2023, the trunk cross-sectional area was 1.23 cm² smaller per tree in ridged terrain than in flat terrain. Localized irrigation significantly improved growth. The trunk cross-sectional area increased by 0.86 cm² in the first year, 1.77 cm² in the second year, and 1.31 cm² on average. The number of shoots per tree rose by 2.77 (2022), 3.07 (2023), and 2.92 on average. Total shoot length increased by 183.5 cm (2022), 358.6 cm (2023), and 271.0 cm on average. The mean shoot length grew by 12.62 cm (2023) and 10.05 cm on average. No significant differences were observed between the two rootstocks. These results emphasize the benefits of localized irrigation in improving plum tree growth, while land shaping and rootstock selection had no notable impact.

Key words*: Prunus, land shaping, rootstock, irrigation, research.*

DIGITAL MANAGEMENT OF ARONIA CROP: THE BENEFITS OF HUMIDITY AND TEMPERATURE MONITORING THROUGH SPECIFIC SENSORS

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Abstract

This study investigated the digitalization of chokeberry (Aronia melanocarpa) cultivation in the Bistrița region through the implementation of a cost-effective and optimized NB-IoT (Narrowband Internet of Things) sensor network, designed to monitor critical environmental parameters essential for optimal plant growth and yield. The objectives of the research were to identify critical phenological stages in chokeberry development and to validate the effectiveness of soil and air sensors for automated control, integrated via a mobile application. Climatic factors were monitored in real-time using an nMETOS 80SM agrometeorological station installed within the chokeberry experimental plot at the Fruit Research and Development Station Bistrița, with data acquisition and visualization facilitated by the FieldClimate platform. Analysis of sensor data recorded during the 2024 vegetation period highlighted intervals of pronounced soil moisture deficit, enabling timely and targeted agronomic interventions. Results emphasized that the implementation of digital technologies for crop management represents a valuable and sustainable strategy for chokeberry crop and is a great decisional support instrument with a significant potential for improving yield performance and fruit quality in general.

Key words*: precision, smart technology, sustainability, irrigation, sensors.*

THE SPECIFICS OF ROOTING, GROWTH OF SOME APPLE VARIETIES IN THE CONDITIONS OF THE SOUTH OF THE COUNTRY

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Abstract

In order to expand the varieties of fruit tree species, it is necessary to know some of their biological peculiarities, the growth dynamics of the roots of the rootstocks that influence the power of the tree`s growth, the fruiting of the trees. Also, the good compatibility between grafts and rootstocks is a basic characteristic for the correct choice of the two partners and the differentiated establishment of the most valuable rootstock for each individual variety. In the process of growth and fruiting, the stem is mainly influenced by the underground part, respectively by the root system. In conclusion, specifying the best rootstock with good rooting that determines a constant production, significant and with superior quality fruits, is essential.

Key words*: apple, root system, rootstocks.*

RESEARCH ON THE QUALITY OF APPLE PRODUCTION DEPENDING ON THE APPLIED HERBICIDES

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Abstract

The creation and exploitation of fruit ecosystems must be done with maximum efficiency, without aggressions and ecological vulnerabilities harmful to humans, animals and the environment. The competition between trees and weeds, if it is out of control, especially when the infestation with `problem weeds` presents a value of more than 35%, although the negative effect is not immediately visible, it causes a low fruit production, and the trees are suffering, especially in critical periods (setting of fruits, intense growth of shoots, ripening of fruits). The problem of the use of herbicides in fruit growing must be seen not only from the perspective of the immediate or subsequent effect on the orchard, on the fruits, but also from the point of view of the quality of the environment in the entire fruit growing ecosystem. The experimental herbicide varieties provided effective control of mono- and dicotyledonous weeds in the apple orchard, resulting in both a significant increase in production and a better and more extensive storage capacity of the crop.

Key words*: herbicide, production quality, environmentally friendly technologies.*

REACTION OF NEW INTRODUCED WALNUT CULTIVARS TO ANTHRACNOSE AND BACTERIOSIS IN BULGARIA

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Abstract

The Walnut bacterial blight caused by Xanthomonas arboricola pv. juglandis and walnut anthracnose caused by the fungus Gnomonia leptostyla (sexual stage) and Marssonina juglandis (asexual stage) are the most economically significant walnut diseases in Bulgaria's climate. This study compared the susceptibility of newly introduced walnut cultivars Valmit, Valeris, Sebin, and Yalova 1 to these diseases with that of the prevalent Bulgarian cultivars Izvor 10 and Silistrenski. Observations for disease symptoms on leaves were conducted twice annually in the spring and autumn in a young walnut orchard at the Fruit Growing Institute – Plovdiv. The average percentage of walnut leaf spots showed that the Romanian cultivar Valmit (31.44%) was most affected. Another Rumanian cultivar Valeris was reported with the lowest percentage of infection to fungal disease with 22.30% infected leaves. From the observed cultivars, the most affected by bacterial blight was the Bulgarian one - Izvor 10 in degree 8.6%, which determinated it as a high susceptible to this disease. In our research the Turkish cultivar Yalova1 was reported as the lowest susceptible with 4.74% infected leaves.

Key words*: cultivars, Gnomonia leptostyla, infection, Juglans regia L., Xanthomonas arboricola pv. juglandis.*

FRUIT CHARACTERISTICS OF DIFFERENT AUTOCHTHONOUS CHERRY GENOTYPES SELECTED FOR THE INTERACTION WITH THE PLUM POX VIRUS

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Abstract

The Plum pox virus (PPV), , is the one that greatly affects stone fruit crops, considered one of the most destructive viruses worldwide, as a quarantine pathogen. Over time, numerous researches have been carried out because the virus affects particularly the productivity and quality of the fruits, but, unfortunately, no treatment has been discovered, and as a last measure taken for a short time, at the present moment, being to eradicate the infected trees and plant new virus-free trees. The highlighting and selection of valuable genes, of economic importance in cherry, through modern techniques, and their transmission to new cherry cultivars, the production of agro-productive and superior quality planting material and the launch on the market of the most valuable cultivars, is a major objective of all programs of cherry breeding both worldwide and in Romania. In this work, the plant material was made up of different F1 hybrid combinations from the specie Cerasus avium. The hybrids studied were obtained in Mihai Bravu locality, Giurgiu county.

Key words*: genetic improvement, tolerance or resistance to pathogens, fruit parameters.*

RESEARCH ON THE INFLUENCE OF THE SOIL MAINTENANCE SYSTEM ON THE QUALITY OF CURRANT FRUITS

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Abstract

The research carried out follows the influence of the soil maintenance system on the quality of fruits from currant plantations in the climate and soil conditions of the northwestern Romanian Plain. Weed control in orchards by manual weeding and the use of mechanical means requires a lot of labor and the allocation of significant resources. A wide range of pre-emergent and post-emergent herbicides are used for chemical weed control, which are very effective in orchards of fruit trees. The problem of the use of herbicides in fruit growing must be considered not only from the perspective of the immediate effect on the plantation (total or partial elimination of weeds), but also from the point of view of the quality of the fruits, determining the specific biochemical parameters.

Key words*: maintenance system, plantation of fruit trees, fruit quality.*

STUDY ON THE IMPACT OF SEMI-TRANSPARENT PHOTOVOLTAIC PANELS IN HORTIVOLTAIC SYSTEMS ON MICROCLIMATE AND STRAWBERRY PRODUCTION IN ROMANIA

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Abstract

Hortivoltaic systems, integrating renewable energy generation with microclimate control, offer sustainable solutions for agriculture under climate change. This study examines the effects of semi-transparent photovoltaic panels on strawberry (Fragaria x ananassa) cultivation. Conducted at the Moara Domneasca Experimental Base in Romania, the experiment used two panel types: PV1 (48.92% transparency) and PV2 (77.01% transparency), alongside a control area. Microclimate monitoring included soil moisture, soil and air temperature, and humidity. Results showed that air temperatures under PV systems were 5.30°C lower than the uncovered control, reducing heat stress. PV panels also lowered soil temperatures (e.g., 21.86°C under PV1 vs. 22.60°C in the control) and increased soil moisture due to reduced evapotranspiration. Regarding strawberry quality, PV1 panels negatively affected fruit weight and sugar content, while PV2 panels maintained comparable sugar levels (30.33% Brix) and firmness (3.27N) to the control. These findings highlight the potential of hortivoltaic systems to optimize crop productivity in hot climates, offering dual benefits of energy production and sustainable agriculture. Future research should explore long-term impacts.

Key words*: agrivoltaics, hortivoltaic systems, semi-transparent photovoltaic panels, microclimate control, strawberry cultivation, quality, fruit firmness.*

THE IMPACT OF CLIMATE CHANGES ON THE PHENOLOGICAL DYNAMICS OF SOME PEAR VARIETIES IN THE MĂRĂCINENI AREA, ROMANIA

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Abstract

Climate change has impact on the phenology of fruit trees brings changes on the quality and productivity of the fruits, on the resistance/tolerance to frost, diseases and pests and implications on the zoning of the fruit tree species. The study was carried out in pear collection from ICDP Pitesti-Maracineni on 7 Romanian pear varieties ('Argessis', 'Carpica', 'Monica', 'Ervina', 'Paramis', 'Paradox', 'Isadora') compared with 'Packham's Triumph' cv., between 2014-2024 periods. It has been studied for 11 years the phenophases of flowering in relation with climatic factors (temperature, and precipitation). Thus, from the multiannual observations it was found that all the flowering phenophases of pear were realized earlier, with about 9 days (for beginning of flowering) and 10 days (for end of flowering). Climate accidents were also recorded in 2017 (late spring frosts, -4.2°C on April, 21-22th), 2020 (late spring frost, -6.2°C ...-7.1°C on March, 16-17th and on April, 1-7th), 2022 (late spring frosts -1.8...5.5°C on April, 18-21th), in 2023 (low temperatures -4°C... -6.4°C on March, 29-30th), and 2024 (high temperature, +27°C, April, 1st). All these climatic accidents had visible negative effects on fruit production (e.g.: low temperatures from April, 2017 led to the loss of yield in a proportion of 95 % on 'Monica' cv.).

Key words*: changes climatic, genetic resources, pear, phenology, late frost.*

EVAPOTRANSPIRATION AND INTERACTIVE EFFECTS OF IRRIGATION AND FERTIGATION ON WHITE STRAWBERRY FRUITS

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Abstract

This research presents the crop evapotranspiration and investigates the effects of drip irrigation and fertigation on white strawberry fruits (diameter and number of fruits per plant). A two-factor experiment was conducted during 2023 and 2024 in an unheated greenhouse in the Chelopechene experimental field, Sofia, Bulgaria with drip irrigated and fertigated strawberry cultivar (Fragaria × ananassa 'Snow White'*). The irrigation and the fertilization factors were applied in 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). Total strawberry evapotranspiration was 380.99 mm for 2023 season and 416.34 mm for 2024 season. The results showed that the highest mean fruit diameter (d) was obtained from I1F2 treatment (22.23 mm) in 2023 and 21.55 mm in 2024 from I1F1. There was a significant reduction (12%) in fruit diameter (d) in the second growing year (2024) in the most unfavourable growing treatment (I2F2). The fruit weight reduction from I2F2 treatment was 31% in 2024. The highest mean number of fruits per plant was obtained from I1F1 treatment – 60.97 pcs in 2023-2024. As opposed to fruit sizes and fruit weight the fruits number per plant increased. The fruits number per plant increasing from I1F1 treatment was 84% in 2024.*

Key words*: white strawberry, irrigation, fertigation, fruit diameter, fruit weight.*

EFFECTIVENESS OF PREPLANT TRENCH ORGANIC FERTILIZATION IN A PLUM ORCHARD

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Abstract

Modern methods applied in technological agricultural practice impose the need to determine their scientific - applied information and effectiveness. With this aim, in 2021, the effectiveness of the applied technology of pre-planting trench organic fertilization with manure at the end of the operating period of a plum plantation of introduced cultivars Tegera and Elena was determined in RIMSA - Troyan. In both cultivar, the agrochemical status of soil profiles from depths of 0-20 cm, 20-40 cm and 40-60 cm was analyzed. The amount content of the main nutritional elements - nitrogen, phosphorus, potassium, calcium, iron, humus and pH - was determined. Vegetative and reproductive indicators were reported. In both varieties, a neutral reaction to pH (KCl), a good stockpile of the macronutrients nitrogen, phosphorus and potassium was found. The highest humus content in the surface soil layer (0-20 cm), 4.57% in the Tegera cultivar and 5.63% in the Elena cultivars. An average yield of 6.87 kg/tree was established for the Tegera cultivars and approximately twice as much for the Elena cultivars - 15.17 kg/tree.

Key words*: plum, organic fertilization, agrochemical analysis, vegetative and reproductive indicators.*

GENETIC DIVERSITY AND RELATIONSHIP ASSESSMENT OF ROMANIAN BLUEBERRY CULTIVARS USING SRAP MARKERS

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Abstract

Sequence-related amplified polymorphism (SRAP) molecular markers have proven to be an effective tool for assessing genetic diversity and cultivar identification in various plant species. Present study aimed to genotype nine Romanian blueberry (Vaccinium corymbosum) cultivars – 'Lax', 'Prod', 'Vital', 'Azur', 'Simultan', 'Delicia', 'Pastel', 'Safir', and 'Augusta' - using SRAP markers to evaluate their genetic variability and relationships. A set of polymorphic SRAP primers was selected to amplify DNA fragments, and the banding patterns were analyzed to assess genetic similarity. Cluster analysis grouped the cultivars based on their genetic similarities, providing valuable insights into their genetic background and potential breeding applications. The study reveals the effectiveness of SRAP markers for the differentiation of Romanian blueberry cultivars, providing a dependable approach for cultivar identification, genetic conservation, and breeding initiatives. This research could be a valuable support for improved cultivars development.

Key words*: SRAP markers, genetic diversity, Vaccinium corymbosum, cultivar identification, molecular genotyping.*

STUDY ON THE POSSIBILITY OF PROCESSING WHITE STRAWBERRY (*FRAGARIA* × *ANANASSA* 'SNOW WHITE') FRUITS INTO PRODUCTS FOR MASS CONSUMERS AND AS COMPONENT COMPOSITIONS IN THE BAKERY AND CONFECTIONERY INDUSTRY

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Abstract

This study examines the possibility of developing products from white strawberries, considering their short harvesting and storage period. Two product assortments—white strawberry jam and white strawberry with quince (Chaenomeles) jam—were developed and analysed at the Institute of Food Preservation and Quality in Plovdiv. The fruits were cultivated and provided by the experimental field in Chelopechene, part of the Institute of Soil Science, Agrotechnologies, and Plant Protection "Nikola Poushkarov" in Sofia. The jam production technology was modified based on the component composition of the product containing white strawberries and quince. The obtained products were analysed at the Laboratory of the Institute of Food Preservation and Quality in Plovdiv and the Department of Microbiology at the University of Food Technologies in Plovdiv. The analysis included physicochemical, biochemical, and microbiological indicators in compliance with current food safety and quality legislation. The final products are intended for mass consumers and as potential components in the confectionery and bakery industries.

Key words*: white strawberry Fragaria × ananassa '*Snow White'*, Chaenomeles, technology, products, biochemical, microbiological indicators.*

INVESTIGATION OF THE POTENTIAL FOR PROCESSING WHITE STRAWBERRY FRUITS INTO CONSUMER PRODUCTS AND AS COMPONENTS FOR THE BAKERY AND CONFECTIONERY INDUSTRY

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Abstract

This study examines the potential to develop products from white strawberries, given their short harvesting and storage period. Two assortments of products - white strawberry jam and white strawberry with Chaenomeles jam - were developed and analyzed at the Institute for Food Preservation and Quality in Plovdiv. The fruits were cultivated and supplied by the experimental field in Chelopechene, part of the Institute of Soil Science, Agrotechnologies and Plant Protection "Nikola Pushkarov", Sofia. The jam-making technology was modified to account for the component composition of products containing white strawberry and Chaenomeles. The final products were analyzed in an Accredited Laboratory at the Food Preservation and Quality Institute (Plovdiv) for physicochemical, biochemical, and microbiological parameters, in compliance with current legislation on food safety and quality. The resulting products are intended both as ready-to-consume items for the general public and as potential components for the bakery and confectionery industries.

Key words*: white strawberry processing, physicochemical, biochemical and microbiological parameters.*

EFFECTS OF DWARFING ROOTSTOCKS ON THE VEGETATIVE AND GENERATIVE DEVELOPMENT OF SEVERAL CHERRY CULTIVARS IN PEDOCLIMATIC CONDITIONS OF BISTRIŢA FRUIT REGION

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Abstract

The field trial was conducted in the Bistrita Fruit Region, Romania, to assess the vegetative growth and generative characteristics of `Lapins`, `Tamara`, and `Kordia` sweet cherry cultivars (Prunus avium L.) grafted on `GiSelA 5`, `GiSelA 6`, and `GiSelA 3` rootstocks. Trees were drip-irrigated and trained as spindle bushes at a density of 1250 trees/ha on molic eutricambosoil. Parameters such as trunk cross-sectional area, canopy volume, leaf area, shoot length and number, tree height, leaf area/fruit ratio, crop load, yield, fruit number per tree, average fruit size, and fruit quality were evaluated. Data showed that trees grafted on 'GiSelA 5' and 'GiSelA 6' induced the most intensive growth characteristics, they proved to be more vigorous when considering trunk cross-sectional area and canopy volume when compared with 'GiSelA 3' rootstock. Higher fruit calibers were obtained at 'Tamara' in comparison with 'Kordia' and 'Lapins' cherry cultivars. Conversely, a higher number of fruits/trees was observed at 'Lapins' cultivar, showing a very intense bearing capacity.

Key words*: rootstocks, high-density orchard, drip irrigation.*

CLUSTERING QUINCE (*CYDONIA OBLONGA* MILL) CULTIVARS ACCORDING TO THEIR RESPONSE TO ECONOMICALLY IMPORTANT VIRUSES

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Abstract

The aim of this study was the application of mathematical and statistical methods to observe the relationship of quince genotypes to economically important viral diseases with ACLSV, ASGV, ASPV causal agents. Clustering of varieties was done by hierarchical cluster analysis. All cultivars tested proved to form three clusters. The first cluster was the most extensive and consisted of the cultivars Bolgradska, Pazardzishka Jabalkovidna, Brig Big, Ildiz Bash, Trimoncium, Kardjali, Asenica, Triumf, in which ASPV and ACLSV were not detected, but between 25% and 50% of the studied trees were infected with ASPV. The cultivars Berezki, Pazardzishka-Malo Konare, Mugabary and Braga were free of virus infection, which determined their separation into a second cluster. The third cluster includes the cultivar Bread quince in which ASPV was not detected (0%), but double viral infection by ASGV and ACLSV was detected. ASGV and ASPV had a greater influence on the distribution of cultivars in separate clusters. ACLSV was not detected in any of the cultivars tested, ruling it out as a factor influencing the classification of cultivars into groups of similar degree of virus infection.

Key words*: Cydonia oblonga Mill, ACLSV, ASPV, ASPV, cluster analysis.*

DIOSPYROS KAKI, *DIOSPYROS VIRGINIANA* AND *DIOSPYROS LOTUS*, NEW FRUIT SPECIES FOR ROMANIA. A REVIEW

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Abstract

Diospyros kaki, Diospyros virginiana and Diospyros lotus are three of the best-known species of Diospyros genus in the Ebenaceae family. D. kaki, has recently been introduced in Romania, while D. virginiana and D. lotus are present since many years in botanical gardens and Arboretums. The present study aims to evaluate the scientific literature on origin, botany, morphology and ecology of the three species, the composition of fruits and leaves, their nutritional and medicinal properties, as well as the possibilities of use. The conclusions of the study show that these three species - D. kaki, D. virginiana and D. lotus - have remarkable nutritional and medicinal properties and have a great potential for cultivation in Romania in organic and integrated orchards.

Key words*: botany, cultivation, Diospyros, health benefits, nutritional and medicinal properties.*

POMOLOGICAL AND CHEMICAL CHARACTERIZATION OF SOME SWEET CHERRY VARIETIES GROWN IN URBAN ORCHARD

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Abstract

The increasing interest in urban agriculture highlights the need for a comprehensive understanding of fruit quality parameters in urban orchards. This study aimed to investigate the pomological and chemical characteristics of four sweet cherry (Prunus avium L.) varieties, namely, 'Napoleon', 'Van', 'Boambe de Cotnari' and 'Stella' cultivated in an urban orchard. The investigated varieties were evaluated for key pomological traits, including fruit weight, size, firmness, and skin colour, as well as chemical attributes such as soluble solids content (°Brix), titratable acidity, pH, vitamin C, total phenolic compounds and total flavonoids. The results revealed significant varietal differences in both physical and chemical properties, with some varieties demonstrating exceptional balance between sweetness and acidity, making them highly suitable for fresh consumption. Furthermore, the urban growing environment was found to influence certain quality parameters, potentially due to microclimatic conditions. This research underscores the potential of urban orchards to produce high-quality sweet cherries while contributing to local food systems. Insights from this study may aid in the selection of cherry varieties best suited for urban cultivation, enhancing productivity and fruit quality.

Key words*: yield, fruit quality, Prunus avium, TSS, TA, phenolic content, vitamin C.*

MULTIVARIATE ANALYSIS OF GENOTYPE BY YEAR INTERACTION FOR SOME FRUIT TRAITS IN ROSEHIP (*ROSA CANINA* L.)

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Abstract

Rosehip grows wildly in many different regions of Romania, revealing high environmental adaptability. Due to cross-pollination, the natural populations of rosehip present a certain degree of heterogeneity. Given the multifaceted pharmacological properties, the rosehip fruits acquire an increasingly and wide application in food, cosmetics, and pharmaceutical industries. The 24-rosehip population was collected from different Arad County locations in the West of Romania. The rosehip fruits were randomly picked from different canopy sides for three shrubs of each population. The present study was conducted to assess the variation of fruit traits for 24 populations of rosehip under the effect of different climatic conditions over three years and to select populations with good stability of desirable fruits. The results indicated significant differences among rosehip populations' fruit traits across testing years due to genotype-by-year interaction. Suitable rosehip populations with specific and broad adaptability were identified for the studied traits.

Key words*: adaptability, AMMI, fruit variation, rosehip, stability.*

DYNAMICS OF CLIMATIC ACCIDENTS DURING PEACH, APRICOT, AND CHERRY DORMANCY AND FIRST GROWTH STAGES IN THE LAST 20 YEARS IN ROMANIA

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Abstract

The paper analyzes the impact of climate change on the 20-year frequency of climatic accidents and the intensity of damage to apricot, peach, and sweet cherry flower buds in the continental climate of Romania. There was a rise from 2004 to 2023 in winter minimum temperature and mean temperature, especially in February, March, and April. Between 2004 and 2023, climatic accidents were registered in Romania in 14 years during the dormancy or in the first growth stages, i.e. damages caused by late frosts in 9 years, in three years (2006, 2010, and 2012) frosts below the hardiness limit of some fruit species causing damages during dormancy, and also in three years (2004, 2015, and 2016) bud damages caused by thermal oscillation in the dormant season (35-40°C in only 2-7 days). In 7 of the 20 analyzed years, the damages caused to the flower buds of some cultivars were major. Although until 2016, damages caused by frosts and thermal fluctuations in the dormancy season prevailed, since 2017, in six out of seven years, the damages were caused only by late frosts.

Key words*: winter minimum temperature, late frost, thermal winter oscillations, flower buds.*

THE REACTION OF SOME APRICOT CULTIVARS AND SELECTIONS TO THE ATTACK OF SOME PATHOGENS AND FROST IN THE CONTEXT OF CLIMATE CHANGE

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Abstract

The main objective of the works was to identify genotypes with increased tolerance or resistance to pathogens under the current climatic conditions for their extension into the culture. The trials on 20 apricot cultivars and selections were carried out in the orchard, during 2020 – 2022, under natural infection conditions, tracking the frequency and intensity of the attack on different organs of the plants and how they were influenced by current climate changes. These studies demonstrated that the most resistant to Monilinia laxa, Cytospora cincta and Stigmina carpophila were 4 cultivars ('Mamaia', 'Roșii de Mărculești', 'Olimp' and 'Elmar'), while 3 other cultivars ('Litoral', 'Pionier' and 'Sirena') had sensitivity to the attack of Cytospora cincta and Stigmina carpophila. The biggest losses caused by frost were recorded during the winter/spring of 2021 in terms of damaged fruit buds: 90% on 'Comandor' 88% on 'Pionier', 85% on 'Roșii timpurii' and 'Sulina', 67% on 'Sirena' and 65% on 'Mari de Mărculești'. The nursery has propagated resistant cultivars and selections, while the most valuable genotypes are grown in commercial orchards.

Key words*: Prunus armeniaca, genotypes, diseases, frequency, intensity, warning.*

COMPARISON OF QUALITY CHARACTERISTICS OF FRESH AND PROCESSED STRAWBERRIES

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Abstract

Strawberries (Fragaria × ananassa) are highly appreciated for their sensory attributes and nutritional benefits, but their quality can vary significantly between fresh and processed forms. This study aimed to compare the quality characteristics of fresh strawberries of three different varieties, namely, 'Karima', 'Auge' and 'Monterey' with their processed counterparts in the forms of jelly and syrup. Key parameters such as color, texture, total soluble solid content (°Brix), total acidity, vitamin C and phenolic compounds were evaluated. Fresh strawberries exhibited superior color, firmness, and higher levels of bioactive compounds, including vitamin C and phenolics, compared to the processed products. However, jelly and syrup retained substantial soluble solids and demonstrated an extended shelf life, making them suitable alternatives for long-term consumption. Processing led to significant changes in pH and acidity, with jelly maintaining a better balance between sweetness and tartness compared to syrup. Although antioxidant activity decreased during processing, both jelly and syrup still provided notable health benefits. This study highlights the trade-offs between sensory and nutritional quality in fresh and processed strawberries, offering insights into their uses and consumers' preferences.

Key words*: Fragaria x ananassa, jelly, syrup, acidity, TSS, total phenolic content, vitamin C.*

IN SITU SELECTION OF LOCAL SOUR CHERRY VARIETIES RESISTANT TO THERMOHYDRIC STRESS

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Abstract

The sour cherry (Prunus cerasus) is a tetraploid tree species native to Central Asia, which is found in semi-spontaneous form in all inhabited areas with favorable conditions for cultivation, especially in hilly areas. The fruits are consumed both fresh, having therapeutic properties, but also in processed form.
The current climate trend of increasing average temperatures and decreasing amounts of precipitation makes the existing varieties suffer to a greater or lesser extent. In order to cope with climate changes, breeding programs also aim to identify valuable genotypes adapted to thermohydric stress conditions.
The research in this paper aims at the in situ identification of some local sour cherry varieties in areas with high temperatures and low rainfall. Such an area is the one in southern Romania, more precisely in the southeast of Dolj county, located at an altitude slightly higher than 100m. Of the 24 selected local varieties, 45.83% have a caliber over 21 mm, the largest being the 24.9 mm at SLV-24-Dj-1.2 selection. In terms of taste and aroma, SLV-24-Dj-2.5 stood out and received the highest score at the tasting.

Key words: *local varieties, resistant, sour cherry, southern Romania.*

THE ACTION OF PRODUCTS BASED ON NAD, ANA AND BA ON THE FRUIT LOAD CONTROL IN GOLDEN REINDERS APPLE TREES

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Abstract

The research was carried out in the plantation of the LLC `Codru ST` enterprise founded in 2006. The efficiency of apple fruits chemical thinning on Golden Reinders variety grafted on the M9 rootstock was studied, under the action of the naphthylacetamide NAD (Geramid-New), naphthylacetic acid ANA (Dirager) and benzyladenine BA (Gerba 4LG), in different doses and thinning periods. Optimum values for the number of fruits in the crown, the average weight of a fruit, the production of fruits per tree and per hectare, as well as the average diameter of a fruit were obtained in the case of treatment with Geramid-New products 2.0 l/ha, Dirager 0,4 l/ha and Gerba 4LG 2.5 l/ha, recording values similar to the manual thinning option. A significant effect was recorded when treating with Geramid-New 2,0 l/ha when 80% of petals fell + 2-3 days, with Dirager 0.4 l/ha when the central fruit diameter was 8-9 mm and Gerba 4LG 2.5 l/ha when the fruit diameter was 10-15 mm.

Key words*: apple, chemical thinning, growth regulators, fruit, average weight, diameter, production.*

PHOSPHORUS AND IRON CONTENT IN APPLES IN DIFFERENT SALES CHANNELS

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Abstract

Phosphorus and iron are essential elements that are necessary for various functions of plants, but also for humans. The apple, Malus × domestica Borkh., is one of the most consumed fruits in the world, also in Croatia. Since the mentioned elements influence the growth and development of the plant and also have certain health effects on humans, the presence of these elements in apples on the Zagreb market should be investigated. After collecting and sampling the apples, the phosphorus content was determined by spectrophotometry and the iron content by atomic absorption spectrometry. Apples from retail chains statistically have the highest average phosphorus content in dry matter (0.14% P DW), while apples from organic products stores statistically have the highest phosphorus content in fresh weight (27.29 mg P/100 g fresh weight). As for iron, the statistically highest average content in both dry matter and fresh matter was found in apples from retail chains (15.99 mg Fe/kg DM and 0.261 mg Fe/100 g fresh weight). These results could be the consequences of conventional agriculture.

Key words*: fruit quality, Malus × domestica Borkh., market distribution, minerals, nutritional value.*

VEGETATIVE AND REPRODUCTIVE CHARACTERISTICS IN RASPBERRY HYBRIDS

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Abstract

A study of raspberry hybrids obtained by artificial pollination - 18176 (Autumn bliss x Zewa), 161811 (Lulin x Autumn bliss) and those from seeds of open-pollinated plants - 9957 (Magdalena) and 5831 (Meeker) - was conducted in a breeding plantation of the Research Institute of Mountain Stockbreeding and Agriculture, Troyan in the period 2023-2024. The following vegetative and reproductive indicators were monitored: average number, average diameter (mm) and average height (cm) of shoots, average fruit weight (g) and average total yield (g). Hybrids 5831 (18.5 pieces) and 9957 (18.5 pieces) had the highest average number of shoots, and hybrid 161811 (7.19 mm) had the largest average diameter. The highest average plant height was recorded in hybrids 5831 (121.6 cm) and 18176 (83.48 cm). The highest average fruit weight was recorded in hybrids 5831 (2.41 g) and 9957 (2.01 g). The average total yield was highest in 9957 (1 041 g).

Key words: *fruit weight, hybrids, raspberries, vegetative parameters, yield.*

PERSIMMON (*DIOSPYROS KAKI*) FRUIT: QUALITY PHYSICO-CHEMICALS UPON DIFFERENT STAGE OF MATURITY

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Abstract

This study investigates the evolution of two persimmon cultivars, `Fuyu` and `Rojo Brillante`, from harvest maturity to consumption maturity. The main parameters including fruit weight, diameter, length, firmness, total soluble solids, pH, total sugars, polyphenols, tannins, flavonoids, anthocyanins, lycopene and β-carotene were evaluated throughout the ripening process. The results indicate a decrease in fruit mean weight from 177.07 (g) to 147.23 (g) for `Fuyu` cultivar and 223.12 (g) to 181.27 (g) `Rojo Brillante` cultivar as the fruits progressed toward consumption maturity. Similarly, fruit firmness decreased, with mean values dropping from 77.6 N to 39.4 N for `Fuyu` cultivar and from 67.9 N to 32.67 N for `Rojo Brillante`.cultivar. Significant changes were also observed in the chemical analyses, reflecting the biochemical transformations associated with ripening. The total soluble solids increased from 15.7 (ºBrix) to 18.3 (ºBrix) for `Fuyu` cultivar and 18.6 (ºBrix) to 19.5 (ºBrix) `Rojo Brillante` cultivar. These findings provide valuable insights into the post-harvest behavior of these cultivars, offering guidance for optimal harvest timing and storage conditions to maintain fruit quality.

Key words*: persimmon cultivars, fruit, physico-chemicals.*

THE GROWTH SEASON FOLLOWING BBCH SCALE AND THE GDD REQUIREMENT FOR *RUBUS IDAEUS* VAR. PROMYK. DURING THE ADAPTATION PERIOD, PLACED IN THE URBAN GARDEN

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Abstract

*Urban gardening represents high interest within cities due to extended heat waves produced by pronounced climate change. Raspberry has high potential to adapt and develop under urban gardening conditions. The study aimed to assess the adaptation of Rubus idaeus var. Promyk in urban garden from UASVM Cluj-Napoca. The observation on phenotypic features according BBCH (**B**iologische Bundesanstalt, **B**undessortenamt und **CH**emische Industrie) scale was recorded twice a week for the growing season of 2023-2024, together with the range time for each principal growth stage. The corresponding heat units' requirement (GDD-growing degree-days) was computed for each phenophase. Overall, the raspberries presented asynchronous growth and development in the adaptation year. The GDD highlighted differences. Therefore, the plant's development differed at the individual level based on climatic conditions.*

***Key words**: adaptation, development, growing degree-days, phenological assessment, raspberry.*

MORPHOLOGICAL AND BIOCHEMICAL PROPERTIES OF FRESH FRUITS OF THE GERMAN PLUM CULTIVARS, TOP SERIES IN THE CONDITIONS OF THE TROYAN, MOUNTAINOUS REGION (BG)

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Abstract

The cultivars from the Top series of the breeding program Dr. Jacob, Geisenheim, Deutschland are now widespread in almost all European countries. They are of interest for modern, sustainable plum production. The data we present are from the Troyan region, an experimental field of the RIMSA. The plantation was established in 2008, with the varieties Topgigant Plus, Topking, Top 2000, Topfive, Top, Topper, etc. The biometric indicators and biochemical composition of the fruits, as well as the color parameters of the fruit skin and fruit flesh in 2021 and 2024 were studied. It has been established that the mid-ripening varieties Topgigant Plus, Topfive, Tophit have larger fruits (40-50g). Late-ripening varieties are characterized by a very high content of dry matter and total sugars and a low content of organic acids. This makes them extremely suitable for processing, given the small mass of the fruit (Topking, Topper). The color of the fruit skin in all varieties is dark blue, with shades of purple and dark purple. The fruit flesh is yellow, juicy, sweet.

Key words*: plum, cultivars, morphology, biochemical properties.*

THE EFFECT OF ALTERNATIVE TREATMENT METHODS ON THE EVOLUTION OF THE *PHILAENUS SPUMARIUS* POPULATION IN GOOSEBERRY CULTIVATION

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Abstract

Philaenus spumarius is a polyphagous insect that attacks hundreds of plant species. Initially, it was considered harmless to crops. However, it is now classified as a highly harmful insect because it serves as a vector for polyphagous pathogens - such as Xylella fastidiosa and Phytoplasma solani - which have caused significant damage to Vitaceae, Oleaceae, Rutaceae, Rosaceae, and Solanaceae crops across Europe.
The attacking capacity of Philaenus spumarius is influenced by factors such as the tolerance of the plant variety, the phenological phase at the time of the attack, climatic conditions, and the type of treatment applied.
Field studies conducted on the gooseberry varieties Invicta, Captivator, and Hinnonmaki Red revealed that Philaenus spumarius prefers Hinnonmaki Red. Treatments using Mentha pulegium, Urtica dioica, Thymus serpyllum, and Mentha piperita had varying effects on Philaenus spumarius specimens.
The research was carried out under field conditions.

Key words*: goosberry, Philaenus spumarius, polyphagous pathogens, vector insect, treatment.*

ADVANCED CHARACTERIZATION OF PLUM FRUITS (*PRUNUS DOMESTICA* L.) BY FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR) AND SCANNING ELECTRON MICROSCOPY (SEM): IMPACT OF APPLIED TREATMENTS ON QUALITY AT DIFFERENT PHENOLOGICAL STAGES

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Abstract

This study investigated plum fruits (Prunus domestica L.) from an orchard located in north-eastern Romania, using high-precision techniques such as Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). The research aimed to characterize the structural and chemical dynamics of the fruits during three phenological stages: early growth phase (BBCH 71), ripening phase (BBCH 74), and maturity (BBCH 89), in relation to the use of conventional methods and treatments. FTIR analysis allowed the identification of chemical composition variations, particularly in the content of polysaccharides, pectins, and phenolic compounds, illustrating the impact of treatments and growth stage on the biochemical profile. In addition, SEM allowed a detailed observation of fruit microstructure, revealing differences in cell integrity, a factor correlated with mechanical durability and post-harvest keeping capacity. This study's results provide particularly valuable insights into the interactions between the applied treatments and fruit quality, contributing to the development of optimized agricultural strategies for plum cultivation under specific pedoclimatic conditions.

Key words: *Prunus domestica L., biochemical profile, Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM), phenological stages, pedoclimatic conditions.*

PRELIMINARY DATA ON THE ADAPTABILITY OF NATIVE ALMOND VARIETIES IN SOUTH-EASTERN ROMANIA

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Abstract

The almond tree (Prunus Amygdalus) is a species native to the arid and semi-arid regions of Central Asia. Due to its resistance to difficult environmental conditions, the almond tree has become a symbol of prosperity and adaptability in agriculture. The paper presents preliminary data on the adaptability of the native varieties of almond, Mirela and Veronica, in the eco-pedo-climatic conditions of south-eastern Romania, a region exposed to climate change that brings with it agronomic challenges. The experimental batch of almonds was established in December 2022 at the Moara Domnească Experimental Base, Ilfov County. The study focused on the evaluation of tolerance to abiotic stress (high temperatures, rainfall deficit and late frosts), phenological behaviour and soil nutrient dynamics. The results showed a catch rate of 75% for both varieties, suggesting a good ability to adapt to local conditions. Soil analysis showed significant changes in macroelement content, highlighting a complex interaction between plants and substrate. These preliminary observations open new research directions for understanding the adaptation mechanisms of the almond species and for optimizing the management of this crop in regions with similar characteristics

Key words*: almond, adaptability, climate change.*

VARIABILITY OF BIOMETRIC AND BIOCHEMICAL CHARACTERISTICS IN SOME APPLE VARIETIES

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Abstract

Apples, Malus × domestica Borkh., are the third most produced fruit in the world after bananas and watermelons (FAO Statista, 2023) and the most consumed fruit in Romania. The fruit market in Romania is invaded by apple varieties imported from Turkey, Poland, Italy, or Hungary. In recent decades, hybrid varieties obtained in Europe or the United States have also influenced domestic production. For this study, five varieties of apples with different origins were studied, which were purchased from the supermarket (in the year 2024). The varieties studied were Starkrimson, Jonaprince, Jonaprince, Idared, and Golden Delicious. In these varieties, the biometric and biochemical characteristics of the fruits were studied, such as the average weight of the fruit, the height and the diameter (large diameter, small diameter) of the fruits, the fruit firmness, the content in soluble dry matter, the percentage of sugar, the fruit acidity and vitamin C. This research focused on the comparisons and linear relationships between the biometric and biochemical characteristics of the studied varieties, followed by principal component analysis (PCA) and cluster analysis.

Key words*: varieties, apples, biometric characteristics, biochemical characteristics, character variability.*

BLOSSOMING PHENOPHASE AT SOME APRICOT AND PEACH CULTIVARS DEPENDING ON AIR TEMPERATURE IN SOUTH-EASTERN AREA OF ROMANIA

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Abstract

Phenological phenophases (such as blossoming) are highly responsive to air temperature and are influenced by the dormancy period at fruit trees. The paper presents the ten-year results of the effect of air temperature on the flowering of four cultivars of apricot and four cultivars of peaches under the conditions of Valu lui Traian commune, Constanta county, Romania country. It was established that there were notable variations in the start, course, and length of flowering between the years. During the ten-year study period, the beginning of flowering was triggered at the earliest on March 13 in the year 2020 for the apricot (Tudor cultivar) and on March 20 in the year 2020 for the peach (Raluca cultivar). Apricot flowering lasted a maximum of 16 days (year 2019 - Olimp cultivar) and a minimum of 5 days (year 2020 -Tudor cultivar). In the case of peaches, flowering lasted a maximum of 22 days (year 2020 - Raluca cultivar) and a minimum of 6 days (year 2019 - Mimi cultivar). In years with an earlier flowering date, the differences in the start of flowering between of the cultivars were more noticeable.

Key words*: onset and end of blossoming, Prunus armeniaca, Prunus persica.*

THE EFFECT OF SPRAYING WITH GROWTH REGULATOR (ATONIC) AND THE BIOLOGICAL FUNGUS *TRICHODERMA VIRIDE* IN IMPROVING THE PHYSICAL PROPERTIES OF BUCKTHORN FRUITS (*ZIZIPHUS MAURITIANA* L. CV. TUFAHI)

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Abstract

In order to determine the impact of spraying with the growth regulator (Atonik) and the suspension of Trichoderma viride, as well as their interaction against the pathogenic fungus Alternaria spp., which isolated from infected fruits on improving some of the studied characteristics of the fruits of Buckthorn trees (Ziziphus mauritiana L. cv. Tufahi) with 6 years old for the stages of complete growth and final maturity, this study was carried out in one of the orchards north of Nasiriyah city in the Thi Qar governorate during the agricultural season 2022–2023. In the physical qualities that were examined (growth rate, fruit diameter, fresh and dry weight of the fruit, flesh, and seed, as well as the proportion of pulp to seed), the interaction factor with the growth regulator (Atonik) and T. viride performed better effect. The findings demonstrated T. viride`s antagonistic capacity against the pathogenic fungus on PDA medium in a Petri dish.

Key words*: Alternaria spp., Atonik, buckthorn fruits, growth regulator, Trichoderma viride.*

EFFECT OF ULTRA AND DISPER CHLOROPHYLL ON THE CHARACTERISTICS OF *PHOENIX DACTYLIFERA* L.

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Abstract

In order to identify some physical and chemical properties compounds represented by nitrogen, phosphorus, potassium and protein, and to determine the change in growth characteristics of plant diameter, frond length, root size and chlorophyll in Phoenix dactylifera L. , the effect of growth regulators Ultra and Disperchlorophyll was studied. This study was conducted in Iraq in Wasit Governorate, Al-Suwaira for the season 2023-2024. The results of the study showed the superiority of the combination of Ultra and Disperchlorophyll in increasing growth indicators of plant diameter, frond length and root size for all treatments compared to the control group. It also increased the chemical compounds represented by nitrogen, phosphorus, potassium and protein. As for chlorophyll, the treatment with Disperchlorophyll gave the highest percentage compared to the rest of the treatments and the control group.

Key words*: Disperchlorophyll, Phoenix dactylifera L., ultra.*

NITROGEN CONTENT IN APPLE LEAVES UNDER VARIOUS FERTIGATION TREATMENTS IN YOUNG, SEMI-YOUNG AND OLD LEAVES

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Abstract

Nitrogen (N) deficiency in apple (Malus domestica Borkh.) leads to typical physiological changes (discoloration of leaves and fruits). Fertigation can significantly increase apple growth, quality and optimize nutrient uptake. The aim of this study was to evaluate how various fertigation treatments affect the N content in apple leaves. The hydroponic cultivation of apple, variety 'Braeburn' was carried out on low vigorous rootstock (M9) in the substrate perlite. The experiment included four fertigation treatments: 1) Hoagland's solution (HS) full solution-control; 2) HS nitrogen excluded; 3) HS iron excluded; 4) HS magnesium excluded. Plant sampling was carried out in June 2024 on three positions of the shoots, based on the leaves age (young, semi-young and old leaves) followed by chemical analyses. Statistically the lowest leaves N content was detected in the young, semi-young and old leaves (1.69, 1.81 and 1.80% N, respectively) in the treatment without N, while the highest N content was detected in the treatments without iron and magnesium (2.07-2.49% N). The N content in the apple leaves varies depending on the type of fertigation treatment.

***Key words**: fruit, hydroponic system, macroelement, mineral, rootstock.*

THE EFFECT OF EXTRACTION TIME ON TOTAL POLYPHENOLS AND TOTAL FLAVONOIDS CONTENTS IN HAWTHORN FRUITS (*CRATAEGUS MONOGYNA* JACQ. AND *CRATAEGUS PENTAGYNA* WALDST. & KIT.)

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Abstract

This paper aimed to determine the optimal extraction time for the highest total phenols content (TPC) and total flavonoids content (TFC) present in hawthorn fruits (Crataegus fructus). The TPC and TFC were determined after 90 minutes, 120 minutes, 150 minutes and 14 hours of extraction. According to the results obtained, considerable variations in the TPC and TFC of the hawthorn species were observed, in correlation with the genotype and the extraction time. The optimal extraction time was 150 minutes. Therefore, evaluation of hawthorn genetic resources could provide valuable data for screening genotypes with high bioactive content for the production of food supplements and other valuable phytochemical compounds.

Key words*: hawthorn fruits, polyphenols, flavonoids.*

FLORAL BIOLOGY OF SOME AUTOCHTHONOUS SOUR CHERRY GENOTYPES FROM THE GERMPLASM FUND

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Abstract

Knowledge of flower biology has a significant importance, particularly in sour cherry which shows different degrees of incompatibility. The main objective of this paper is to study some aspects regarding floral biology of 42 autochthonous sour cherry genotypes: beginning, ending and intensity of flowering, self-fertility, as well as the viability and germination capacity of pollen. The phenological observations were made noting the date on 1-5% of flowers opened (beginning of flowering) and when 95-100% of flowers fell (end of flowering). The degree of self-fertility was determined by isolating 100 flowers and counting the fruits set. The pollen viability was determined in acetic carmine. The pollen germination capacity was determined in vitro on solid medium (15% sucrose, 1.5 g agars, 0.01 g boric acid in 100 ml distilled water), under laboratory conditions (temperature 18-20ºC and relative humidity of 70-90%). In 2024, the average date of beginning of flowering for the 42 sour cherry genotypes was April 6, varying from April 3 at 'Drobeta', 'Turcești', 'Mari timpurii', 'Mocănești 16', 'Timpurii de Pitești' cvs. and April 9 at the 'Bucovina', 'Crișana 2' and clones, 'Dropia', 'Ilva', 'Nana', 'Stelar', 'Vrâncean', 'Mărculești' and his clones. Average flowering duration was 9 days and average flowering intensity was medium to high (notes 3.5-4). The average value of pollen viability was 78.47%, varying from 91.85% at 'Selecție M' genotype and 37.89% at 'Mari timpurii cl. 11' genotype. The average value of pollen germination was 18.01%, varying from 38.55% at 'Rival' cv. and 4.87% at 'Topologu Tulcea' cv. Regarding self-fertility, the sour cherry genotypes studied were classified into 3 groups: self-fertile (e.g. 'Bucovina', 'Ilva', 'Nana', 'Rival', 'Suraia Vrancea' cvs. - over 10% fruits set); partially self-fertile (e.g. 'Mocănești 16', 'Scuturător', 'Stelar', 'Timpurii de Osoi', 'Brezniţa' cvs. - 5-10% fruits set) and self-sterile (e.g. 'Dropia', 'Țarina', 'Vrâncean', 'Crișana 2', 'Locale de Bistriţa' cvs. – below 5% fruits set). The results regarding floral biology in sour cherry provide information regarding the use of a variety as a pollinator in commercial orchards, as well as a parent in breeding works.

Key words*: phenology, pollen viability, pollen germination, self-fertility, sour cherry.*

REPRODUCTIVE MANIFESTATIONS OF APPLES BY CONVENTIONAL FARMING

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Abstract

There are a number of innovative projects looking for techniques that can improve production while reducing resource input and impact on the environment. A study is made of growth and reproductive manifestations of apples (variety Florina) on the territory of the, Plovdiv region, Bulgaria country. Conventional production is applied in two variants of area - on cultivated area and on grassplot area. The following parameters regarding the growth parameters of Florina apples are monitored: cross-sectional area of the stem, average weight of fruit, number of fruits per tree, productivity coefficient. The different indicators give a different reflection in the two variants of area, but in the same conventional production. The average weight of fruit, number of fruits per tree and the coefficient of productivity give better results on growing apples in a grassplot area. The indicator `cross-sectional area of the stem` presents better values when growing apples on a cultivated area. The results are visualized by presentation in a digital technology, using Geographic Information Systems (GIS), with the aim of faster and rational use by modern farmers.

Key words*: apple reproductive manifestations, conventional production, cultivated area, grassplot area, GIS.*

PRELIMINARY ASSESSMENT OF SOME MORPHOLOGICAL TRAITS OF JUJUBE FRUITS PRODUCED IN SOUTHERN OLTENIA

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Abstract

This work aimed to analyse the main morphological characteristics of jujube fruits (Ziziphus jujuba Mill.) produced in a small orchard in Southern Oltenia, Romania. Ten genotypes were evaluated for fruit key morphological traits (height, diameter, weight, and shape index). Fruit height varied from 22.37 mm (R5) to 41.79 mm ('Lang' cv.), while fruit diameter ranged from 17.77 mm (S1) to 35.74 mm ('Lizao' cv.). Total fruit weight ranged from 4.13 g (Jurilovca) to 22.52 g ('Lizao' cv.), and the shape index varied between 0.96 ('Fengmiguan' cv.) and 1.82 (S1). The analysis revealed a high coefficient of variability in total fruit weight, ranging from 15.73% (Fellini selection) to 35.25% (R5), indicating significant morphological diversity among the genotypes. The observed variability can be attributed mainly to the genetic characteristics of the genotypes, with additional influences from pedoclimatic conditions and applied orchard management practices. These results highlight the morphological diversity of jujube fruits in Southern Romania and underscore the role of genetic and environmental factors in fruit development.

Key words*: jujube, biometric analysis, cultivar, genotype.*

ORGANIC FOLIAR FERTILISERS INFLUENCE ON SOME PEACH VARIETIES

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Abstract

Foliar fertilization is a fundamental instrument in orchard management, having an important role in obtaining good-quality crops and being essential in maintaining fruit yield, as frequent fertilization assures sufficient mineral nutrients for tree growth. Foliar fertilisers have countless benefits for plants, produce a rapid effect in comparison with soil fertilization and are easily assimilated. Foliar fertilisers also increase plant resistance to diseases and pests thus decreasing the environmental impact of chemical fertilisers. The presented data are partial results of the PhD thesis. The experiment was conducted in 2024 at a fruit tree nursery located in Lugoj, Timis County (45°42'22.1"N 21°51'36.1"E). The research focused on analyzing four peach varieties: "Tokinostate", "Eureka," "Desert Gold" and "Elbertina." These varieties were treated with three different organic foliar fertilisers—Albit, Cropmax, and Naturamin Plus - applied during three distinct growth phenophases. The studied varieties were differently influenced by the applied fertilisers. Soluble solid content was improved in most of the varieties when using organic fertilisers.

Key words*: fruit mass, soluble solid content, size index, fruit hardness.*

DAMAGES ON *FRAGARIA ANANASSA* VAR. 'SNOW WHITE' CAUSED BY *ERWINIA AMYLOVORA* AND POTENTIAL OF *CHAENOMELES* EXTRACT FOR DISEASE CONTROL

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Abstract

Plant pathogens present serious challenges before producers. Erwinia amylovora is a polyphagous pathogen that also affects strawberries. However, data on bacterial pathogens on this crop is scarce worldwide and lacks in Bulgaria. The present study aimed to investigate the damages that E. amylovora induces in greenhouse-grown strawberries (Fragaria ananassa) from the variety "Snow white" in Bulgaria, with respect to different irrigation and fertilization levels, and the potential of a plant-derived extract from fruits of Chaenomeles sp. to be used for disease control. The extract has previously shown to have good antibacterial activity and it exhibited no phytotoxicity on the strawberry plants. The results showed raised leaf losses for the inoculated with pathogen vs the non-inoculated plants and vs the inoculated and treated with extract plants. The flower losses due to infection are significant and the inoculated plants lose about 2.3 times more flowers compared to the non-inoculated plants and about 2 times more flowers compared to the inoculated and treated plants, thus revealing a clear tendency towards flower damaging caused by the pathogen and a protective effect of the used extract.

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

TOWARDS *IN VITRO* CONSERVATION OF SEVERAL PLUM CULTIVARS (*PRUNUS DOMESTICA* L.)

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Abstract

Prunus domestica L. is one of the most economically important fruit species in the global plum industry, serving as a key species for both fresh consumption and processed products. In vitro micropropagation is one of the most suitable methods to preserve the valuable cultivars of species. Twentynine plum cultivars certified at Prebasic category were initiated on Woody Plant Medium (WPM) with benzylaminopurine (BAP) or meta-topolin (mT), to assess their effect on initiation rate. Although the average of both variants showed a similar initiation rate, there were significant differences between some cultivars. During the multiplication stage, the explants from 19 plum cultivars were cultivated on two medium (WPM or Murashige & Skoog) with the same hormones, and the multiplication coefficient (number of proliferated shoots) and regeneration efficiency (proportion of explants developing into healthy plants) were assessed. Results revealed that both indicators proved to be highly variable dependending mainly on cultivar and less of the four culture variants.

Key words*: cultivars, cytokinins, initiation rate, multiplication coefficient, plum preservation.*

EVALUATION OF SOME QUALITY PARAMETERS OF 'ENROSADIRA' RASPBERRY VARIETY UPON DIFFERENT GROWING SYSTEMS

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Abstract

The increasing global trend in cultivating berries, particularly raspberries, is driven by their high content of bioactive nutrients. These fruits are not only very attractive for consumers but also offer numerous health and diet benefits. This study focuses on the cultivar 'Enrosadira', a recent Italian variety of raspberry known for its attractive flavor, good yield and high adaptability to different growing conditions. The objective of current research was to asses the influence of cultivation system upon some characteristics of raspberries after first growing season. Yield, fruit weight, total phenolic and flavonoids content, total tannins and antocyanins, total sugar content, soluble solid content (SSC) and carotenoids were evaluated during the trial. The fruit weight varied between 3.17 g to 4.30 g and the total phenolic content differed among growing conditions from 347.83 mg GAE/g FW to 443.76 mg GAE/g FW. The total sugar content ranged from 3.72 g glucose/100 g to 4.04 g glucose/100 g, indicating variability in the sweetness and caloric value of the fruit. The findings from the study enphasized significant variation in the fruits physico-chemical properties on different growing conditions.

Key words*: berries, bioactive nutrients, physicochemical properties, different growing condition.*

MOTHS AND FLIES (INSECTA: LEPIDOPTERA, DIPTERA) ASSOCIATED WITH WALNUT (*JUGLANS REGIA* L.) FRUITS IN BULGARIA

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Abstract

In recent years, the establishment of walnut plantations has gained increasing interest in Bulgaria. This study aimed to assess the distribution and diversity of moths and flies associated with walnut fruits across the country. From May to September 2024, a detection survey was conducted at 32 locations in urban and suburban areas of Bulgaria. Insect species were identified based on adult and larval morphological characteristics. This paper presents findings on the species composition, damage patterns, relative abundance, and distribution of the detected species. The pest status of several phytophagous alien species is analyzed and discussed, including Garella musculana (Erschov, 1874), Rhagoletis completa Cresson, 1929, Pseudaulacaspis pentagona (Targioni Tozzetti, 1886), Saissetia oleae (Olivier, 1791), Metcalfa pruinosa (Say, 1830), Pseudococcus calceolariae (Maskell, 1879), and Halyomorpha halys (Stål, 1855). Additionally, a list of saprophagous insect species encountered during the survey is provided.

Key words*: Insecta, phytophagous, saprophagous, distribution, economic impact.*

THE INFLUENCE OF ORGANIC AND CONVENTIONAL CULTIVATION SYSTEMS ON SOME QUALITY AND PRODUCTIVITY INDICES OF THREE PEACH VARIETIES GROWING IN SOUTHEASTERN ROMANIA

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Abstract

The peach (Prunus persica L.), native to China, is a fruit tree of global importance, appreciated for its nutritional and sensory qualities. This study analyzes the influence of organic and conventional cultivation technology on some fruit quality indices (firmness, sugar content, acidity, pH) and productivity of three peach varieties - 'Catherine Sel1', 'Springcrest' and 'Raluca' - grown in south-eastern Romania. The results showed that the conventional system significantly influenced the fruit weight, 61.64 g compared to 37.36 g in the organic system, and consequently the productivity was higher in the 'Catherine Sel1' variety. The fruit firmness was similar for both systems, while the sugar content was higher in fruit from conventional culture (17.3 °BRIX compared to 15 °BRIX). The pH values were comparable, with the 'Raluca' variety recording the highest pH (3.76) and the citric acid content showed minor differences between the systems (0.97% vs. 0.91%), with the 'Springcrest' variety reaching the highest value of 1.78%.

Key words*: organic system, conventional system, quality indices, peach, productivity.*

THE EFFECT OF PHOTOVOLTAIC SYSTEMS ON BERRIES PRODUCTION. A REVIEW

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Abstract

Presently, there is a growing interest in berry production, particularly in developing innovative and resilient agricultural practices that align with consumer expectations for superior flavors and nutritional value. The yielding and quality of berries fruits are influenced by various abiotic and biotic stress factors, and closely monitoring of these can lead to significant improvements regarding production and fruit quality. Photovoltaic systems provide an innovative approach to improving the use of natural and anthropic resources, reducing the negative impacts of climate change, and enhancing environmental protection. In recent years, various studies have recognized the important benefits of photovoltaic systems in fruit production such as – reducing energy costs, decreasing carbon emissions at the farm level, preserving water resources, offer shelter for beneficial organisms, and improve fruit quality in terms of appearance and nutritional matter. This study aims to provide an extensive review of the current knowledge on the opportunities and advantages of photovoltaic systems for berry crops, with a particular focus on red currants. It explores their role in optimizing growth and fruiting, enhancing resource efficiency, and reducing abiotic stress – such as sunburn for example.

Key words*: abiotic stress factors, innovative cropping systems, red currant, resilient agriculture, sustainable farming.*

PROXIMATE COMPOSITION AS A FORM OF NUTRITIONAL QUALITY ASSESSMENT OF BANANA PEEL

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Abstract

Banana peel, obtained as by-product of banana processing, contains sufficient amounts of nutritive and phytochemical constituents that have positive effects in human nutrition. Previous studies have shown that banana peels are rich in nutritional and bioactive compounds, which provides a number of benefits, that include antibacterial, antihypertensive, antidiabetic and anti-inflammatory properties. Proximate analysis provides valuable information about the nutritional composition of banana peels and helps to evaluate the sample quality. This work aims to determine the proximate composition of banana peels, with a view to their valorization for the development of value-added food products. The obtained results show that the nutritional parameters of banana peel provide values that vary depending on the origin of the fruit from which they were obtained: 5.21-8.21% moisture, 12.86-8.17% ash, 5.28-7.84% protein, 3.14-4.11% fat, 10.23-14.65% fiber, and 57.93- 62.72% carbohydrate. These values show that the analyzed banana peels have considerable nutritional value and could be effectively integrated into a diverse range of value-added food products

Key words*: banana peel, by-products, nutritional constituents, proximate composition.*

EFFECTS OF SALICYLIC ACID (SA) AND MICROELEMENT SUBSTITUTION ON CELLULAR SENESCENCE AND MORPHOGENESIS IN *LONICERA CAERULEA*

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Abstract

Premature cellular senescence and degeneration represent critical challenges in the in vitro propagation of some Lonicera caerulea cultivars. This study explores the potential of 2-hydroxybenzoic acid (salicylic acid - SA) and modified microelement compositions (DKW vs. MS medium) to enhance tissue vitality and delay cellular aging in two cultivars, Lonicera caerulea sin. "Kamtchatica" and Lonicera caerulea "Leningradzkij Velikan". SA`s antioxidant properties and its role in delaying senescence through oxidative stress reduction and hormonal modulation were combined with the use of DKW microelements, known for their higher micronutrient content, to assess their combined effects on shoot proliferation and morphogenesis. The experimental design evaluates whether these modifications can reduce stress-induced degradation and improve the efficiency of micropropagation protocols of two important edible berries, cold hardiness, and early ripening cultivars.

Key words*: 2-hydroxybenzoic acid, premature senescence, oxidative stress, honeyberry micropropagation.*

PLANT MATERIAL IN SOME STONE FRUIT SPECIES ROOTSTOCKS

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Abstract

This paper present results regarding the sterilization effectiveness of plant material applied to peach and plum rootstocks explants necessary for the initiation of the in vitro culture. For peach and plum rootstocks tissue culture initiation, two pre-sterilization agents (sanitary alcohol and ethanol) and two sterilization agents (sodium hypochlorite and calcium hypochlorite) where tested in 16 different variants. The Mirobolan dwarf explants were cultured in Murashige and Skoog, 1962 basal medium and the Adaptabil explants were cultured in Querin and Lepoivre, 1977 basal macronutrients and micronutrients and Linsmaier and Skoog, 1965 vitamins. The growth chamber for the in vitro culture had 22±2˚C temperature, with a photoperiod of 16h day light and 8h dark. For Mirobolan dwarf rootstock a good survival rate of explants was obtained both in sterilization variant 15 (56.67%) and in sterilization variant 16 (63.33%).With the Adaptabil rootstock, good sterilization results were also obtained in variant 16 (70%). A good percentage of survival with a lower contamination rate was obtained also in variant 1 (69.67%). Both for Mirobolan dwarf and for Adaptabil rootstocks, the sterilizing agents from variant 16 can be used to sterilize the plant material.

Key words*: rootstock, in vitro culture, sterilization, explants, sodium hypochlorite, calcium hypochlorite.*

GRAFTING EFFICIENCY OF APPLE TREES IN THE NURSERY BY APPLYING DIFFERENT TECHNOLOGY ELEMENTS

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Abstract

Considering the close relationship between soil, water and the plant, the current research aims to establish the influence of irrigation, fertilization, and cultivar on some morphological characters of the apple trees in the nursery. The nursery research sector in our country has demonstrated the necessity of specialization and modernization of this field, due to the growing demand for high-quality certified planting materials. The main aim is to increase continuously the quality and quantity of valuable planting material and guaranteed in terms of authenticity, health, and suitability for the new orchard systems with large plots per hectare and high potential. The research was carried out in the climate conditions of the northwestern Romania and the studied apple cultivars were Florina and Idared, organized on five repetitions, with irrigation as the primary factor, cultivar as the secondary factor and fertilization as the tertiary factor. Following the research, it is found that both the irrigation and the application of different doses of NPK have allowed a significant increase in the survival rate of grafting trees of the two apple cultivars.

Key words*: apple cultivar, fertilization, grafting, irrigation, nursery.*

PLANT PROTECTION EFFECT OF FLOWER CROPS IN ORGANIC ORCHARDS

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Abstract

This article aims at presenting specific solutions that can be applied when growing plants in the family Rosaceae (apple, pear, apricot, plum, etc.), as it points out preventive measures that limit the development of pest insects in organic orchards. By taking into consideration the possibility of flower species (annual or perennial) in different families to be attractants/repellents for pests allows to form provocative belts, buffer strips, mechanical barriers, floral tufts, which supports the biological balance of agroecosystems. Furthermore, the article points out the plant protection effect of crops in different families, which may be used by farmers in organic farms for fight against C. pomonella, G. molesta, D. plantaginea, D. pyri, Anthonomus pomorum, H.testudinea, Aphis spp., etc.

Key words*: agroecosystems, buffer strips, organic orchards, provocative belts, Rosaceae.*

UGA BLUEBERRY BREEDING PROGRAM UPDATE

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Abstract

The public blueberry program in the University of Georgia has eighty years of history started by Dr. Tom Brightwell in 1944. The breeding program focused on breeding rabbiteye blueberries initially and expanded to southern highbush breeding in the 1990's. Rabbiteye is endogenous to southeast US and adapted to the soil types in Georgia, however, the fruit size and quality requires improvement. Southern highbush has high fruit quality and early maturing time window yet this species requires intense soil amendment and has short orchard life due to disease susceptibility and lack of soil and weather adaptation. Continued effort in blueberry breeding contributed to the blueberry acreage expansion in Georgia. Major cultivar improvement through the breeding program includes plant vigor, local soil and weather adaptability, fruit quality, fruit flavor, fruit storage and shipping quality. The breeding program released sixteen rabbiteye and thirty-five southern highbush varieties including popular rabbiteye varieties 'Brightwell,' 'Climax,' and 'Krewer' and popular southern highbush varieties 'Rebel,' 'Suziblue,' and 'Georgia Dawn.' The current breeding goal is to develop both rabbiteye and southern highbush blueberries adapted to the southeastern U.S. growing environment through wide hybridization, tissue culture and utilization of genomic and genetic tools. Interspecific hybridization resulted in the creation of triploid hybrids and pentaploid populations. Genome sequencing of both rabbiteye and southern highbush in our breeding program provides useful reference genomes for marker development. In addition, success in establishing tissue culture and polyploid induction protocols allows us to effectively expand the gene pool of existing blueberries and hasten the development of blueberries better adapted to Georgia growing environment.

Key words*: blueberry, interspecific hybridization, tissue culture.*

VITICULTURE AND OENOLOGY

STUDIES ON THE EVALUATION OF THE PHENOLIC POTENTIAL OF GRAPE POMACE FOR RED WINES

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Abstract

The valorisation of phenolic compounds from grape pomace continues to remain a challenge, but also an opportunity to promote sustainable practices in wine industry. The objective of this study was to evaluate the phenolic potential of the red wine fermented-pomace obtained during 2023 harvest from the Feteasca Neagră and Cabernet Sauvignon varieties from three renowned Romanian vineyards: Murfatlar, Dealu Mare and Iaşi. The extraction method used was the classical solid-liquid method, that is the maceration of the pomace at ambient temperature for 24 hours, with discontinuous stirring. As extraction solutions there were used mixtures of ethyl alcohol and water in different concentrations: 25%, 50%, and 75% v./v. The polyphenolic content of the resulting extracts was evaluated by UV-VIS spectrophotometric determinations: total polyphenols (g GAE/L), anthocyanins content (mg/100 g grape pomace, colour intensity and antioxidant activity (DPPH%). A series of phenolic indices, such as the total polyphenol index and the Folin-Ciocalteu index, were also calculated. The obtained results highlighted that many factors influence the extraction process. The highest values for extracted polyphenols were recorded for the 50% hydroalcoholic solution, but also significant differences were induced by the grape variety and the viticultural terroir. The values obtained for the total phenolic compounds content fluctuated in the range of 7.1-31.9 g GAE/L and between 253-798 mg/100 g in the case of anthocyanin pigments. All phenolic extracts presented high antioxidant activity, confirming that they can be used as cheap and easily available sources of bioactive compounds for the pharmaceutical, cosmetic and food industries.

Key words*: grape pomace, hydroalcoholic extract, total phenolic compounds, antioxidant activity, anthocyanins.*

CURRENT STATUS OF GRAPEVINE *FLAVESCENCE DORÉE* AND *BOIS NOIR* IN BULGARIA (2022-2024)

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Abstract

The present article examines the monitoring of phytoplasma diseases in grapevines during the period 2022-2024, with a special focus on the distribution, symptoms, diagnosis, and control methods of these diseases. Phytoplasma diseases, such as Flavescence dorée and Bois noir, pose a serious risk to viticulture due to the significant economic losses they cause. Molecular methods were used in the study to detect phytoplasmas. A total number of samples was more than 660 were analyzed, of which around 6 indicated a positive result for the phytoplasma disease Bois noir. And for the time being, the phytoplasma disease Flavescence dorée is not present in Bulgaria. Regardless of the status of the two phytoplasmas, from quarantine to non-quarantine controlled, according to phytosanitary legislation, the risk of their spread poses a significant threat to viticulture in Bulgaria. The obtained results highlight the need for integrated control strategies, including early diagnosis, vector control, and the use of resistant grapevine varieties, to prevent the introduction of this phytoplasma disease.

Key words*: Phytoplasma diseases, Flavescence dorée, Bois noir, Bulgaria.*

INVESTIGATING THE IMPACT OF CLUSTER LOAD ON THE CHARACTERISTICS OF TWO WHITE WINE GRAPE VARIETIES (`*KIRÁLYLEÁNYKA`/`FETEASCĂ REGALĂ`* AND `*KERNER*`)

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Abstract

Globally, grapes are cultivated across 8.5 million hectares of land, with 60% of these grapes originating from Europe, where France, Italy, and Spain are the leading producers of both grapes and wine. The Carpathian Basin has a rich viticulture history that spans 2,000 years. This experiment aims to explore the effects of different cluster loadings (30% and 50%) on both the quantity and quality of yields from two grape varieties, `Kerner` and `Fetească regală` (`Királyleánka`). The study was conducted in Mica village, Mureș County. Results indicated that the control group yielded the highest quantities for both grape varieties. The 30% cluster load resulted in the highest sugar content and the lowest acid content, while the values at the 50% load were comparable. For producing high-quality wine, the 50% load was found to be the most effective, whereas the 30% load was more favorable in terms of the quantity of grape berries produced for both varieties.

Key words*: cluster load, grape berries, viticulture, wine.*

AGROBIOLOGICAL CHARACTERISTICS OF SOME AUTOCHTHONOUS TABLE GRAPE VARIETIES UNDER THERMOHYDRIC STRESS IN SOUTHERN ROMANIA

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Abstract

In this study, we followed the physiological characteristics of three local table grape varieties, under conditions of thermal and hydric stress, which have an essential role in their transpiration and implicitly drought resistance. The varieties 'Augusta', 'Victoria' and 'Xenia' were studied, in the phenophases of flowering, berry growth, veraison and ripening. The content of chlorophyll and carotenoid pigments was generally sub-unitary, compared to the values reported for grapevines (1.05-1.58 mg 100 g^{-1} FW). Regarding the number of stomata, the most were determined in the 'Augusta' variety (123 stomata/mm^2), followed by 'Xenia' (98 stomata/mm^2) and 'Victoria' (88 stomata/mm^2). The photosynthesis rate recorded maximum values in the flowering phenophase in the 'Augusta' (16.14 µmols CO_2 $m^{-2}s^{-1}$) and 'Xenia' varieties (12.37 µmols CO_2 $m^{-2}s^{-1}$), possibly also due to a high requirement for photoassimilates. In the 'Victoria' variety, the highest value was reached at veraison (11.19 µmols CO_2 $m^{-2}s^{-1}$). As a result, the recorded productions were diminished, without affecting the quality of the grapes.

Key words*: table grape varieties, physiology, thermohydric stress.*

CONSUMER PREFERENCES IN LOW-SULPHUR WINE QUALITY

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Abstract

This paper investigates the impact of different reduced concentrations of sulfur dioxide (SO_2) and dimethyl dicarbonate on the sensory profile and consumer preferences of white wines obtained from a blend of Muscat Ottonel and Fetească regală grape varieties. The resulting wines were treated with three doses of SO_2 (40 mg/L, 80 mg/L and 160 mg/L) and two doses of dimethyl dicarbonate (100 mg/L and 200 mg/L) to evaluate the effects of the treatments on the sensory profile of the experimental wines. Results show that low concentrations of SO_2 (40 mg/L) allow the perception of natural and authentic flavors, such as `vegetal`, preferred for their subtle profile. At 80 mg/L SO_2, fruity and fresh flavors (e.g. `green apple`, `peach`) are highlighted, suggesting a balance between complexity and intensity, while at 160 mg/L SO_2, intense and complex flavors (e.g. `mango, tropical fruits), most appreciated by consumers, being balanced in taste. The study concludes that both sulfur dioxide and dimethyl dicarbonate treatments contribute to maintaining or even highlighting the aroma profile of wines, allowing them to be adapted to consumer preferences.

Key words*: stabilization treatments, sensory profile, white wine, acceptability, consumers.*

SECONDARY METABOLITES ACCUMULATION IN LONG-TERM CALLUS CULTURES OF *VITIS VINIFERA* CV. 'NEGRU VÂRTOS' UNDER DIFFERENT STRESS CONDITIONS

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Abstract

Negru Vârtos is a variety of Vitis vinifera cultivated since the Dacian period. It is one of the most appreciated varieties in Romania, giving it a balanced and intensely colored wine. Our research aimed to increase the production of secondary metabolites in a long-term V. vinifera cv Negru Vârtos callus culture obtained many years ago. Seven different abiotic factors represented by different media composition, salt addition, and UV or low-temperature exposure were tested to achieve this goal. The phenolic, flavonoid, anthocyanidin, and proanthocyanidin content was determined. Also, antioxidant activity was estimated by the α-diphenyl-α-picrylhydrazyl free radical-scavenging method (DPPH). Although all the tested variants showed better results concerning the callus morphometrical parameters as callus survival percentage, callus growth index, or callus moisture, only the variants treated with a low temperature of 4ºC for 24 h revealed an increase of flavonoids, proanthocyanidins, and anthocyanidins content. Also, the production of anthocyanin was slightly stimulated in the R2 variant.

Key words*: abiotic stress, long-term callus, metabolites with biological activity, phenolic content, Vitis.*

COMPARISON OF THE PHENOLIC COMPOSITION OF MAMAIA, BĂBEASCĂ NEAGRĂ AND PINOT NOIR BLACK GRAPES IN THE MURFATLAR WINE CENTER

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Abstract

Grape polyphenols are essential components that determine the quality and benefits of derived products, contribute to organoleptic characteristics (color, aroma, taste) and have remarkable antioxidant properties. The research aimed to compare black grape varieties from Murfatlar wine center to assess if their winemaking pomace is a good polyphenols source for food fortification. The varieties Mamaia, Băbeasca Neagră and Pinot Noir were especially selected, as they are not intensely coloured varieties and are usually not valorized for polyphenol extraction. During 2024 the grape ripening process was monitored and the must and the fresh, unfermented, pomace were analysed using the ITV method. The following parameters were determined: total polyphenol content, extractable anthocyanin concentration, total anthocyanin potential, total polyphenol index and antioxidant activity. The results indicated that Pinot Noir exhibited the highest values, with total polyphenols of 1022.3 mg GAE/L, 385.4 mg/L anthocyanins, and 36.2% antioxidant activity, followed by Băbeasca Neagră and Mamaia. These findings highlight the remarkable potential of Pinot Noir for pomace utilization, while also demonstrating the usability of the other varieties in enhancing the valorization of winemaking by-products.

Key words*: grape pomace, antioxidant activity, fortified foods, anthocyanins.*

CONSUMER ACCEPTANCE OF SWEET WINES PRODUCED BY STOPPING FERMENTATION WITH OCTANOIC AND DECANOIC ACIDS

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Abstract

The use of MCFA for arresting the fermentation and producing sweet wines was investigated at industrial level. Doses of 10 mg/l of octanoic or decanoic acid and a combination of 5+5 mg/l octanoic and decanoic acid were used to produce sweet wines of Tamaioasa romanească variety in volumes of 3000 l. As using these acids also leads to some concentrations of their corresponding ethyl-esters, with potential impact on the aromatic profile, it is important to have the wines evaluated by consumers. The resulted wines were evaluated by novice consumers, as well as by professional tasters. Consumers appreciated equally the wines treated with 10 mg/l decanoic acid and the control wines, while professionals assigned significantly higher scores for wines treated with 10 mg/l of either octanoic or decanoic acid, compared to controls. The samples treated with the combined dose of 5+5 mg/l octanoic and decanoic acid were not preferred by either consumers or professional tasters. Thus, the variant with decanoic acid appears to be the one most preferred by both consumers and professionals.

Key words*: MCFA sweet wines, sensorial analysis, alcoholic fermentation cessation, wine octanoic acid, wine decanoic acid.*

ELICITORS IN VITICULTURE AND THEIR EFFECT IN WINEMAKING: A SUSTAINABLE APPROACH TO CLIMATE RESILIENCE

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Abstract

Climate change exerts an increasingly pronounced impact on the viticultural sector, requiring sustainable solutions for adaptation and maintaining production quality. The use of elicitors, natural or synthetic compounds that stimulate the grapevine`s defense mechanisms, represents an innovative approach to reducing pesticide dependency and optimizing the biochemical and organoleptic properties of grapes and wines. Elicitors such as chitosan and salicylic acid significantly enhance the grapevine`s resistance to pathogens, including to Plasmopara viticola and Botrytis cinerea, while promoting the accumulation of secondary metabolites with enological value, such as polyphenols. Their use in vine growin can influence fermentation during winemaking or can lead to more stable wines or with enhanced aromatic profile. This review synthesizes recent advancements in the use of elicitors, highlighting their mechanisms of action, practical applications, and impact on wine quality, while exploring opportunities for their integration into climate-smart agricultural systems to enhance the resilience and sustainability of viticulture and winemaking.

Key words: *chitosan, climate-smart viticulture, polyphenols, sustainability, grape oenology.*

ORGANIC VITICULTURE – CURRENT STATE AND TRENDS

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Abstract

Organic viticulture represents a growing sector in the wine industry, characterized by the use of sustainable agricultural practices respectful to the environment for grape and wine production. In recent decades, interest in organic viticulture has significantly increased, considering concerns about the negative impact of conventional agricultural practices on the environment and human health. In the context of a significant increase in demand for organic products, the organic wine industry faces challenges such as climate change, certification and regulation, competition and prices, as well as natural resource management. By assessing the evolution of organic viticulture and identifying key factors influencing it, the paper highlights both the advantages and difficulties encountered by organic wine producers. Through the adoption of strategies such as Organic 3.0, organic viticulture can significantly contribute to promoting a more sustainable and efficient organic agriculture, thus supporting environmental protection and rural community development.

Key words*: sustainable agriculture, organic vineyards, principles, trends, challenges.*

RESEARCH ON THE REACTION OF THE CABERNET SAUVIGNON GRAPEVINE VARIETY TO THE VARIABILITY OF CLIMATIC CONDITIONS

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Abstract

Climate change are indisputable, and projections predict an intensification of the effects felt. Viticultural technologies must adapt quickly to ensure the unaltered quality of viticultural production. As a result, studies on the effect of climate change on the intensity of physiological and biochemical processes in the plant, on the quantity and quality of production have represented a priority for many research teams. The present study, carried out at the "Banu Mărăcine" Didactic Station of the University of Craiova, in a wine-growing area located in southern Romania, characterized in recent years by a high incidence of warm temperatures and unevenly distributed precipitation during the growing season, falls within this context. The research highlighted the reaction of the Cabernet Sauvignon variety in 2 years with different climatic profiles that influenced the rate of photosynthesis and transpiration, modified the length of the growing season and the dynamics of the accumulation of synthesized substances, and determined the quality and quantity of production. The results obtained can constitute reference points for establishing technological measures in the case of vineyard plantations affected by climate change.

Key words*: grapevine, climate changes, physiological and biochemical processes, quantity and quality of production.*

EVALUATION OF SOME WHITE WINES' DYNAMIC VISCOSITY AND CORRELATION WITH OTHER PHYSICAL PARAMETERS

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Abstract

The study sought to evaluate the dynamic viscosity of Chardonnay and Sauvignon Blanc dry and semi dry wines and to correlate it with other physical parameters. The samples originated from vineyards situated in different geographical regions of Romania (Banat, Transylvania, Oltenia, Muntenia, Moldavia and Dobrudja). A supplementary sample was introduced, a blending variety originating from the Cotesti vineyard (Moldavia region). Based on previous studies in the literature, the wine samples were considered to possess Newtonian fluid characteristics. Therefore, the wines' dynamic viscosity was computed using a mathematical formula, using an indirect method. The dynamic viscosity of the dry Chardonnay wine at 20ºC ranged between 1.5446 mPa·s (ISSA-Transylvania Hills) and 1.6602 mPa·s (Tarnave Jidvei region-Transylvania), while the one of the semi dry Chardonnay variated from 1.6756 mPa·s (Tarnave Jidvei region-Transylvania) to 1.5344 mPa·s (Ovidiu-Dobrudja). The blending variety's dynamic viscosity had a mean value of 1.5627 mPa·s. The pH of the samples from the two varieties ranged between 2.97 (Dobrudja) and 3.46 (Banat), while for the blending variety we obtained the lowest value, with the exception of the dry Chardonnay originating in Dobrudja.

Key words*: ˚Brix, colour, pH, viscosity, white wine.*

THE INFLUENCE OF CLIMATE VARIABILITY ON GRAPE RIPENING AND QUALITY IN A VINEYARD LOCATED IN MINIS-MĂDERAT AREA

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Abstract

Climate variability has necessitated adjustments in varietal selection and growing practices for many wine grape varieties. Simultaneously, rising temperatures and increased solar insolation have led to the accumulation of higher sugar levels in grapes, with important implications for the winemaking process. This study, conducted in a vineyard from Miniș-Măderat area, examined the influence of climate variability on the ripening time and berry sugars accumulation of several wine grape varieties. Climate data from recent years were compared to those from 2001, chosen as a benchmark year. Climate resources were analyzed based on the vine's requirements, with key climate indices calculated. Additionally, the evolution of grape ripening and the optimal harvest time were monitored, and differences were compared with the reference year. The results revealed that the majority of varieties ripened 20–30 days earlier, depending on the year and variety. A significant increase in must sugar content was also observed. These findings highlight the need for adaptive strategies in viticulture to address the challenges posed by climate variability.

Key words: *climate indices, grape, quality, ripening.*

INFLUENCE OF TREATMENT WITH BIOSTIMULANTS ON THE CHEMICAL COMPOSITION OF GRAPES AND WINE IN CONDITIONS OF CENTRAL SOUTH BULGARIA

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Abstract

During the period 2022–2023, the impact of biostimulants from Agrological Dynamics Proserpina (USB 20.20 at 2.5 l/ha, Resource Intense at 2.5 l/ha, and Sileko at 0.5 l/ha) was studied on the chemical composition of grapes and wine from the red wine variety `Kaylashki Rubin` in the region of Central South Bulgaria.The key findings are positive effects on quality indicators of grapes and wine- the application of these biostimulants improved technological parameters such as sugar accumulation and acid balance in grapes. The use of biostimulants positively influenced phenolic compounds and flavor components in the wine, contributing to higher product quality. The study confirmed the effectiveness of biostimulants in achieving improved results in grape and wine production, ensuring better quality of the final products.

Key words*: grape, wine, biostimulants, chemical composition, quality.*

TECHNOLOGICAL CHARACTERISTIC OF CABERNET SAUVIGNON WINES PRODUCED IN AN INTEGRATED SYSTEM

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Abstract

The effects of Integrated Production were studied on the Cabernet Sauvignon variety and five modules (MED) in which different techniques were applied. The total supply of N, P, and K is optimal for MED 1 "Soil Maintenance and Fertilization" and MED 4 "Integrated Production." The fertility of the winter buds increased by a higher percentage than in MED 4; in MED 2 "Vegetation Structure," the crop potential was carefully adjusted according to the variety's potential and the canopy's aeration. The treatment application schedule, based on the vine development stages and infection intensity, yielded the best results. Relevant for grape quality is the reduction of grey rot attack from 47% in MED 5 to 4.3% in MED 4, with the results at veraison also observed at harvest. The higher alcohol content of the wines produced in MED 3 "Phytosanitary Protection" and MED 4, correlated with the higher extract levels in MED 2 and MED 4, highlights the influence of vegetation structure.

Key words*: systemic concept, integrated production, production system, maturation stage, conventional system.*

OPTIMIZING PRODUCTIVITY AND FRUIT QUALITY OF 'MUSCAT HAMBURG' CULTIVAR THROUGH PRUNING INTENSITY

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Abstract

Pruning is a key practice in viticulture, influencing grapevine productivity, fruit quality, and plant health. As the climate evolves, adapting pruning strategies to optimize grape yield and quality becomes increasingly vital. This study was conducted in the grapevine fields of the Research Station for Viticulture and Oenology Murfatlar, Romania, on 'Muscat Hamburg', a table grape cultivar. Three pruning variants were evaluated over a 3-year span (2022-2024): V1 (24 buds), V2 (32 buds), and a control (38 buds). The impact of these variants was assessed on parameters such as total shoots, fertile shoots, fertility percentage, cluster weight, weight of 100 berries, sugars, total acidity and pH. Climate data were analyzed and statistical analysis was performed to compare the variants. Results show that V1 outperformed V2 and the control in fertility percentage (72.9%), cluster weight (195g), and weight of 100 berries (256g). Additionally, the glucoacidimetric ratio was highest in V1 (70.1) compared to V2 and the control. and pH values (3.50) were similar across all variants. These findings indicate that pruning with 26 buds optimizes grapevine productivity and fruit quality.

Key words*: pruning, climate change, grapevine productivity, cluster weight, optimisation.*

ASSESSMENT OF GENETIC DIVERSITY OF GRAPEVINE GENOTYPES USING SIMPLE SEQUENCE REPEATS (SSR) MARKERS AND SSR-BASED DNA BARCODE DESIGN

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Abstract

Romania has a valuable wine heritage, and the genetic evaluation of grapevine genotypes from Vitis germplasm collections is a national priority. Thus, this study aimed to characterize 22 Romanian grapevine genotypes and five international reference varieties using nine SSR (Simple Sequence Repeats) loci. VVMD32 was the most informative (He =0.837; PI = 0.040) SSR marker with 11 alleles generated. Conversely, the VvZag62 locus generated the lowest number of alleles (6) with values recorded for He =0.744 and PI = 0.109. The genetic SSR profiles were used to construct a barcode design to compare the number and size of alleles among the screened grapevine samples. The results of this study show that SSR genotyping supplemented with a useful data grouping mode is effective for genetic diversity analysis of Vitis germplasm resources.

Key words*: Vitis vinifera L., OIV microsatellites, DNA polymorphism, genetic resources.*

TECHNOLOGICAL SOLUTIONS TO REDUCE THE DISTURBING EFFECT OF CLIMATE CHANGE IN THE DEALU MARE VINEYARD

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Abstract

The researches were carried out in the Valea Calugareasca viticultural center in a vineyard with the Cabernet Sauvignon variety. The experimental device included as an experimental factor the soil maintenance system (black field, permanent grass with herbs from spontaneous flora, lawn, phacelia, white clover and vetch). The viticultural climate, characterized by a high heliothermic regime, against the background of reduced water resources and the technological variants experienced had a differentiated impact on the quantity and quality of grape production. The soil maintenance variants with Phacelia and vetch ensured significant differences in production, +1.052 kg/vine and +0.924 kg/vine, respectively. The deviation from the optimal content of the sugar of 12.0-12.8% was registered in the case of the soil maintenance variant with Phacelia, vetch and white clover. The leaf area required to produce one gram of grape in the conditions of maximum sugar accumulations was between 11.05 cm^2/g grape (the soil maintenance system variant by phacelia) and 9.92 cm^2/g grape (the soil maintenance system variant as black field).

Key words*: climatic change; grapevine; phacelia; white clover; grape production.*

THE INFLUENCE OF THE ROOTSTOCK PARTNER FROM THE GRAFTING COMBINATION ON THE QUANTITY AND QUALITY OF GRAPE PRODUCTION OF THE FETEASCĂ NEAGRĂ VARIETY IN THE DEALU MARE VINEYARD

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Abstract

The rootstock exerts an important influence on the quality of the grapes, affecting the level of production through the vigor given to the vinifera variety. The research was carried out between 2020 and 2024, in a plantation with the Fetească neagră variety grafted on rootstocks: 125AA, 2C, RG, 71C, SO4-4, 5BB, 140 Ru, 57D, 26C. Compared to the average (2020-2023), grape production in 2024 decreased by +1.117 kg/vine in the case of SO4-4 rootstock and by 0.464 kg/vine in the RG rootstock. The multiple comparison between rootstocks indicates that the 57D, 71C and 2C rootstocks achieved statistically assured positive production differences compared to the 125AA, 26C and RG rootstocks. Due to the accentuated hydric deficit and a high heliothermic regime characteristic of 2024, the concentration of the sugars varied between 262.9 g/l tartric acid at rootstock 57 D and 241.7 in the case of rootstocks 2C, RG, 26 C and SO4-4, to the detriment of the total acidity with variations between 3.9 g/l tartaric acid (57 D) and 5.7 g/l tartaric acid (125 AA and 2 C).

Key words*: extractible anthocyanins; grafting; polyphenols; rootstocks; total anthocyanins.*

INVESTIGATION OF THE NDVI CORRELATION IN A *VITIS VINIFERA* CV. MERLOT VINEYARD GROWN WITH DIFFERENT NUTRIENT REGIMES UNDER NON-IRRIGATED CONDITIONS

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Abstract

The production of high-quality wine grapes represents a significant challenge for winemakers, both in the short term and on an annual basis. In the context of modern viticulture, the means to achieve this goal include the application of vegetation indices derived from remote sensing. The objective of this study was to establish a correlation between NDVI and the growth stages of Vitis vinifera cv Merlot vines grown in the village of Brestnik. The study period was the 2023-2024 growing season.
The NDVI values were calculated from time series of Sentinel-2 images for the main phenological stages. The results indicated the vegetative and reproductive potential of the vines and relation with NDVI. The resulting mathematical model and correlations can be used as predictive models.

Key words*: NDVI, grapevine, remote sensing, vineyards, vegetation indices.*

APPLICATION OF CANOPY MANAGEMENT ON THE QUALITY OF REPRODUCTIVE ORGANS IN PINOT NOIR CLONE 777 GROWED UNDER NON-IRRIGATION CONDITIONS IN SLIVEN REGION, BULGARIA

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Abstract

The influence of canopy management on the quality of the reproductive organs of the Pinot Noir clone 777 was studied during the period 2022-2023. The vineyard was established in 2008 in the land of the village of Nikolaevo, Sliven district, Bulgaria. The vines are formed on a bi-lateral cordon training with 6 spurs, at planting distances of 2.4 x 0.9 m and non-irrigated conditions. The yield rationing in the fruit set stage in variant V2 at a shoot length of 20 cm led the formation of a larger individual mass of the bunch from 106.5 g in V2 to 88.0 g in V1. The bunches from the rationing variants during the second and fourth phases of the growing season have a strong influence on the length and width of the bunch. The percentage of bunches varies from 2.40% in V1 to 3.60% in the control Vo, and in V2 it is 2.96%. The results obtained show that we have differences in the change in the mechanical composition of the grapes under the influence of the applied vine loading scheme.

Key words*: yield, thinning, rationing, canopy management.*

INVESTIGATION OF THE PHENOLOGICAL PHASES OF THE PINOT NOIR CLONE 777 UNDER THE INFLUENCE OF CLIMATE CHANGE IN THE SOUTHERN VINE-GROWING REGION IN BULGARIA

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Abstract

The impact of climate change on the phenological phases of the Pinot Noir variety clone 777 was studied during the period 2022-2023. The plantation was established in 2008 in the land of the village of Nikolaevo, Sliven district, in the southern wine-growing region of Bulgaria. The vines are formed on a one stem cordon with a pruning severity of 6 spurs, at planting distances of 2.4 x 0.9 m and non-irrigated conditions. The climate is transitionally continental with low mountain influence and diverse relief. In 2022, budburst begins in the first ten days of March, lasting about 35 days, flowering varies from 17 to 22 days, veraison occurs from 18 to 23. In 2023 budburst begins in the first ten days of April with a duration of 5 to 9 days, flowering began on June 04, with the standardized variants flowering 9 days longer, veraison is from 20 to 23 days. The grape harvest was carried out in the third ten days of August for 2022 and the first ten days of September for 2023. The difference in phenophases is due to the uneven distribution of rainfalls and unpredictable temperature dynamics.

Key words*: viticulture, climate, phenology, Pinot Noir clone 777.*

DEVELOPMENT OF THE WINE SECTOR IN THE REPUBLIC OF MOLDOVA, BASED ON SMALL AND MEDIUM PRODUCERS

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Abstract

The wine sector in the Republic of Moldova is strategic for the national economy. It includes three basic subsectors - the production of planting material (vine nursery), the table grape sector, wine production (winemaking). For each specialized subsector the size of enterprises and production is different, namely: - for wine nursery, farmers with a production from 100 thousand grafted plants to 2-3 million grafted plants per year; - for table grapes, farmers from 0.5 hectares to several hundred hectares, in family enterprises, peasant households, LLCs, etc.; - for wine production, with vineyards from 1-2 hectares and 10-20 thousand bottles of wine per year. The small and medium enterprise sector contributes to the joint development of the rural tourism sector, wine tourism, which highlights the traditions and culture of the Moldovan people.

Key words*: climate change, small and medium producers, viticulture, varieties, wine, winemaking.*

POTASSIUM INFLUENCE ON *VICTORIA* AND *PERLA DE CSABA* TABLE GRAPES QUALITY

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Abstract

The study was conducted between 2021 and 2023 and evaluated the influence of potassium on the quality of 'Victoria' and 'Perla de Csaba' table grapes. The samples were collected from a private vineyard in Misca, Arad County. Three doses of potassium (120, 130, and 140 kg/ha) were applied at three critical phenological stages (before flowering, pre-veraison, and post-harvest). The results indicated that the different potassium (K) doses significantly ($p \leq 0.05$) influenced the grapes' quality. Notably, the dose of 130 kg (K) had a major impact on varieties, influencing sugar content, aromas, and berry size uniformity. The 140 kg/ha potassium dose increased the average bunch weight and significantly ($p \leq 0.05$) decreased berry acidity, particularly in the 'Perla de Csaba' variety. The study highlights the importance of balanced potassium fertilisation to improve key grape quality parameters, such as sugar content and bunch weight. The results suggest that adjusting potassium doses according to grape variety may optimise grape quality outcomes.

Key words: *table grape, potassium, blooming, veraison, harvest.*

OPTIMIZATION OF THE EXTRACTION OF PHENOLIC COMPOUNDS FROM GRAPE POMACE USING SUPERCRITICAL LIQUID (CO_2) METHODOLOGY

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Abstract

The extraction of phenolic compounds and antioxidant activity (AA) of winemaking by-products using supercritical liquid methodology has been investigated. In order to have a green product, CO_2 was used in extraction. Extraction by supercritical liquids on grape pomace and wine enriched with total polyphenolic compounds (TPC) from extracts and antioxidant activity were evaluated. Several grape varieties from two different vineyards were used Stefanesti and Murfatlar. The extract TPC ranged from GAE/L to 156.66 mg to 2536.89 mg GAE/l, and for fortified wine ranged from 1510 mg GAE/L to 7457 mg GAE/L. Antioxidant activity in fortified wine varied between the values of 54.45 mmol TE/L and 216.13 mmol TE/L. With the help of chromatography several phenolic compounds, such as gallic acid, were identified, shikimic acid, caffeic acid, catechin, epi-catechin, syringic acid, p-coumaric acid

Key words*: Chlorophyll fluorescence water deficit, Vitis vinifera L, environmental drought stress, photosystem II efficiency.*

EVALUATION OF THE TECHNOLOGICAL POTENTIAL OF WINE GRAPE VARIETIES IN THE CONTEXT OF CLIMATE CHANGE IN THE DEALU MARE VINEYARD

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Abstract

Climate change involves the adaptation of crop systems to the effects of climate variability, which influence vines, given the dependence of weather changes during the growing season, as well as increasing the duration and intensity of meteorological phenomena. The researches were carried out in the Valea Călugărească viticultural center within three viticultural plantations with the varieties Sarba, Negru aromat and Feteasca neagră. In the last the 25 years, the climate has changed in the meaning that heating resources increased and the rainfall resources decreased. These changes in the viticultural climate have determined an earlier development of the vegetative phenophases, especially the early phenophases and grape ripening (by approximately 7-14 days), which has particularly influenced the quality of grape production. Regarding the yield of grape production, it was found that the average rate of decrease was 0.86 kg/vine, the loss of acidity by 0.99 g/l and a higher accumulation of sugar 30-60 g/l.

Key words*: climatic change, grapevine, phenology, grape production.*

THE BEHAVIOR OF GRAPE VARIETIES FOR RED WINE IN THE VALEA CĂLUGĂREASCĂ WINE CENTER

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Abstract

The researches were carried out in the period 2020-2024, at the wine center Valea Calugareasca within six viticultural plantations with the varieties Feteasca neagra, Cabernet Sauvignon, Merlot, Negru aromat, Novac and Olivia, particularly valuable varieties from an oenological point of view, which are part of the basic assortment for the production of quality red wines. In the last 4 years, the climate has changed in the sense that the thermal regime has increased and the water deficit was accentuated especially during the vegetation period of the vine. The level of the sugars in grape juice has varied between 270.4 g/l (Negru aromat), 254.4 g/l (Novac) and 237 g/l (Merlot), but secondary metabolites such as anthocyanins, negatively affected by high temperatures and with oscillations between 1854 mg/l (Novac), 1540 mg/l (Cabernet Sauvignon) and 1155 mg/l (Olivia). Regarding the content in total polyphenols, the maximum was obtained by the varieties Olivia (81 mg/l), Novac (78 mg/l), Negru aromat (73 mg/l) compared to the variety Cabernet Sauvignon, in which the content in total polyphenols was only 41 mg/l.

Key words*: grape production, sugars, varieties, anthocyanins, total polyphenols.*

INVESTIGATION OF THE RELATIONSHIP BETWEEN SPECTRAL VEGETATION INDICES AND CHLOROPHYLL CONTENT IN THE LEAVES OF SYRAH CULTIVAR VINES

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Abstract

Chlorophyll is a vital component of vine leaves, offering insights into their physiological state. It is the catalyst for photosynthesis, a process that drives the vegetative growth of vine plants. The present study investigates the correlation between chlorophyll content in vine leaves, which were simultaneously monitored by ground-based measurements and Sentinel 2 high-resolution vegetation indices (VIs)NDVI, CVI, CLGR through multispectral imaging. The experiment was conducted on Syrah grapevines over a three-year period, from 2020 to 2022. The vineyard was in full fruiting at the time of the study. In situ measurements of the photosynthetic activity of the vines were performed twice during the vegetative phase, before and after the flowering phase, in real conditions with a mobile apparatus (CCM-300). The remote data and imageries were processed using SNAP and QGIS. This study is of significant value to the field of precision viticulture, particularly in the context of grape production, as it provides insights into the potential of vegetation indices based on in situ measurements and VIs data from satellites.

Key words*: Chlorophyll, precision viticulture, remote sensing, vegetation index, vine.*

RESEARCH ON THE AGROBIOLOGICAL AND TECHNOLOGICAL VALUE OF SOME OLD ROMANIAN VINE VARIETIES IN THE CONTEXT OF CLIMATE CHANGES IN THE ODOBEŞTI VINEYARD, VRANCEA COUNTY

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Abstract

The issue of returning to the ancestral varieties from the old sortiment specific to Romanian vineyards in the context of global warming and the conservation of biodiversity in wine-growing areas, represents one of the main directions of scientific research. The old Romanian grape varieties are currently preserved in ex situ germplasm collections (ampelographic collections) at the research units in the viticulture field. This paper presents preliminary results regarding the agrobiological and technological characteristics of four old autochthonous grape varieties (Vitis vinifera L.) for white wines ('Galbenă de Odobeşti', 'Cruciuliță', 'Pîrciu' and 'Gordin'), in the climatic conditions of the year 2024 in Odobeşti vineyard, Vrancea county. In the drought conditions of year 2024, these varieties demonstrated a high fertility potential (63.2-89.6% fertile shoots) and valuable technological characteristics, with a production that varied between 2.26 kg/vine for 'Pârciu' variety and 4.43 kg/vine in 'Cruciulita' variety, under the conditions of a good accumulation of sugars in the berries (>190 g/L) and a balanced total acidity (>5.1 g/L as tartaric acid).

Key words*: ancestral varieties, stress factors, agrobiological and technological value.*

COMPARATIVE ANALYSIS OF THE PRODUCTION OF DESSERT GRAPES GROWN ON STEM GUYO AND PERGOLA FORMATION IN SOUTHERN BULGARIA

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Abstract

Trends in modern global and European production of grapes for fresh consumption increasingly require a change in the technological model. Producers and processors of grape derivatives are increasingly turning to formations and technology that contribute to increasing the quantity and improving the quality of table grapes. These changes are motivated by several factors, including growing consumption, labor shortages, the presence of dynamic climatic processes, as well as the need for optimization and mechanization of cultivation operations. This research based on production experience gives us grounds to deepen and search for economic and social effects on society. Similar studies, both in the viticultural and economic fields, create reliable prerequisites for selecting technological changes in the processes of growing, harvesting, sorting, packaging and transporting table grapes to the food chains and markets. An algorithm has been developed to determine the economic efficiency of applying different technologies in the cultivation of table grapes.

Key words*: Bulgaria, economic efficiency, Pergola, production costs, table grapes.*

INFLUENCE OF SOME SOIL HERBICIDES ON THE VEGETATIVE MANIFESTATIONS OF GRAFTED CUTTINGS OF SIYANA VINE VARIETY

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Abstract

The article shows the results of the influence of three soil herbicides: pendimethalin (Stomp New 330EK), s-metolachlor (Dual Gold 960EK) and pendimethalin and clomazone (Alcans Sync Tech) on the vegetative manifestations of the grafted vine cuttings. The study was carried out during the period 2018-2021, in the experimental vine rooting nursery of IASS "Obratzov Chiflik", with Siyana dessert variety. Dual Gold 960EK and Stomp New 330EK were found to have high selectivity, provide good control of annual weeds, do not suppress budding and do not reduce the vigor of the main shoot growth. The tested herbicides did not negatively affect the synthesis of photosynthetic pigments. Alcans Sync Tech caused a moderate to moderately strong phytotoxic effect, expressed in a chlorotic halo of the first leaves of the cuttings, which was overcome at a later stage and did not affect their development. Despite slight fluctuations in the values of the ratio of chlorophylls to carotenoids, there was no evidence of premature aging due to stress factors.

Key words*: weeds, herbicides, efficacy, phytotoxicity, vine rootstock.*

STUDY ON THE IDENTITY OF A WINE BETWEEN VARIETY AND GEOGRAPHICAL SPACE

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Abstract

The identity of a wine is the result of complex interactions between the grape variety and the geographical space in which it is grown. Understanding and capitalizing on these interactions are essential in the production of wines, which, beyond the exceptional quality, must reflect the specificity and authenticity of the place of origin, becoming an ambassador of the region and culture from which it comes. The sensory profile analysis in determining a wine's identity offers consumers an unparalleled multisensory and cultural experience by creating a unique and valued consumption experience. In this paper, the sensory characteristics that contribute to the identity of a wine were analyzed in detail, emphasizing aspects such as aromas, tastes, and the general structure of the wine. The results obtained provide a deep understanding of the organoleptic qualities of the wine and suggest distinct promotion strategies for each region, highlighting the specific strengths of each wine to satisfy varied consumer preferences.

Key words*: region, sensorial profile, terroir, variety, wine.*

STUDY ON THE BEHAVIOR AND DEGREE OF ADAPTABILITY OF THE MATILDE VARIETY IN THE CLIMATE CONDITIONS IN ROMANIA

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Abstract

The Romanian wine-growing area, through all the terroir conditions offered, ensures the cultivation of a varied range of table grape varieties, both from the international and domestic assortment, thanks to the generosity of the orographic, climatic, pedological factors and, last but not least, the applied technology, rich in innovative measures to ensure a good plant-productive balance. In the present work, the observations, measurements and analyzes focused on the evaluation of the agrobiological and technological parameters of the 'Matilde' variety, verified by calculating specific and representative indices that provide clues about the adaptation of this variety to the climatic conditions of southeastern Romania, different from of the place of origin of the variety. The results obtained, supported by the attributes and quality of the production, offer a positive perspective, which can include the variety in the planting list of economic agents who grow table grapes.

Key words*: adaptation, climate change, grape, quality, yield.*

RESEARCH ON THE TECHNOLOGICAL CHARACTERISTICS OF SELECTED CLONAL ELITES FROM TWO POPULATIONS OF TABLE GRAPE VARIETIES UNDER THE CONDITIONS OF THE MURFATLAR VINEYARD

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Abstract

Between 2019 and 2024, a study was conducted in Research Development Station for Viticulture and Winemaking Murfatlar on clonal selections of two table grape varieties: 'Afuz Ali' and 'Coarna neagra'. Five clonal elites from each variety were comparatively analyzed, evaluating their technological qualities relative to the standard variant. During the research, the clonal elite 'Afuz Ali 72/3/16' consistently outperformed the control and the other four studied elites, recording high and quality yields with an average of 42 tons/ha, compared to 27 tons/ha for the control variety. Similarly, the clonal elite 'Coarna neagra 14/5/22' demonstrated a consistently higher level than the control and the other four elites, with high and quality yields, averaging 38 tons/ha compared to 26 tons/ha for the control variety. The clonal selections recommended for certification and propagation in the Dobrogea area and regions with similar climates are 'Afuz Ali 72/3/16' and 'Coarna neagra 14/5/22', which exhibit superior quality over the control in terms of bunch appearance, pulp consistency, aroma, and typicity.

Key words*: clonal selection, productivity, quality, organoleptic evaluation.*

CLIMATE CHANGE A SERIOUS THREAT ON FETEASCĂ NEAGRĂ GRAPE VARIETY BEHAVIOR SITUATED IN THE SOUTH-EASTERN PART OF ROMANIA

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Abstract

Feteasca Neagră is a notable red grape variety indigenous to Romania. It is primarily grown in Eastern South-Eastern and Southern regions of Romania. Continental temperate climate conditions are optimal for Feteasca Neagră variety, benefiting from hot summers and cool winters. The current study aims at new climate conditions impact during 2024. Heat and temperature values, Rainfall regimes and specific vine parameters were monitored. Current study results, show important changes due to possible global warming phenomena influence in vineyard microclimate modifications. While global warming presents significant challenges, it also offers opportunities for innovation in viticulture. Feteasca Neagră a native Romanian vine variety can be considered a bioclimatic indicator due to its sensitivity to climate factor variations. Viticulture strategies are being developed whit the goal of maintaining Feteasca Neagră wine organoleptic profile sustainability amidst climate change

Key words*: climate conditions, Feteasca negră behavior, global warming.*

CHEMICAL WEED CONTROL IN FRUIT-BEARING TABLE GRAPE VINEYARDS (*VITIS VINIFERA* L.)

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Abstract

Weeds are competitive with cultivated plants, as for vines as well. They make harvesting, manual and mechanized operations, etc. difficult. The purpose of the present study, conducted in the area of the Varben village, Bulgaria, was to investigate the efficacy of herbicides and herbicide combinations on weed density and on productivity and yield elements in a vineyard, cultivar "Bolgar". Variants of the experiment were: 1. Untreated control; 2. Economic control; 3. Two-time application of Ecopart Turbo (26.5 g/l pyraflufen-ethyl) – 0.08 L ha^{-1}, without removing the young shoots from the stem; 4. Two-time targeted application of Ecopart Turbo – 0.08 L ha^{-1}, with removing of the young shoots from the stem; 5. Double application of Roundup Classic Pro (360 g/l glyphosate) – 0.40 L ha^{-1} + Ecopart Turbo – 0.03 L ha^{-1}. The highest yield in the economic control – 11.89 t ha^{-1} was reported, which represents a 54% higher yield than that of the untreated control. In the variants with herbicides, the highest yield – 11.69 t ha^{-1} in treatment 5 (Roundup Classic Pro – 0.40 L ha^{-1} + Ecopart Turbo – 0.03 L ha^{-1}) was recorded.

Key words*: grapes, weeds, herbicides, yields.*

VEGETABLE GROWING

RESEARCH ON FEED BACK REACTIONS OF PLANTS SUBJECTED TO EXTERNAL FREQUENCY FIELDS FROM AN EPIGENETICAL POINT OF VIEW

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Abstract

The first epigenetic modification found was DNA methylation. Several DNA modifications, such as hydroxymethylation and carboxylation, as well as many post-translational histone modifications that epigenetically shape cell identity, have been discovered to date. DNA methylation is the most important epigenetic mechanism that has been intensively investigated. There are many conventional techniques to analyze the approximate or exact methylation content of DNA. The present research aimed to study the influence of the electromagnetic field of the Teslatron device (therapy device with high electrostatic potential) and the light fields of the Bioptron (performs light treatment) on some plants in order to see if this influence changes the quantity and quality of the active substances from the treated plants, compared to the control group. Genomic DNA isolations were then performed, which was quantified at the nanodrop. It was observed that there are changes in the amount and quality of DNA influenced with the Teslatron biofield compared to the control.

Key words*: teslatron, genomic DNA, epigenetic, nanodrop.*

COMPARATIVE STUDY OF THE NUTRITIONAL COMPOSITION OF MAJOR LEGUME SPECIES

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Abstract

Legumes are essential in traditional diets, providing nutritional and health benefits, while also supporting economic stability and environmental sustainability. This study evaluates the nutritional quality of three legume species: Vicia faba L., Pisum sativum L., and Phaseolus vulgaris L., by analysing total dry matter, total soluble solids (TSS) and titratable acidity. These parameters were measured using standardized methodologies on selected genotypes cultivated under controlled conditions. Significant inter- and intra-species variability was observed. Broad bean genotypes, especially L5, exhibited the highest dry matter content (34.55%), which is often associated with increased concentrations of essential nutrients. Pea genotypes, such as L6, demonstrated elevated TSS levels (>14°Brix), suggesting potential for fresh market applications. Common bean genotypes, particularly the climbing variety L135, showed high TSS values (16.03°Brix) and moderate acidity, underscoring their suitability for processing. These results emphasize the importance of genetic diversity in legumes to optimize nutritional value and processing potential. This study supports the development of targeted cultivation and breeding strategies to improve legume productivity and quality under diverse environmental conditions, particularly in the context of climate change.

Key words*: legumes, nutritional quality, Vicia faba L., Pisum sativum L., Phaseolus vulgaris L.*

FRUIT QUALITY AND BIOACTIVE COMPOUND ACCUMULATION IN ROMANIAN PEPPER CULTIVARS

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Abstract

This study, conducted in 2023 and 2024, explored the phenotypic diversity of five Romanian pepper cultivars from VRDS Buzău (Roial, Decebal, Cantemir, Regal, L-50), focusing on fruit quality traits and yield. Fruit quality was assessed by analyzing dry matter content, fruit firmness, total soluble solids, titratable acidity, ascorbic acid, lycopene, and β-carotene at different ripening stages. Results showed a significant increase in bioactive compounds at full ripeness. L-50 exhibited the highest total soluble solids (9.53°Brix) and β-carotene (8.71 mg·100 g^{-1} F.W.) levels, making it nutritionally valuable. Roial stood out for its high vitamin C content (232.8 mg·100 g^{-1} F.W.), while Cantemir demonstrated superior firmness (11.42 N), enhancing post-harvest durability. All genotypes exhibited antioxidant properties, suggesting their potential contribution to functional foods These findings highlight the diversity and nutritional attributes of the studied Romanian pepper cultivars, though further research is needed to confirm their broader applicability.

Key words*: Capsicum spp., carotenoids, nutritional profile, vitamin C.*

IDENTIFYING CULTIVARS FOR ORGANIC FARMING: A CASE STUDY ON SOLANACEOUS VEGETABLES IN ROMANIA

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Abstract

Organic farming is a key priority for the European Union, aiming for 25% of agricultural land under organic cultivation by 2030. In Romania, organic farming expanded by 67% between 2012 and 2022, increasing the need for cultivars suited to non-chemical systems. This study evaluates eleven tomatoes (Solanum lycopersicum), five pepper (Capsicum annuum), and five eggplant (Solanum melongena) cultivars, traditionally bred for conventional farming, assessing their yield, fruit quality, and adaptability under organic conditions in southern Romania. Results indicate that Darsirius tomato maintained stable yields (2.85 kg/plant organic vs. 3.05 kg/plant conventional), while Regal pepper exhibited stable productivity (140.16 g/fruit organic vs. 142.18 g/fruit conventional) and superior nutritional quality. Rebeca eggplant showed strong pest and disease resistance. Ema de Buzău recorded the highest dry matter content (10.82%), and Andrada had the highest lycopene concentration (12.7 mg/100g organic). These findings support selecting robust cultivars for organic farming, aiding sustainable agriculture and food security in Romania.

Key words*: Capsicum annuum, organic farming, sustainable agriculture, Solanum lycopersicum, Solanum melongena.*

EFFECT OF CULTIVAR AND GROWING SYSTEM ON THE PHENOLOGICAL AND QUALITY ATTRIBUTES OF TOMATO

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Abstract

Tomato is a staple crop with diverse cultivars, and their adaptability to environmental changes prevalently derives from distinct genetic traits that influence their phenology, fruit quality, and antioxidant constituents. Also, environmental conditions and agronomic techniques have an effect on these. This experiment was carried out at the VRDS Bacau in subdivided plots, with three replicates in protected areas in which the influence of two factors was evaluated: the cultivar (genotype 1 to genotype 10) and the growing system (conventional and organic). Data collection involved phenological observations (flowering time, fruit set, maturation, and overall growth) and chemical analyses (acidity, carotenoid content). Regarding the influence of the cultivar on the phenological characteristic values are reached by G2 for soluble solids, G4 for TSS, G1 for water%, and G2 for lycopene and beta carotene. Tomatoes grown organically were found to have richer flavour profiles and deeper colour intensity compared to their conventionally grown counterparts, which tended to be more uniform in size and shape.

Key words*: genotypes, growing system, plant breeding, phenological properties, nutritional quality.*

EVALUATION OF THE INTEGRATED EFFECTS OF SOIL MANAGEMENT AND FERTILIZATION STRATEGIES ON THE GROWTH, YIELD AND QUALITY OF SWEET PEPPER (*CAPSICUM ANNUUM* L.) CULTIVATED IN POLYETHYLENE GREENHOUSES

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Abstract

This study investigates the impact of various soil management practices and fertilization treatments on the growth, yield and quality of `DarianaBac`sweet pepper (Capsicum annuum L.) cultivated in polyethylene greenhouses. Experimental variants were defined by two distinct soil preparation methods: plowed soil and rotary-tilled soil, coupled with five different fertilization treatments, including Albit + Turboroot, Biochar + Woodvinegar + Cropmax, Nutriplant + Resid, Orgevit + Kerafol and untreated controls. Comprehensive assessments were conducted across several key parameters: plant biometrics (plant height, number of branches, stem collar diameter, flower count per plant), physiological and stress-related responses (anthocyanin and chlorophyll content), productive parameters (fruit count per plant, average fruit weight, yield per plant), fruit morphology (fruit width, length, and form index) and yield quality indicators (carotenoid and lycopene content, total soluble solids, and dry matter content of fruits). Statistical analysis revealed significant differences in plant development and yield outcomes influenced by both soil treatment and fertilization regime.

Key words*: ploughing tillage, rototiller, soil enrichment practices, crop management, controlled environment.*

EFFECT OF VARIOUS FERTILIZATION REGIMES ON THE GROWTH AND PHYSIOLOGICAL CHARACTERISTICS OF ROUND PEPPER (*CAPSICUM ANNUUM* L.) SEEDLINGS IN CONTROLLED GREENHOUSE CONDITIONS

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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 in 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 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*: plant nutrition, bio-stimulants, foliar treatments, growth enhancement, morphological traits.*

MATHEMATICAL MODELING IN THE APPLICATION OF BIOFERTILIZERS IN BELL PEPPER CROPS

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Abstract

Mathematical modeling is a useful tool for assessing the potential risks in pepper crops. It has been demonstrated that biofertilizers can improve plant growth and development by mobilizing nutrients from the soil. The objective of this study is to analyze a mathematical model to assess the stimulatory capacity of a biofertilizer on the germination of bell pepper seeds following their wetting in solutions of varying concentrations of the product. Furthermore, the study employs collembola (Folsomia candida L.) to assess the ecotoxicity of the utilized product, thereby providing a multifaceted examination of soil health in relation to plant development and evolution under the influence of diverse substances. The population dynamics of F. candida serve as a barometer for this relationship, offering insights into the interactive dynamics between soil health, plant growth, and the impact of chemical substances.

Key words*: mathematical modeling*; *seed germination; biofertilizers; Folsomia candida; Capsicum annuum L.*

THE INFLUENCE OF FERTILIZERS ON THE DEVELOPMENT OF THE ROOT SYSTEM AND PRODUCTION CAPACITY OF SWEET PEPPER (*CAPSICUM ANNUUM* L.)

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Abstract

The study investigates the impact of different fertilization strategies on the root development and yield capacity of Capsicum annuum L. Four fertilization variants were tested: V1 - Graundfix®, V2 - Albit®, V3 - Rerum and V4 - Unfertilized (control) on three cultivars in polyethylene greenhouse soil. Parameters assessed included plant height, stem collar diameter, root length, root width and weight, and yield per plant. The application of biofertilizers (V1 and V2) demonstrated a positive impact on the root system activity of the greenhouse culture, when compared to the control and chemical fertilizer treatments. The productivity of the plants was found to be directly proportional to the root parameters.

Key words: *root system, fertilizer, productivity, sweet pepper.*

GROWING ONION IN ROMANIA: CHALLENGES AND OPPORTUNITIES

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Abstract

This research examines the current status of Allium cepa (onion) cultivation in Romania, highlighting its significance for food security and sustainable agriculture. Despite Romania's rich agricultural heritage and favourable conditions, onion production faces challenges like outdated practices, reliance on imported seeds, and inefficient supply chains. Although Romania ranks sixth in the EU for onion cultivation area, domestic consumption often exceeds production, leading to increased imports. The study explores opportunities to enhance yield and quality through modern breeding techniques, technological advancements, and international collaborations. It also underscores the need for preserving native onion landraces to maintain genetic diversity and promote resilience against climate change. Strengthening agricultural infrastructure, improving organization among farmers, and optimizing supply chains are critical for reducing market imbalances and waste. An integrated approach combining scientific research, sustainability principles, and market knowledge is essential to unlock Romania's onion industry potential, support rural livelihoods, and contribute to national food security and economic growth.

Key words*: Allium cepa, landrace, sustainable cultivation.*

THE RESPONSE OF SOME CHERRY TOMATO HYBRIDS TO FOLIAR FERTILIZATION

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Abstract

This study evaluated the response of some cherry tomato hybrids to foliar fertilizers. The experiment was carried out in protected space conditions (solar tunnel). As biological material were used four hybrids (factor A): Arielle F1 (a1), Ravello F1 (a2), Black Cherry F1 (a3) and Vespolino F1 (a4). The foliar treatments (factor B) were: unfertilized (b1), Kerafol Evo (b2), Plantfert U (b3). From the combination of factors, 12 experimental variants resulted. Physiological indices, productivity elements and yield were analyzed in relation to the experimental variants. In unfertilized conditions (b1), the yield (Y, kg plt^{-1}) recorded differentiated values in relation to the potential of the hybrids, Y = 1.416 kg plt^{-1} (a1), Y = 1.632 kg plt^{-1} (a2), Y = 1.668 kg plt^{-1} (a3) respectively Y = 1.890 kg plt^{-1} (a4). Through foliar treatments, the performance of the hybrids increased, but the Vespolino F1 hybrid (a4) remained with the highest yield, Y = 2.538 kg plt^{-1} (b3). The foliar fertilizer Plantfert U (b3) ensured the highest increase in yield (ΔY) in all the tested hybrids. Mathematical models described yield variation in relation to physiological indices and productivity elements.

Key words: *cherry tomatoes, foliar fertilizers, mathematical model, physiological indices, productivity elements, yield.*

THE PERSPECTIVES OF HYDROPONICS CULTIVATION SYSTEM: A REVIEW

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Abstract

Hydroponics is a growing technique that uses aqueous media (nutrient solution) to support plant growth. This technology offers viable solutions to today's global challenges. In the context of the decreasing and degrading of available agricultural land, hydroponic systems can contribute to food security. The main objective of this study is to analyze the current hydroponic techniques and nutrient solution management. Additionally, the study explores the groundbreaking advancements in hydroponic cultivation, emphasizing the integration of sensor-based monitoring systems and automated control technologies, which collectively enhance resource efficiency and optimize plant growth conditions while enabling precise, data-driven agricultural practices. The conclusions of the study emphasize that hydroponic agriculture is an alternative with high potential for increasing crop yields and optimizing the use of limited resources.

Key words*: growing technique; nutrient solution; food security; smart farming.*

CRAFTING UNIQUE BLENDS: EXPLORING COMBINATIONS OF ONION, GARLIC, WILD GARLIC AND LEEK

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Abstract

Due to their high content of phytonutrients, Allium plants are used both as food and in the treatment of many medical conditions. The increased interest in these plants is due to their powerful antioxidant properties. In this paper, the Barchart logarithmic diagram allowed us to identify the representative nutritional components for each investigated product (onion, garlic, wild garlic and leek plants), allowing us, at the same time, to identify potential mixtures of dehydrated powders to be recommended to the consumer according to his nutritional deficit. Based on the generalized model, the following potential powder mixes were highlighted and characterized by mathematical modeling in order to make food supplements: mix of garlic and wild garlic, mix of onion and wild garlic, mix of wild garlic and leek. In order to determine the moisture content, the total antioxidant capacity and the total polyphenol content of the leaves of wild garlic, onion bulbs and garlic, the following methods were used: thermogravimetric analysis, analysis of the total antioxidant capacity using the CUPRAC method, determination of the polyphenol content using the method Folin-Ciocalteu.

Key words*: Allium plants; food supplements; nutritional deficiency; powder mixes.*

THE ALLECOSYS PROJECT. AGROECOLOGY LIVING LABS AS DRIVERS OF RESILIENT AND THRIVING AGRI-FOOD SYSTEMS

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Abstract

The AllEcoSys project advances sustainable and climate-resilient farming by establishing a network of agroecological Living Labs across Europe. These Living Labs will act as platforms for testing, co-designing, and disseminating agroecological approaches that enrich soil vitality, support biodiversity, and enhance ecosystem-based pest and disease management. The project combines local and scientific knowledge through a structured co-creation process, aimed at strengthening the role of farmers and local actors in shaping future-ready agri-food systems. AllEcoSys dedicates to stakeholder involvement and Living Lab co-creation soil and microbiome research and crop diversification with biological control, and socioeconomic

evaluation. Building upon the work of the CORE-Organic Cofund Resberry project and other national initiatives, AllEcoSys hypotheses that agroecological diversification supports better soil function, increased resilience, and enhanced natural pest regulation services. Through ongoing socio-economic analysis of barriers adoption and trade-offs, the project aims to inform broader uptake of agroecological practices. By aligning with the ambitions of the European Green Deal, AllEcoSys demonstrates how Living Labs can engage stakeholders in co-creating actionable solutions, contributing to ecological integrity, economic sustainability, and community well-being across European agricultural landscapes.

***Key words**: Agroecology Living Labs, co-creation, soil health, natural pest regulation, resilient food systems.*

CULTIVATION MODEL OF URBAN PROTECTED HORTICULTURE IN CHINA

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Abstract

Protected horticulture refers to the agricultural method of using various facilities (such as greenhouses, plastic tunnel, etc.) for horticultural crops production. The cultivation area of protected horticulture in China has reached 2.8 million hectares, ranking first in the world. In recent years, the urban protected horticulture cultivation model in China has developed rapidly, providing a new cultivation solution for efficient agricultural production, improved space utilization, and tourism functions. The main modes of urban protected horticulture in China include the following: wall soilless cultivation, column soilless cultivation, mobile pipeline cultivation, multi-level stereoscopic cultivation, vegetable tree cultivation, aerial sweet potato soilless cultivation, giant melon and fruit cultivation, and aeroponics cultivation. By combining stereoscopic cultivation, interesting cultivation, and landscape design, vegetable green corridors, green walls, flower holes, and other cultivation scenes can be formed to create a comprehensive agricultural sightseeing park. The urban protected horticulture cultivation model not only improves land and resource utilization, but also integrates production, ecological, and leisure functions, promoting the development of urban agriculture towards high efficiency, intelligence, and sustainability.

Key words*: protected horticulture, cultivation model, stereoscopic cultivation.*

THE EFFECT OF GROWING CONDITIONS ON THE YIELD AND QUALITY OF LETTUCE CULTIVATED IN THE NFT SYSTEM

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Abstract

This research investigates the effects of culture conditions on the quality of 8 lettuce varieties grown in a Nutritive Film Technique (NFT) system under LED lighting. The NFT system, an advanced hydroponic method suitable for growing cycle leafy greens, offers commercial advantages while enhancing both the nutritional and biochemical value of crops.
The main aim of this study was to evaluate the growth and development of lettuce varieties in the NFT system under controlled LED lighting conditions. The study was carried out within the Faculty of Horticulture, UASMV Bucharest, under LED lighting conditions, in the research space of the Plant Factory. Vertical farms, also known as plant factories, optimize agricultural production per unit area by arranging crops on multiple stacked levels. This method is particularly advantageous in urban environments, where space availability is limited. Such facilities can operate year-round, being independent of climatic or seasonal conditions, which ensures a constant production. Although these systems contribute to saving space and water, they often require significant energy consumption for artificial lighting and climate control, which can lead to increased costs and ecological impact.

Key words*: lettuce, LED lighting, fertilization, biochemical content.*

ENHANCING FRUIT YIELD AND QUALITY IN PEPPER AND EGGPLANT: THE ROLE OF MULCHING TECHNIQUES

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Abstract

Soil mulching can create a microclimate at the plant level and has several advantages, the most important being its inhibitory effect on weed growth and its ability to retain soil moisture for a longer period. The purpose of this study is to determine the influence of different types of agricultural mulching films on yield and fruit quality of round pepper and eggplant. The experiment took place at RDIVFG Vidra in 2024. The biological material for peppers consisted of seedlings of the round pepper cultivar Asteroid 204 and eggplant cultivar Belona. Four variants were studied: unmulched soil, mulching with black foil, mulching with white-black foil, and mulching with brown foil. It was found that the use of mulch has beneficial effects on the yield and quality of fruits both in pepper and eggplant. Among the mulching options, the white-black foil resulted in the greatest increases in the number of fruits per plant, yield, and fruit weight in peppers, also positively influencing fruit quality. In eggplant, the greatest positive effects were observed with the use of brown foil.

Key words*: Capsicum annuum, fruit quality, mulch, Solanum melongena, yield.*

GENETIC DIVERSITY ANALYSIS OF TOMATO VARIETIES BY SCoT MARKERS

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Abstract

This study evaluates the genetic diversity of nine tomato genotypes using SCoT molecular markers and assesses their acidity and Vitamin C levels to determine nutritional properties. Among the primers analyzed, 11 generated 118 bands, of which 78 were polymorphic, with polymorphic band percentages ranging from 60% to 80%. The average polymorphic information content (PIC) was 0.29, with the highest value for SCoT 10, while the mean diversity index (H) and marker index (MI) were 0.360 and 3.40, respectively. Hierarchical Cluster Analysis (HCA) divided the genotypes into two main groups and revealed a moderate-high level of similarity between the analysed varieties clustered in the same group. Acidity levels ranged from 0.21% in Kumato Nero cv. to 0.73% in Claudia cv., while Vitamin C content varied between 11.03 mg/100g (Kumato Nero cv.) and 17.11 mg/100g (Matilda cv.). Kumato Nero exhibited the lowest Vitamin C and acidity levels, suggesting high consumer acceptance. This research highlights the importance of assessing genetic diversity and also nutritional value, providing valuable insights for future breeding programs to improve tomato traits.

Key words*: Solanum lycopersicum L., acidity, vitamin C, molecular marker, tomatoes.*

ASSESMENT OF VARIOUS CONCENTRATION OF SALICYLIC ACID IN TISSUE CULTURE *IN VITRO* SYSTEMS FOR THEIR EFFECT ON MODULATING ABIOTIC STRESS TOLERANCE MECHANISMS IN PEPPER (*CAPSICUM ANNUUM* L.) PLANTS

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Abstract

Abiotic stress, particularly in climate-sensitive crops like Capsicum annuum L., severely impacts crop productivity. Understanding the mechanisms through which plants can mitigate these stresses is key to developing more resilient crop varieties for the future. Salicylic acid is a plant hormone known for its role in regulating plant growth and enhancing resistance to abiotic and biotic stresses. Thus, this study focuses on elucidating the dose-dependent effects of exogenous SA application on physiological, biochemical, and morphogenetic responses of pepper explants cultivated in vitro. The findings revealed a dose-dependent effect of SA, where lower concentrations significantly enhanced seed germination rates, shoot initiation and elongation while promoting robust root development. It also increased the total phenolic and chlorophyll content, suggesting an activation of defense mechanisms and improved photosynthetic efficiency.

Key words*: salicylic acid, in vitro; resilient, vegetable, crops.*

CARBON FOOTPRINT OF LETTUCE GROWED WITH MINERAL AND BIOLOGICAL FERTILIZATION IN GREENHOUSES

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Abstract

The amounts of carbon emissions during the cultivation of lettuce in greenhouse conditions during the autumn-winter period were measured in a polyethylene greenhouse. Fertilised and unfertilised soils, with and without plants, were placed in hermetically sealed chambers for 24 hours under identical conditions, after which the quantitative content of CO_2 in each chamber was determined. The impact of mineral and biological fertilizers on greenhouse gas emissions was studied. To assess the contribution of soil microflora to carbon emissions in the gas chambers, a comparison was made between the CO_2 levels measured in the unfertilised and fertilized soil variants, as well as between soils with and without plants. Model calculations were performed for the absorbed CO_2 gas over a relatively equal period in each of the three research years for NPK-fertilized, biologically fertilized, and unfertilized lettuce cultivation variants. It was found that mineral fertilization when cultivating salads in greenhouse production conditions, in norms N12.5P4.17K15.83 and has lower emissions - as a share in greenhouse gases (in the amount of 90.74 g/m3) compared to unfertilized and fertilized with organic plants.

Key words*: greenhouses gases, lettuce, carbon emission, mineral and biological fertilization.*

CARBON FOOTPRINT OF SPINACH GROWED WITH MINERAL AND BIOLOGICAL FERTILIZATION IN GREENHOUSES

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Abstract

To determine the amount of greenhouse gases during the period 2021-2024, an experiment was set up with spinach under greenhouse conditions. The following options were tested: 1. spinach chamber without fertilization - control; 2. spinach chamber with mineral fertilization - NPK; 3. spinach chamber with organic fertilization - Vitaorganic; 4. Chamber without lettuce and without fertilization. At each reading, the CO_2 concentration was additionally measured outdoors and in the polyethylene greenhouse. Readings were carried out weekly from planting to harvesting - from January to April. Under adverse weather conditions, young plants fertilized with organic fertilizer consume less CO_2, compared to that released from the soil and available in the atmosphere. As temperatures rise, they begin to consume increasingly larger amounts, with the maximum at the end of February, after which consumption decreases to on March 28. The mineral fertilization option has a higher degree of CO_2 fixation compared to organic fertilization. When entering economic maturity, the CO_2 fixation values are highest for mineral fertilization, while with organic fertilization the fixation is less.

Key words*: greenhouse gases, spinach, carbon emission, mineral and biological fertilization.*

RESEARCH ON WEED CONTROL IN ONION AND GARLIC CROPS

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Abstract

Onion and garlic crops are weeded by a wide range of weed species, including annual and perennial monocotyledonous and dicotyledonous. The application of herbicides is an economical, rapid measure, which allows the cultivation of large areas and the achievement of high production yields and increased economic efficiency. Three active substances with pre-emergence application (metolachlor, pendimethalin and oxyfluorfen) and various concentrations of oxyfluorfen with post-emergence application were tested. The results showed good control of annual monocotyledons with metolachlor and good control of annual dicotyledons with small seeds, with oxyfluorfen and pendimethalin. The post-emergence application of oxyfluorfen with various concentrations controlled annual cotyledons with large seeds (Xanthium sp. and Abutilon theophrasti) but did not control perennial dicotyledonous species.

Key words*: onion crop, garlic crop, herbicides.*

THE IMPACT OF DROUGHT STRESS ON PHYSIOLOGICAL AND BIOCHEMICAL PROCESSES IN LEGUMES

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Abstract

Drought stress is one of the most significant environmental factors that limit the growth and productivity of Legumes. This review explores the impact of drought stress on the physiological and biochemical processes in legumes, focusing on various responses and adaptations exhibited by these plants in response to water scarcity. Under drought conditions, legumes plants undergo physiological changes such as stomatal closure, reduced photosynthesis, and altered water uptake and transport mechanisms. Additionally, drought stress triggers biochemical responses, including enhanced production of antioxidants, osmoprotectants, and stress-related proteins. Understanding the complex interplay between physiological and biochemical processes in legumes under drought stress is crucial for developing strategies to enhance the resilience of these economically important crop plants to water scarcity. Insights gained from this review can inform future research efforts aimed at improving drought tolerance, through genetic engineering and breeding practices.

Key words*: antioxidants, stress-related proteins, stress survival, sustainability, water management.*

INFLUENCE OF FERTILIZATION ON FRUIT MORPHOLOGICAL CHARACTERISTICS AND YIELD OF PEPPER VARIETIES

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Abstract

The study aims to adapt the technology to climate change in growing field peppers by applying different fertilizer rates. Two local pepper varieties were used - Sofiyskaya and Ivaylovskaya Kapiya. Two fertilization rates were tested - with higher levels of PK Sheme 2 (N21.9P45.8K60.9Ca11.7) and Sheme 3 (N21.9P42.4K95.2Ca11.7). Control - conventional, optimal .rate (N34.5P13.8K42.5Ca11.7). The main morphological characteristics of the fruit and yield were monitored. Results were processed by a two-factor analysis of variance. It was found that the length of the fruit in both varieties is most strongly influenced by the growing season. The width of the fruit is less affected by the applied fertilizer compared to the length. The applied fertilization options have a statistically proven effect on the mass of the pericarp in Sofiyska Kapiya. The indicator of the thickness of the pericarp is more responsive to the studied fertilization options in the Ivaylovska Kapiya variety. The applied fertilization options have a positive effect on the substandard yield, reducing the number of substandard fruits and the size of the substandard yield.

***Key words**: fertilization, pepper varieties, morphological characteristics of fruit, yield.*

THE INFLUENCE OF MICROORGANISMS ON THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF TOMATO FRUITS

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Abstract

Tomato (Solanum lycopersicum L.) is one of the vegetables with the highest global production value. In an effort to achieve an increasing both quantity and quality production, researchers have been and are still looking for strategies to improve crop technology using various plant protection and stimulation products.
Over the years, different technologies have been developed for cultivating and treating plants with Bacillus spp. in order to increase plant productivity but also to reduce residual elements in plants, thus helping to protect the consumer.
The present study aims to highlight the effect of the microbial inoculants Rizobac and Bactilis on fruit quality indicators for the three tomato hybrids. Both microbial inoculations had a tendency to increase fruit size in the treated tomato hybrids, for total dry matter they ranged between 4.03% and 4.38% for Buffalosun F1, pH ranged from 4.07 to 4.12 for Kingset F1, from 4.05 to 4.18 for Bucanero F1 and from 4.01 to 4.21 for Buffalosun F1, when Bactilis was applied.

Key words*: beneficial bacteria, fertilization, microorganisms, production, environmental protection, tomatoes.*

RESEARCH ON THE INFLUENCE OF FERTILIZATION ON TOLERANCE TO ABIOTIC STRESS IN THE CASE OF SOME TOMATO GENOTYPES CULTIVATED IN THE SOUTHERN AREA OF ROMANIA

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Abstract

Tomatoes (Solanum lycopersicon) are some of the most cultivated and consumed vegetables worldwide, having significant economic and nutritional importance. Tomatoes are some of the most important horticultural crops in Romania, but production is often affected by abiotic stress factors, characteristics this region. This research aims to analyse how fertilization influences tolerance to abiotic stress (such as drought, salinity or extreme temperatures) in the case of some tomato genotypes grown in southern Romania, namely Pontica (Dacia), Florina 44 and Buzau 1600. The study focuses on the evaluation of different types of fertilizers and their impact on the response of plants to stressful conditions. The expected results of this research refer to the identification of optimal fertilization practices that can improve stress tolerance, and the determination of some tomato genotypes that show a superior resistance to adverse environmental conditions, offering valuable perspectives for the development of sustainable agricultural practices in the southwest region of the countries.

Key words*: abiotic stress, tomato, tolerant, foliar fertilization, southern Romania.*

PHYSICO-CHEMICAL CHARACTERISTICS OF WATERMELON FRUITS (*CITRULLUS LANATUS*) OF GENOTYPES CULTIVATED ON SANDY SOILS IN SOUTHWESTERN ROMANIA

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Abstract

The study was carried out during 2022-2024 within the experimental field of the Research - Development Station for Plant Culture on Sands Dăbuleni. The method used to set up the experiment was the randomized block. The material used to set up the experiment consisted of six watermelon genotypes:'Dulce de Dăbuleni', 'Oltenia', 'De Dăbuleni', own creations of the Research - Development Station for Plant Culture on Sands Dăbuleni, and Burebista F1, Kratos F1, Fechete F1 of other origin. Physical characteristics such as length, diameter, and shape index of the fruits, quantitative characteristics such as fruit weight, fruit peel thickness and weight, core percentage, and also biochemical ones such as soluble dry matter content, total dry matter content, titratable acidity, vitamin C, and carbohydrates were evaluated. The weight of the fruits analyzed during the study period recorded average values that varied between 4.63 kg for Burebista F1(2024) and 9.32 kg for Fechete F1(2023). The soluble dry matter content varied between 10.00 and 11.80%, the highest average value being recorded for the Burebista F1 cultivar, respectively 11.00%.

Key words*: watermelon, physicochemical characteristics, sandy soils.*

STUDY OF THE POSSIBILITIES OF USING COMPOST AS A SUBSTRATE FOR GROWING *BRASSICA OLERACEA* L. VAR. *CAPITATA* L.

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Abstract

The present study aimed to trace the change in microbial communities and the degree of cabbage formation, under different variations of the growth medium. Five variants were studied: control – soil, V1- 10% compost and 90% soil, V2- 25% compost and 75% soil, V3- 50% compost and 50% soil, V4-100% compost. Samples were taken on 15, 30 and 60 days. The amount of total microflora in all variants slightly decreased over time, but the mineralization rate remained almost the same. Throughout the experiment, the main share in the composition of the total microflora was occupied by non-spore-forming bacteria and bacilli, and actinomycetes and micromycetes were less represented. The total amount of microorganisms was higher in the variants with compost compared to the control, highest in the variant with 100% compost content.

Key words*: microorganisms; compost; Brassica oleracea L. var. capitata L.*

STUDY ON THE IMPACT OF ELECTROMAGNETIC FIELDS ON THE GROWTH AND DEVELOPMENT OF CERTAIN VEGETABLE PLANT SPECIES

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Abstract

Electromagnetic fields can influence plant growth and development, with their effects depending on frequency, intensity, and exposure duration. Research conducted so far has highlighted both positive and negative effects. Regarding the beneficial effects, exposure to low-frequency fields has been associated with faster seed germination, stimulation of stem and root growth, and increased biomass accumulation. Additionally, these fields can activate metabolic processes by increasing the levels of plant hormones (auxins, gibberellins) and improving enzymatic activity, supporting the overall health of plants. On the other hand, prolonged or intense exposure can lead to negative effects, such as oxidative stress caused by an excess of reactive oxygen species (ROS), which can damage cells. Some studies show growth inhibition, manifested by reduced root and stem length, as well as a decrease in chlorophyll content, which affects photosynthetic efficiency. The aim of this study is to analyze the impact of different wavelengths on the growth of vegetable plants, in order to identify optimal electromagnetic conditions that could enhance agricultural productivity and reduce associated risks.

Key words*: electromagnetic fields, seeds, germination,*

STUDY ON THE IDENTIFICATION OF *AMARANTHUS* VARIETIES FOR FRESH CONSUMPTION

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Abstract

Amaranthus spp. has demonstrated a special vitality, growing in many types of environments, the genus having pioneer species that have found unoccupied niches in nature, such as colonizing affected lands. It produces many seeds that germinate quickly, staggered and the productivity is exceptional, allowing several harvests per year. The leaves are edible and have a taste similar to loboda (Atriplex hortensis), being more succulent and making culinary preparations denser. It has a tendency to assimilate nitrogen in the form of nitrates and cultivated on soils on which excess nitrogen fertilizers have been applied, it becomes toxic to humans and animals, such as cattle and pigs, causing indigestion and bloating. The study aims to analyze and identify Amaranthus varieties that are recommended for consumption.

Key words: *amaranth, cultivars, identification, nutrients.*

EXPLORING THE SYNERGISTIC EFFECTS OF CALCIUM NITRATE AND BIOSTIMULANTS ON SEED YIELD IN *CAPSICUM ANNUUM* L. VAR. *GROSSUM*

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Abstract

This work aims to study the potential for increasing seed yield in round pepper (Capsicum annuum L. var. grossum) by applying calcium nitrate in combination with various biostimulants. The biological material used in the experiment was the semi-early cultivar "Asteroid 204", obtained from ICDLF Vidra. Treatments included calcium nitrate alone and in combination with various biostimulants, specifically two seaweed derivatives - one containing Ascophyllum nodosum extract and the other containing Ecklonia maxima extract - as well as two inocula based on mycorrhizal fungi, one enriched with Trichoderma spp. and the other with Bacillus spp. The results indicate that the combination of calcium nitrate and biostimulants based on seaweed or mycorrhizal fungi can lead to an increase in round pepper seed yield, as well as an improvement in seed quality.

Key words*: biostimulants, mycorrhizal fungi, seed quality.*

NUTRITIONAL AND BIOLOGICAL VALUE OF NEW CULTIVARS OF PUMPKIN (*CUCURBITA MAXIMA*) GROWN IN BULGARIA

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Abstract

The main indicators that determine the culinary use of pumpkin fruit are the sugars and carotenoids content. By determining these indicators, the fruit can be standardized in terms of nutritional and biological value. The main aim of this paper is to make a comparative evaluation of new pumpkin varieties of different origin of the species Cucurbita maxima, grown under the soil and climatic conditions of Bulgaria. Four new pumpkin varieties were studied. Their main agronomic characteristics - length of growing season in days to first harvest, average fruit weight (kg), total yield (kg/da), were determined. Fruit flesh was analyzed for content of dry matter (%), moisture (%), ash content (%), total and reducing sugars (mg/g fresh weight), carotenes (mg/kg fresh weight) and pH. The complex evaluation of the fruits of the new cultivars showed a high nutritional and biological value, defining them as suitable for the vegetable market for fresh consumption.

Key words*: pumpkins; yield; productivity; sugar content; carotenoids.*

CONVENTIONAL AND BIOLOGICAL CONTROL OF PESTS IN PEPPERS AND EGGPLANTS CROPS IN THE GREENHOUSE. A REVIEW

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Abstract

The paper presents the main pests that affect peppers and eggplants crops and chemical and biological methods to control. In the 2010-2021 period, in Romania, the average area of eggplants was 9233,75 hectares and in peppers case was 18745.5 hectares. The most common pests in peppers and eggplants crops are trips, whiteflies, aphids, mites and caterpillars. Even though the use of pesticides can reduce the percentage of damage caused by pests, they are less and less used worldwide due to several disadvantages. To reduce the amount of pesticides used, more and more studies are being conducted on the application of biological products based on plant extracts (such as citrus, cinnamon, mimosa tenuiflora and seaweed extract) or microorganisms (Bacillus thuringiensis) and on the release of parasites and predators (Macrolophus pygmaeus, Amblyseius swirskii, Chrysoperla carnea etc.) to reduce risks to human health and the environment.

Key words*: control, eggplant, pepper, pest.*

PARAMETRIC EVALUATION OF POD YIELD STABILITY IN BUSHING SNAP BEAN (*PHASEOLUS VULGARIS* L.)

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Abstract

In the context of climate change, the achievement of economically efficient yields largely depends on the cultivar's stability. A snap bean variety is considered more stable if it achieves a high green pod yield with a low variation of mean yield over diverse environments. The study was carried out to identify snap bean varieties that have high and stable yield across different years, to be used in breeding and sustainable production of this species. The plant material was composed of 20 varieties of bushing snap bean, genetically and ecologically differentiated. The varieties were evaluated for their green pod yield over three years using a randomized block design with three replications. To assess the performance of the varieties, a combined analysis of variance and yield stability statistics were determined. 'Sondella', Plador', Doge' and 'Maxidor' varieties, with relatively high pod yield expressed a good stability and can be used to develop new diverse cultivars with stable yields. 'Super Nano Yellow' variety expressed the highest sensitivity to the change of climatic conditions, being specific adapted to favorable conditions.

Key words*: genotype x environment interaction, pod yield, snap bean.*

CORRELATION BETWEEN CLIMATIC FACTORS AND DYNAMICS OF PATHOGENS AND PESTS: A CASE STUDY IN CABBAGE CROPS

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Abstract

The study analyzes the impact of climatic conditions on the dynamics of diseases and pests in cabbage crop at the Vegetable Research and Development Station Bacău. High temperatures, with a maximum of 35.5°C in mid-summer, favored the development of pests such as Phyllotreta spp. and Plutella xylostella, while the August drought (rainfall of 0.3 mm) increased infestation. In contrast, high humidity in May-June supported the emergence of Brevicoryne brassicae, while heavy rainfall in September (170.4 mm) intensified the spread of fungal diseases, including Xanthomonas campestris. The analysis correlates variations in temperature, humidity and rainfall with the specific dynamics of the main pest species, highlighting the major challenges for phytosanitary control of cabbage crops in the context of climate change. The results provide a basis for improving integrated management strategies adapted to extreme and diversified weather conditions. The study underlines the importance of agro-meteorological monitoring in optimizing crop protection.

Key words*: agro-meteorological monitoring; cabbage pests; climate variability; integrated pest management; NE Region.*

ENVIRONMENTAL FACTORS CONTROL AND ENERGY EFFICIENCY IN PROTECTED SPACES

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Abstract

Protected horticulture is a crucial solution to address global challenges such as population growth, climate change, and the need for energy sustainability. This paper examines various types of protected spaces - greenhouses and polytunnels - and their associated structures, materials, and technologies, focusing on energy efficiency, the integration of modern technologies, and the use of renewable energy sources. The paper identifies and analyzes several types of protected environments, including traditional greenhouses, underground and semi-underground greenhouses, passive solar greenhouses, and high-tech greenhouses. These structures, made from materials like glass, polycarbonate, and double-film covers, offer flexibility and performance to meet diverse cultivation needs. Furthermore, the integration of renewable energy sources significantly enhances the sustainability of protected spaces. Photovoltaic panels and solar thermal collectors help reduce reliance on conventional energy sources, while phase change materials (PCM) and water-based energy storage systems assist in maintaining optimal temperatures. Geothermal energy also plays a key role in providing efficient heating and cooling solutions

Key words*: greenhouses, energy efficiency, energy sources, automations.*

COMPARATIVE STUDY OF INTRODUCED SWEET CORN VARIETIES

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Abstract

Sweet corn is a crop highly sensitive to climatic conditions, which raises scientific interest in its productive indicators under climate change conditions. This study presents a comparative analysis of four promising hybrids for Bulgaria – Zeaton F1, Turbo F1, HMX5389 F1, and HMX59YS832 F1. The experiments were conducted in 2023 and 2024 on the territory of the Agricultural University of Plovdiv. The results show significant differences between the hybrids, with Zeaton F1 exhibiting the best biometric indicators and a maximum plant height. Plant development and especially critical periods coincided with stressful summer conditions. The second year was characterized by more extreme climatic events, but late sowing reduced the negative impact on yield. It was established that growing sweet corn in the dry conditions of Plovdiv is impossible without irrigation, while drip irrigation significantly improved moisture reserve. Hybrids with a shorter growing season showed better growth parameters when sown late. A strong correlation was observed between plant height and the number and length of leaves.

Key words: *productivity parameters, sweet corn, meteorological conditions, biometric indicators*.

RESPONSE OF TARRAGON (*ARTEMISIA DRACUNCULUS* L.) TO THE APPLICATION OF ZINC SULFATE AND GLYCINE BETAINE UNDER WATER STRESS CONDITIONS

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Abstract

An experiment was conducted to investigate the effects of zinc sulfate and glycine betaine on tarragon (Artemisia dracunculus L.) under different irrigation regimes, using a central composite design (CCD) in greenhouse conditions. The experimental factors included irrigation at 30, 65, and 100% of field capacity (FC), zinc sulfate at 0, 3, and 6 g/L, and glycine betaine (GB) at 0, 75, and 150 mM. The imposition of drought stress led to a decrease in plant height and shoot dry weight (DW), while the highest rate of essential oil (EO) content was obtained under mild stress conditions. The highest plant height was obtained with moderate amounts of zinc sulfate, while the maximum DW was obtained with the application of 6 g/L of zinc sulfate. GB application had no significant effect on plant height and DW, but applying intermediate GB level maximized the EO content. In general increasing stress intensity reduced plant growth traits, but by imposing a moderate drought stress and applying 75 mM of GB, the EO content can be maximized.

Key words*: tarragon, drought stress, zinc sulfate, glycine betaine, essential oil.*

STUDY ON THE BEAN LOSSES AND CONSUMPTION IN COUNTRIES OF THE BALKAN PENINSULA

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Abstract

The study examines the quantities of food supplies of beans, their import, export, losses, and the consumption of proteins by the population of the Balkan Peninsula countries during the period 2010-2022. A hierarchical cluster analysis was applied to identify countries with similar characteristics based on the specified indicators. A comparative assessment of the countries was conducted for each characteristic. Correlation and regression analyses were applied to analyze the relationships between the different indicators. The clustering identified that the studied countries formed three clusters based on similarities in bean import and export, losses, and protein consumption. The first cluster includes North Macedonia and Serbia, the second comprises Greece, Romania, and Turkey, while Bulgaria forms an independent cluster. The highest bean imports were recorded in Bulgaria and North Macedonia, while Bulgaria had the highest exports. The maximum bean losses were observed in North Macedonia, while Romania had the lowest losses. The populations of Serbia and North Macedonia consume the highest amounts of beans protein, whereas Bulgaria records the lowest protein consumption. A very strong positive correlation exists between the quantity of food supplies of beans and the protein consumption of the population. However, no direct relationship was found between bean losses and the other examined indicators.

Key words*: been losses, protein, fao, food supplies, population nutrition.*

MEDICINALS AND CHEMICAL PROPERTIES OF SOME SPECIES OF THE CUCURBITACEAE FAMILY: A REVIEW

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Abstract

The Cucurbitaceae gourd family consists of more than 900 species.The plants of this family consist of several edible fruits used in medicine or in different food recipes. The other parts of the plants (steam, leaves, flowers and seeds) can be used in the treatment of different symptoms such as headache, rhinits, fever, anemia, inflamations or poisoning.Cucurbits are rich in carotenoids, saponins, phytochemicals and vitamins.Momordica charantia can be used in the treatment of diabetes, ulcers or liver diseases.Cucumis sativus seeds can help to lower the cholesterol, while the fruits can reduce swelling and burns.Cucumis metuliferus is a great source of anti-oxidants protecting the organism of the cellular damaging caused by the oxidative stress, reducing inflammations and preventing heart diseases.Different parts of Luffa cylindrica can be used in treatment of snake bites, chronic bronchitis, nasal swelling and used in China for anthelmintic and stomachic purposes.This review evaluates the current literature about medicinals and chemical properties of some plants of the Cucurbitaceae family in addition to their positive effects on human health.

Key words: *Cucurbitaceae, medicinal properties, homeopathy, antioxidants, chemical properties.*

ADVANCEMENTS IN CARROT GROWTH TECHNOLOGIES: ENHANCING YIELD, QUALITY, AND SUSTAINABILITY

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Abstract

Carrot (Daucus carota) cultivation has undergone significant technological advancements to improve yield, quality, and sustainability. This study explores novel approaches in precision agriculture, hydroponic and aeroponic systems, genetic enhancements, and biostimulant applications for optimizing carrot production. Precision agriculture techniques, including remote sensing and AI-driven irrigation management, have improved resource efficiency by reducing water and fertilizer waste. Hydroponic and aeroponic systems have demonstrated increased growth rates and reduced disease susceptibility, while genetic modifications and selective breeding have enhanced resistance to pests, bolting, and abiotic stress. Additionally, the application of microbial and organic biostimulants has shown promise in improving nutrient uptake, root development, and overall crop resilience. The integration of these technologies offers a sustainable path forward for high-efficiency carrot farming, meeting the demands of global food security while minimizing environmental impact. Future research should focus on optimizing these technologies for large-scale adoption and evaluating their long-term ecological benefits.

Key words*: carrot cultivation, precision agriculture, hydroponics, aeroponics, sustainability.*

DIVERSITY AND RELATIONSHIPS IN KEY TRAITS IN PEPPER COLLECTION OF NATIONAL GENEBANK OF BULGARIA

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Abstract

Pepper (Capsicum spp.) is an important vegetable crop in the world. The preservation and study of traditional germplasm collections is an essential element in the expansion of ecotypes To explore the structure of genetic diversity in Bulgaria pepper germplasm resources and possible relationship with cultivar types or geographic origin, we sampled and compared 32 sweet and 20 hot GenBank pepper accessions (local cultivars and landraces) from different regions. The fruits were morphologically characterized based on fruit length, diameter, fresh mass and pericarp thickness, and biochemically analyzed for their content in ascorbic acid content %, fruit dry matter content% and sugars %. All phenotypic traits showed significant differences among the pepper accessions, indicating a wide variability. Significant variations ($p < 0.05$) were detected among the pepper genotypes for all measured traits. The results indicated that the selection of genotypes with better agronomic traits could be achieved from this pepper gene pool. The significant morphological and biochemical differences between the evaluated accessions, are foundations for further breeding programs and a major source of agricultural biodiversity

Key words*: pepper, landraces, germplasm collection, morphological characteristics, fruit quality.*

GENE EFFECTS INVOLVED IN THE MANIFESTATION OF GROWTH CHARACTERISTICS AND RESISTANCE TO THERMAL STRESS

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Abstract

Data are presented on the response of tomato plant growth characters in hybrid combinations F_1, F_2, BC_1, BC_2 and parental forms to stress temperatures (40, 42, 10°C). The reaction of seedlings to high temperatures (40, 42°C) and low positive (10°C) was differentiated depending on the combination, character and temperature level. The calculation of the degree of dominance (h_p) of the growth characters (radicle, stem, whole seedling) of tomatoes demonstrated the significant influence of positive (+), negative (-) dominance factors on their phenotype. By researching the genetic effects involved in the phenotype and the inheritance of the radicle and stem length character, it was found that for each combination, in the control (25°C) and thermal stress (40°C, 42°C and 10°C) variants, effects with positive values (increasing) and with negative values (which decrease) the character. The combinations under study showed duplicated epistasis, which reveals the need for long individual selections in order to obtain tomato genotypes resistant to high temperatures.

Keywords: *tomatoes, varieties, hybrids, gene effects.*

INFLUENCE OF ORGANIC FERTILIZERS ON THE MORPHOLOGICAL DEVELOPMENT AND PRODUCTIVITY IN GREENHOUSE TOMATO

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Abstract

During the period 2022-2023 was studied, the morphological characteristics were monitored of a greenhouse tomato: plant height, number of leaves, number of inflorescences and number of buds per plant in different variants of treatment with organic fertilizers. The results of the morphological analysis show that in terms of plant height, the variants that were fed with organic fertilizers, on average for the studied period, exceed the unfertilized control by 12.2% to 18.5% for Vermilenza and by 14.3% to 23.6% for Grando. The application of fertilizers increases the development index in the studied tomato varieties. With application of the organic fertilizer Siapton, the highest values were recorded for the Grando variety - 10.50 and for the Vermilenza variety - 7.63. A strong positive relationship was established between the indicators `plant height` and `total yield`, with a correlation coefficient for the Grando variety r = 0.91, and for the Vermilenza variety r = 0.89. The nature of the linear relationship between the indicators `plant height` and `number of inflorescences` was determined, with a coefficient of determination $R^2 = 0.846$ for the Grando variety and $R^2 = 0.797$ for the Vermilenza variety.

Key words*: greenhouse tomato, organic fertilizers, productivity, ANOVA.*

PRODUCTION OF POLYPHENOLIC COMPOUNDS WITH HIGH ANTIOXIDANT ACTIVITY IN *MELISSA OFFICINALIS* L. CALLUS LINE

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Abstract

The importance of antioxidant components for disease prevention and health quality improvement has attracted much research attention over the last decades. Aromatic herbs have been recognized as important sources of antioxidants, Melissa officinalis L. being one of the species with many therapeutic actions. Plant extracts represent mixtures of numerous compounds and their biological actions are often attributed to polyphenol components, such as flavonoids and phenolic acids, which possess antioxidant activities. The aim of our research was to obtain and characterize a highly metabolite-producing callus line of lemon balm, with antioxidant activity. Our callus' performances were represented by a very high antioxidant capacity (18.74 mM Trolox equivalents/g DW), a high content of total polyphenols (2.57 mg gallic acid equivalents/g DW) and an especially rich content of flavonoids (19.21 mg rutin equivalents/g DW). This lemon balm callus line was compared to plant tissues grown in ex vitro conditions and proved to have clearly superior productive qualities. Also, our results showed values 4 to 18 times higher than those reported in other studies which investigated different types of lemon balm extracts.

Key words*: callus line, Melissa officinalis L., antioxidant activity, polyphenols.*

IMPACT OF COMPOST APPLICATION ON SOIL AND ZUCCHINI YIELD

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Abstract

The field experiments were conducted in 2024. The soil type is classified as alluvial-meadow with a light mechanical composition. The crop grown was Cucurbita pepo var. giromontia (zucchini). Four variants of compost treatment were developed, with a tested compost application rate of 5 t/da. The treatments included: Variant 1 (control) - untreated soil; Variant 2 - 20% of the optimal compost rate; Variant 3 - 50% of the optimal rate; and Variant 4 - 100% of the optimal rate. The compost used in the experiment was prepared from urban waste provided by the `Capital Waste Treatment Enterprise.` Compost analysis revealed a nitrogen (N) concentration of 16.2 mg/kg, phosphorus (P) at 2.183 g/kg, and potassium (K) at 7.52 g/kg. Measurements included climate data, biometric parameters, and yield. The results showed that the highest compost application rate (Variant 4) had a depressive effect on plant development, suggesting that excessive compost may hinder growth. The study aimed to evaluate the influence of different compost treatments on the yield and quality of zucchini.

Key words*: compost treatment, zucchini yield, urban area.*

RESPONSE OF CATALASE TO MICROBIOLOGICAL AND CHEMICAL SOIL INDICATORS IN SOLE AND INTERCROPPED CABBAGE CULTIVATION

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Abstract

The influence of microbiological and chemical soil indicators on catalase activity in soils under sole and intercropped cabbage cultivation with leek, beans, tagetes, flower mix, and dill has been established. The highest catalase was observed in intercropping cabbage with tagetes (1.63 ml 0_2/30 min.), while the lowest was found in cabbage and leek (1.20 ml 0_2/30 min.). A high correlation was found between catalase and the total microflora in the soil (r=0.90), mainly determined by the activity of non-spore-forming bacteria (r=0.71) and mold fungi (r=0.82). A moderate correlation exists between mineralization activity and catalase (r=0.39), as well as between total microflora and mineralization coefficient (r=0.36). The relationship between catalase and ammonium (r=0.53) and potassium ions (r=0.33) is moderate, while no such relationship was found with phosphorus (r=0.02). The dependence between Fe and catalase is also moderate. A weak influence on catalase activity in the variants was observed from the quantity of bacilli (r=0.30) and actinomycetes (r=0.27), as well as from the content of humus (r=0.18) and carbon (r=0.17). There is no positive correlation between pH and catalase (r=-0.24).

Key words*: catalase, soil microflora, agrochemistry, co-planting, correlations.*

THE INFLUENCE OF CERTAIN AGROTECHNICAL MEASURES APPLIED IN CARROT TECHNOLOGY UNDER PEDOCLIMATIC CONDITIONS OF VERESTI COMMUNE, SUCEAVA COUNTY

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Abstract

Carrots are not particularly sensitive regarding cultivation technology but they require increased attention at certain stages. Some of these stages include the preparation of the seed bed, sowing and fertilization. These factors are: the timing and method of seedbed preparation, the sowing scheme, and the method of fertilization. The study was conducted over three years under the pedoclimatic conditions of Veresti Commune, Suceava County. The aim was to develop an innovative technology to increase production. Following the analysis of the data from the three years of study (2016, 2017, 2018) and the comparative analysis of the experimental variants, a significantly positive difference in production was highlighted in the experimental variant where the seedbed was prepared in the fall, the land was shaped, the sowing scheme was 15+15+75+15+15 and fertilization was done with NPK. In this variant, the production increase was 19786 kg/ha, compared to the variant where the seedbed was prepared in the spring, the land was not shaped, the applied sowing scheme was 15+15+75+15+15s, and fertilization was with NPK.

Key words*: fertilizers, seedbeds, quality, production, sowing scheme.*

EFFECT OF VERMICOMPOST AND SPRAYING WITH AMINO ALEXIN IN IMPROVING THE VEGETATIVE AND YIELD PROPERTIES OF CUCUMBER IN PROTECTED AREA

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Abstract

An experiment was conducted at the organic fertilizers to determine the impact of treatment with Vermicompost (0, 100,200 g/plant) and spraying with Amino Alexin (0, 150, 300 ml/L) on vegetative and yield properties of cucumber variety Cadiar. This study was carried out in one of the orchards in AL-Selman district west of AL-Samawa governorate during the agricultural season 2022-2023. In the qualities that were examined (concentration of N- P- K in leaves, growth rate, fruit diameter, fruit length, yield plant, Total cholorophyll, dry weight of the vegetative growth, dry weight of root, size of root). Results showed that all the treatments effect significantly with most of characters studied and the interaction factor with Vermicompost and Amino Alexin with highest concentration performed superior effect. Fertilizer treatments didn't differ in fruit lenghth and diameter. Relative to spraying concrntrations treatments of Amino Alexin withVermicompost (150 ml/L and 200g/plant) respetively resulted in significantly highest values of leaf content of total chlorophyll and root size and dry matter.

Key words*: Cucumber, Vermicompost, organic, fertilizers, yield, Cadiar.*

EFFECTS OF MONTMORILLONITE-ENRICHED HYDROGELS ON LETTUCE MORPHOLOGY UNDER DROUGHT STRESS

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Abstract

Lettuce is a widely cultivated leafy vegetable that is sensitive to drought stress. Drought stress is a significant environmental factor that adversely affects the growth and development of lettuce. Montmorillonite-infused hydrogels are emerging to mitigate the effects of drought by reinforcing soil moisture retention and facilitating plant growth. This study investigates the impact of different montmorillonite-enriched hydrogel samples (0%, 0.25%, 0.5%, and 1% montmorillonite) on lettuce growth under irrigated (every 3 days) and drought-stressed (no watering) conditions. The study examined various morphological characteristics, including total plant length, leaf count, root length, root weight, root volume, stem diameter, and aerial biomass. The results revealed that the hydrogel formulation with the highest montmorillonite content (1%), produced the most favorable results under irrigated and drought-stressed conditions, promoting enhanced root development (11.90% under drought and 4.17% with irrigation compared to the control sample) and leaf production. The findings underline the potential of montmorillonite-enriched hydrogel formulations to improve lettuce growth under different water conditions, presenting a promising approach for sustainable approaches.

Key words*: drought, hydrogel, Lactuca sativa, montmorillonite.*

INFLUENCE OF CONVENTIONAL AND BIOLOGICAL CONTROL ON POSTHARVEST QUALITY OF TOMATOES

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Abstract

The objective of this experiment was to evaluate the efficacy of some chemical and biological products used in the control of foliar pathogens in tomato crop in greenhouse and their influence on the quality and shelf life of tomato fruits. Conventional products ensured a much higher efficay (>90%) compared to biological ones (<67%). The high moisture content of the fruits contributes to their relatively short shelf life. Water loss not only accelerates the aging process of the fruits but also impacts their quality. This research systematically examines variations in water content, total dry matter, total soluble solids, organic acids, and firmness in tomatoes stored at temperatures of 6°C and 22°C, starting from the time of harvest and extending for 3, 5, 7, and 10 days. Observations indicated that water loss, evidenced by reduced firmness and fruit weight, was associated with an increase in soluble solids and total dry weigt per unit mass. Additionally, the degradation of organic acids in tomatoes was influenced by the storage duration, with increasing temperatures accelerating these transformations.

Key words: *Solanum lycopersicum, biological and conventional control, storage temperatures, postharvest quality.*

EVALUATION OF PHYSIOLOGICAL PROCESSES IN SOME POTATO GENOTYPES CULTIVATED ON SANDY SOILS IN SOUTHERN OLTENIA

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Abstract

This study presents the research conducted at the Dăbuleni Research and Development Station for Plant Culture on Sands, which aimed at monitoring the physiological reactions of 11 potato genotypes, in order to determine their tolerance to the thermo-hydric stress characteristic of the sandy soil area in southern Oltenia. At an air temperature between 33.4 – 35.07 °C and a very strong solar radiation, between 1800-2090 µmol/m²/s, the photosynthesis rate ranged between 6.08 µmol CO²/m²/s for the TS 12-1489-1576 genotype and 15.46 µmol CO²/m²/s for the 22-1941/8 genotype. Calculating the water use efficiency, as the ratio between the photosynthesis rate and transpiration (µmol / mmol), in all experimental variants supraunitary values were obtained, which demonstrates that the plants efficiently used the water lost through transpiration. From this point of view, the genotypes TS 09-1441-1525, TS 12-1489-1576 and TS 16-1527-1867 were highlighted. Between stomatal conductance and the physiological processes of photosynthesis and foliar transpiration, statistically significant correlations were established.

Key words*: photosynthesis, transpiration, climate, potato, sandy soils.*

ALLIUM CEPA SEEDLINGS RESPONSE TO STRESS GENERATED BY CHEMICALS

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Abstract

This research analyzed the response induced by certain chemicals in Allium cepa seedlings under laboratory conditions, University of Life Sciences "King Mihai I" from Timişoara. Onion bulbs with roots were treated with water (V1), copper sulfate ($CuSO_4$ 300 mg L^{-1} –V2), Faster insecticide (0.3 ml L^{-1} –V3, 0.4 ml L^{-1} –V4, 0.5 ml L^{-1} –V5) and Karate zeon insecticide (0.15 mg L^{-1} –V6; 0.20 mg L^{-1} –V7; 0.25 mg L^{-1} –V8). Morphological parameters (root length, RL; leaf number, LN; leaf length, LL) were determined. The results of the experimental trials presented statistical safety ($p<0.001$). For RL morphological parameter, significant differences from the mean ($\overline{RL}$ = 4.62 cm) were shown by the variants V1 (ΔRL = 4.09 cm; $p<0.01$), and variant V2 (ΔRL = -3.32 cm; $p<0.01$). In the case of the LN parameter, significant differences compared to the mean ($\overline{LN}$ = 0.99) were presented by variant V1 (ΔLN = 0.91, $p<0.001$), and variants V2 and V3 (ΔLN = -0.55, ΔLN = -0.50, $p<0.05$). For LL morphological parameter, compared to the mean ($\overline{LL}$ = 4.41), significant differences were presented by variant V1 (ΔLL = 6.07, $p<0.001$), and variants V2 and V3 (ΔLL = -3.39, ΔLL = -2.77, $p<0.05$).

Key words: *Allium cepa, pesticides, morphological indices, root system, seedlings, stress response.*

CONTENT OF MICROELEMENTS IN FRENCH BEAN PODS FROM DIFFERENT CULTIVATIONS

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Abstract

The aim of this work was to determine how the cultivation method affects the microelements content of the French bean (Phaseolus vulgaris L.*) pods. The pod samples were collected in the city of Zagreb at three markets, three retail chains and three stores selling organic products. The concentrations of iron, zinc, manganese and copper were determined using an atomic absorption spectrometer. The value of the dry matter in the pods was between 6.74 and 12.54 %. The proportion of microelements in the dry matter of the pods (mg/kg ST) was Fe 49.86-188.9, Zn 23.43-43.47, Mn 2.53-42.3, Cu 6.57-9.74, and in the fresh matter (mg/100 g fresh matter) Fe 0.49-1.96, Zn 0.19-0.42, Mn 0.03-0.32 and Cu 0.05-0.11. According to the Regulation on the provision of food information to consumers, it can be concluded that the consumption of 100 g of the studied french beans tested covers 4.21-8.0% of the daily human requirement of iron, 2.5-3.8% of the daily requirement of zinc, 4.0-13.0% of the daily requirement of manganese and 7.0-8.0% of the daily requirement of copper.*

Key words*: copper, iron, manganese, Phaseolus vulgaris* L.*, zinc.*

ANALYSIS OF SOME ROMANIAN CUCUMBER GENETIC RESOURCES

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Abstract

Cucumbers are a valuable source of nutrients and bioactive substances, used both in food and for therapeutic purposes. Improving drought tolerance in this species is essential and can be achieved through the application of innovative methods and technologies. These include the analysis of specific genes, signal transduction pathways, plasma membrane permeability, osmotic potential, as well as the content of antioxidants, soluble carbohydrates, chlorophyll, ions, and hormones. Keywords: abiotic stress, biotic stress, enzymes, genetic resources, nutritional quality. The paper highlights the critical role of modifying plasma membrane permeability, osmotic potential, and genes involved in managing abiotic stress. The study analyzes cucumber responses to stress factors such as drought, heat, and salinity, offering insights into antioxidant enzymes, physiological parameters, and essential genes for adaptation. This information contributes to the development of resistant varieties and promotes sustainable production.

Key words*: abiotic stress, biotic stress, enzymes, genetic resources, nutritional quality.*

STUDY ON THE IDENTIFICATION OF CUCUMBER VARIETIES DEVELOPED IN ROMANIA. A REVIEW

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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 variety is 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*: cucumbers, cultivars, greenhouses, high tunnels and fields.*

PARASITOID NATURAL ENEMIES OF LEPIDOPTERAN PESTS ON KALE (*BRASSICA OLERACEAE* L. VAR. *ACEPHALA)* IN URBAN ENVIRONMENT

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Abstract

Intercropping has become a valuable agroecological method for improving pest management and decreasing the dependence on chemical inputs in urban farming. This experiment was conducted in Sofia, Bulgaria, in urban experimental field. Kale "Nero di Toscana" (Brassica oleracea convar. acephala var. palmifolia) was intercropped with repellent and attractant companion plants - Lobularia maritima, Borago officinalis, Fagopyrum esculentum, Tropaeolum majus, Calendula officinalis, Tagetes patula, Anethum graveolens, Coriandrum sativum, Petroselinum crispum, Ocimum basilicum and Allium porrum. Three families of butterflies were reported as iconomically importants pests to kale plants - Plutellidae, Pieridae and Noctuidae. Their parasitoid complex is described and the relationships between the companion plants and different species of wasps and Tachinid flies is discussed.

Key words*: intercropping, Noctuidae, Parasitoids, Pieridae, Plutellidae, urban agriculture.*

SCREENING OF GENE EXPRESSION ASSOCIATED WITH SALINITY AND UVB TOLERANCE IN LOCAL TOMATO LANDRACES

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Abstract

Rapid climate change in recent years may significantly impact future generations through various climate factors affecting crop production. As a result, a primary global concern is developing new crop plant varieties that are more resistant to abiotic stress factors such as high temperatures, salinity, drought, and UVB radiation. These new plant varieties may be selected from local landraces that thrive in the affected soils. Therefore, the present study focuses on several local tomato landraces from northwestern Romania, cultivated in soils impacted by salinity, drought, and high temperatures. This research evaluated the gene expression of selected genes related to abiotic stress, aiming to identify valuable molecular traits among the local landraces that confer resilience to fluctuating environmental conditions. This approach could allow for the breeding of new tomato varieties to meet the food industry and consumers' quantitative and qualitative demands.

Key words*: climatic changes, DREB, HSP70, gene expression, PSIID2, SOD.*

ENZYMATIC AND ANTIOXIDANT ACTIVITIES OF SEVERAL EDIBLE MUSHROOMS SPECIES

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Abstract

Edible mushrooms are widely consumed for their nutritional value, bioactive compound content, and good taste. The objective of this study was to evaluate and compare the enzymatic and the antioxidant activities of six species commonly marketed in Romania (Pleurotus ostreatus, Agaricus bisporus white, *Agaricus bisporus* brown, *Lentinula edodes (Shiitake), Shimeji* white and S*himeji* brown. *The enzymatic activity of superoxide dismutase (SOD), catalase (CAT) and soluble peroxidase (POX) as well as the antioxidant activity against DPPH (2,2-diphenyl-1-picrylhydrazyl) radical and ABTS (2, 2'- azino -bis(3-ethylbenzothiazoline-6-sulfonic acid)) radical cation were determined by colorimetric methods. The studied mushroom species have appreciable antioxidant enzymatic activities with an important role in human health. Pleurotus ostreatus is distinguished as having the highest antioxidant activity and high enzymatic activity. The results of this study recommend introducing the investigated mushrooms in diet as a source of exogenous antioxidants.*

Key words*: antioxidant, enzymes activity, mushrooms, polyphenols.*

THE INFLUENCE OF GENOTYPE AND ENVIRONMENTAL FACTORS ON THE NUTRITIONAL COMPOSITION OF *ROSA CANINA* L. FRUITS

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Abstract

This study aimed to determine how factors such as genotype and place of cultivation influence the variation of nutritional compounds that constitute the nutraceutical profile of Rosa canina L. fruits. These fruits can be integrated as a functional food in the daily life of the Romanian population. Twelve genotypes of Rosa canina L. were studied, for which the following average values were determined and recorded: total dry matter (46.54%); titratable acidity (40.32 mg/s fw); reducing sugar content (23.32%); total polyphenols (48.07 mg GAE/100 g fw), ascorbic acid content (7.04 mg/100 g fw); ABTS antioxidant activity (182.48 µMTE/g fw) mg/100 g). The results obtained showed that the determining factor is the genotype that induces significant variations in the content of nutritional compounds. The high values of the nutritional compounds determined in this study justify the high nutritional potential of these fruits originating from spontaneous flora and their use as natural medicines.

Key words*: antioxidant activity, Rosa canina L, total polyphenols, vitamin C.*

MORPHOLOGICAL AND AGRO-BIOLOGICAL CHARACTERIZATION OF LOCAL AND INTRODUCED GERMPLASM OF COMMON BEANS (*PHASEOLUS VULGARIS* L.).

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Abstract

Phaseolus germplasm collection has a considerable potential value which can be widely used in breeding work as well as for direct use by farmers. The objective of the present research was to make morphological, agro-biological and agronomic characteristics of local and foreign accessions in order to select those with desirable traits. The study was carried out during the period 2021-2023 with 35 accessions of common bean (Ph. vulgaris L.). The accessions were with maturity from 84 to 98, with mean value of 88,5 days. Six accessions were the earliest with 84 days, while the latest were with maturation of 98 days. Two accessions showed higher grain yield from one plant (C1E0076, 93201018) with 17.8 and 18.9 g, respectively. Bigger variation was registered in weight of plant without pods and weight of plant, as well as number of pods and weight of seeds per one plant with coefficient of variation (CV%) 94.8, 57.0, 51.2 and 44.5%, respectively. The promising accessions will be selected as the most perspective with a view of their future utilization in the breeding process.

Key words*: common bean, origin, germplasm, characterization, evaluation.*

THE INFLUENCE OF SOIL TYPES ON SEEDS GERMINATION AND PLANTS HEALTH TO DIFFERENT SPECIES OF VEGETABLES

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Abstract

Vegetable yield is significantly influenced by the pedoclimatic conditions in the growing areas, by the applied technology and by the level of soil infection with different pathogens. We worked with 7 soil samples from Cluj County and 7 samples from Arad County. The soil samples were analyzed in terms of infection levels with various soil pathogens that cause seed rot and `damping-off`. The presence of pathogens was determined by the `trap plants` method. The experiment was performed in laboratory conditions, at an average temperature of 20.6-26.0 ° C and average relative humidity of 34.5-46.4%. In the soil samples it was determined the presence of soilborne pathogens Pythium debaryanum, Phytophthora parasitica and Rhizoctonia solani which cause seed rot and `damping-off`. Soil samples from Cluj County presented the largest number of `fallen` cabbage plants. Arad County showed the highest number of `fallen` tomato plants, 38 `fallen` cucumber plants.

Key words*: pathogens, nutrients, damping-off, Pythium debaryanum, Phytophthora parasitica, Rhizoctonia solani.*

PRESERVING BELL PEPPER QUALITY THROUGH FREEZING BY ASSESSMENT OF PRE-TREATMENT CONDITIONS AND FREEZE-DRYING EFFECT

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Abstract

Bell peppers (Capsicum annuum) are a widely consumed vegetable; however, their highly perishable nature necessitates the implementation of preservation techniques to prolong their storage potential. This study sought to analyze and characterize the biochemical properties and freezing suitability of several bell pepper varieties, including Cantemir, Buzău 10, Arum, and Galben superior, which the Buzău Research and Development Station has approved for Vegetable Growing. This research endeavored to identify the bell pepper variety most suitable for long-term frozen preservation based on an evaluation of their physicochemical attributes. In order to determine the effect of the freezing process on the products, four sample variants were studied: fresh vegetables, immediately after harvesting; blanched vegetables; fresh vegetables, preserved by freezing and thawed at certain periods of time; blanched vegetables, preserved by freezing and thawed for certain periods of time. In this study, a series of analyses and observations were conducted on the pepper fruits to assess various characteristics, such as humidity content, ascorbic acid content, total polyphenol content, acidity, and antioxidant activity at different maturity stages.

Key words*: bell pepper, varieties, freezing suitability, physicochemical properties.*

PHYSIOLOGICAL REACTION OF CABBAGE (*BRASSICA OLERACEA* L.) TO HEAT STRESS

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Abstract

Head cabbage (Brassica oleracea) is an important vegetable, rich in vitamin C, dietary fiber, and health-promoting nutrients. Head cabbage grows mainly at low temperatures, and exposure to high temperatures leads to reduced disease tolerance and lower yields. The selection of varieties tolerant to high-temperature stress is an important goal in the cultivation of cabbage crops. We conducted a comparative test in 2022-2023 to determine the sensitivity/tolerance of the photosynthetic apparatus to the abiotic stress factor of high temperature in 7 cabbage breeding lines belonging to the late maturity group: lines 503-2, 16-2, 5-1, 15-2, and 22-27, as well as the varieties Maritsa 48/5 and Puldiner. We studied the impact of the high temperature factor on the state and functional activity of the photosynthetic apparatus by analyzing the characteristics of chlorophyll fluorescence of photosystem 2, chlorophyll content in the leaves, and the relative leaf water content during the seedling phase and the beginning of cabbage shrinkage.

Key words*: high temperature, Brassica oleraceae var capitata L., photosynthesis, plant water relations, chlorophyll fluorescence.*

IMPROVING PLANT CANOPY MICROENVIRONMENT CONDITIONS BY USING DOUBLE CHANNEL AERATION CULTIVATION SYSTEM IN A PLANT FACTORY: SIMULATION ANALYSIS AND EXPERIMENTAL STUDY

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Abstract

To address the current issues in plant factories including stagnant airflow in plant canopies, uneven distribution of environmental factors, and high complexity of environmental control systems, this study developed an integrated double-channel aeration cultivation system (DCAS) combining ventilation ducts with cultivation tanks. A three-dimensional computer fluid dynamic model was developed and validated through simulating the airflow distribution within the plant canopy under different ventilation parameters. Results showed that compared with CK, the experimental groups demonstrated better performance in lettuce growth, canopy microenvironment and heat exchange with the surrounding environment. Under T2 treatment, the dry and fresh weights of lettuce shoots increased by 24% and 14%, respectively, compared to those under the CK. The canopy microenvironment and heat exchange reached optimal status under T3 treatment, where the average relative humidity and air temperature in lettuce canopy decreased by 8.8% and 2.8°C, respectively, compared to those under the CK. Additionally, DCAS ventilation effectively reduced the incidence of tipburn in lettuce. The above results indicate that the DCAS can be considered as an effective system for improving canopy microenvironment, plant growth and reducing tipburn occurrence.

Key words*: plant factory, airflow, CFD, canopy microenvironment, plant quality.*

IMPACT OF HEAT AND DROUGHT STRESS ON THE RESPONSE OF THE PHOTOSYNTHETIC APPARATUS OF POTATO PLANTS *(SOLANUM TUBEROSUM* L.)

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Abstract

The pot experiments were carried out in a greenhouse during 2018-2021. Plants were subjected to stress factors during the reproductive period (bud formation and flowering phases), which is considered particularly critical for potato plants. The influence of drought and high temperature on the condition and functional activity of the photosynthetic apparatus was studied by analyzing the chlorophyll fluorescence characteristics of the photosystem II and the content of total chlorophyll in the potato leaves. The cultivars were subjected to two water levels (75%–80% and 45%–50%), which represented the well-watered and moderate drought stress conditions. The obtained results show that the applied stress during the budding-flowering phenophases has a negative impact on the activity of the photosynthetic apparatus (PSA) of potatoes, as expressed by the changes in the chlorophyll fluorescence values. A genotypic differentiation was found in studies of a set of potato samples regarding their response to the abiotic stress factors of high temperature and drought.

Key words*: potato, breeding, abiotic stress, photosynthetic apparatus, chlorophyll fluorescence.*

RESEARCH OVER THE INFLUENCE OF LED LIGHT RECIPES ON THE MORPHOLOGICAL AND BIOCHEMICAL ATTRIBUTES OF BASIL PLANTS

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Abstract

This study investigates the optimization of vertical hydroponic systems for leafy vegetables under controlled environmental conditions, focusing on Ocimum basilicum cultivars `Genovese` (green basil) and `Dark Opal` (red basil). The research aimed to identify the influence of LED light recipes on the morphological and biochemical attributes of basil to establish parameters for high-quality production. The experiment utilized vertical farming equipment with three LED light configurations and a peat-based substrate. Growth conditions, including fertigation, temperature, and light exposure, were precisely managed. Morphological parameters such as leaf area, length, and width were measured using imaging software, while biochemical analyses encompassed dry matter content, antioxidant activity, chlorophyll, carotenoid, and anthocyanin levels. Physiological processes like photosynthesis and transpiration were also evaluated. The findings demonstrated significant effects of light configurations on plant traits. Green basil under a specific LED recipe achieved the highest dry matter content (12.54%) and antioxidant activity (78.05%), while red basil exhibited enhanced anthocyanin accumulation, reaching 188.06 mg C3-G equivalent/100 g. These results show the role of lighting in improving both the nutritional quality and productivity of basil in vertical farming systems.

Key words*: vertical farming, hydroponic systems, growing lights, Ocimum basilicum.*

OPTIMIZING TOTAL RNA EXTRACTION PROTOCOLS FROM YOUNG LEAVES FOR ENHANCED GENE EXPRESSION ANALYSIS

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Abstract

Accurate gene expression analysis using real-time PCR (qPCR) requires high-quality RNA, making the optimization of RNA extraction protocols a crucial step in molecular biology research. This study focuses on refining a total RNA extraction protocol using young leaves as the starting material to maximize RNA yield, purity and integrity. Several extraction methods were tested and optimized by adjusting key parameters, including lysis conditions, purification steps and DNase treatment. The optimized protocol resulted in high-purity RNA with minimal degradation and contamination, as confirmed by spectrophotometric analysis, agarose gel electrophoresis and RNA integrity number (RIN) assessment. The extracted RNA will be used for cDNA synthesis and qPCR, in order to demonstrate its suitability for gene expression analysis. The improved method will ensure reproducibility and efficiency, providing a reliable approach for molecular studies involving plant gene expression. This optimized protocol can be applied to various plant species, facilitating functional genomics and transcriptomic studies.

Key words*: RNA extraction, young leaves, gene expression, protocol optimization, plant molecular biology.*

EVALUATION OF THE COMBINING ABILITY AND HETEROSIS IN EGGPLANT PARENTS FROM BRGV BUZĂU FOR OBTAINING VALUABLE F1 HYBRIDS

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Abstract

This study evaluates the combining ability and heterosis phenomenon in eggplant (Solanum melongena L.) parents to obtain valuable F1 hybrids. The research was conducted at the Plant Genetic Resources Bank (BRGV) Buzău and included 70 parental lines selected for genetic stability and distinct phenotypic expression. Testing the general (GCA) and specific (SCA) combining ability led to the identification of 31 hybrid combinations with high potential. The results indicated a strong manifestation of heterosis in most combinations, with 23 hybrids showing a 30% yield increase compared to their parents. Additionally, 35 hybrid combinations demonstrated high offspring uniformity, crucial in selecting new genotypes. In conclusion, the study highlights the importance of using local genetic material in eggplant breeding, contributing to reducing dependence on imported hybrid seeds. These findings offer promising perspectives for developing competitive hybrids adapted to local climatic conditions, thereby supporting the progress of the Romanian vegetable sector.

Keywords*: breeding, genetic diversity, hybridization, phenotype, resistance.*

PRODUCTIVITY PARAMETERS OF SWEET CORN CULTIVATED UNDER METEOROLOGICAL CONDITIONS OF PLOVDIV

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Abstract

Sweet corn falls into the group of vegetable crops with great sensitivity to environmental conditions. In conditions of climate change, the manifestations of its productive parameters arouse high scientific interest due to the wide application of this crop. Therefore, the purpose of this study is a comparative analysis of four promising sweet corn varieties for Bulgaria - names Zeaton F1, Turbo F1, HMX5389 F1 and HMX59YS832 F1. The experiments were carried out under the meteorological conditions of 2023 and 2024 on the territory of the Agricultural University of Plovdiv. The results obtained provide information about the productive and morphological parameters of the varieties. The variety with the shortest vegetation period Turbo F1 has the best productive parameters ear mass, number of rows in the ear, number of grains per ear, grain weight per ear, weight of 1000 grains and length of the grain. The correlation analysis calculated the strongest relationship between ear mass and both, the kernel weight per ear and the mass of 1000 kernels.

Key words*: productivity parameters, sweet corn, heat stress.*

APPLICATION OF WEB-BASED TOOLS FOR DOCUMENTATION OF HORTICULTURE LOCAL VARIETIES – BULGARIAN AND SLOVAKIAN EXAMPLE

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Abstract

Plant genetic resources play an important role in maintaining global food security, conserving biodiversity and promoting sustainable agriculture. The paper aims to explore the data management, digitization and cataloguing the horticulture traditional varieties conserved ex situ/on farm. The approaches include development of optimised databases and web-based tools in accordance with FAO/Bioversity descriptors. Intelligent technologies are used for creating public access under the Nagoya Protocol and equitable sharing of benefits from the use of gene pool under the International Treaty on Plant Genetic Resources for Food and Agriculture. The interdisciplinary approach for promoting the local varieties is a part from their valorisation as biocultural heritage. The results have an impact to the modernisation of genebank documentation systems and for reintroduction of plant diversity to the home gardens and farms. The study contributes to environmental protection and sustainable preservation of gene pool, according to the national conservation strategies of Bulgaria and Slovakia.

Key words*: plant diversity, horticulture crops, genebanks, information systems, European networks.*

INNOVATIVE TECHNIQUES FOR MONITORING AND EFFICIENT MANAGEMENT OF THE BULGARIAN GENEBANK

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Abstract

Every country is responsible for preserving its gene pool as a national capital. The genebank, located in Sadovo, is the main center for the long-term conservation of the plant diversity of Bulgaria. The research focuses on the development and implementation of innovative technologies for the management and storage of plant genetic resources. The main goal is to optimize the quality and efficiency of the processes in the National Genebank by intelligent systems and sensor networks to facilitate the monitoring of the accessions. The component for notification of control tests of the seeds and an interface for monitoring the chambers, as well as algorithms for intelligent search in ontologies are implementing. The importation of evaluation seed data from external devices is answering the need of digitalization of the genebank. The results have a significant scientific and public contribution leading the increase of the functionality and security of the genebank fund. The IS-PGR-SADOVO project supports the establishment of the quality standard for ex situ storage, in accordance with the Operational Guide for the Bulgarian Genebank, approved by the ECPGR Management Committee (2023).

Key words*: seed accession, genebank, long-term conservation, innovation, digitalization.*

ALLELOPATHIC EFFECT OF WEED SPECIES ON TOMATO (*SOLANUM LYCOPERSICUM* L.)

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Abstract

Allelopathy is included in the sight of sustainable agriculture and has been intensively studied in recent years as a phenomenon relevant in plant populations. Weedy plants are part of the biodiversity in the agrophytocenosis. The aim of the laboratory study was to determine the allelopathic relationships between tomato and weed species- Convolvulus arvensis, Cirsium arvense, Portulaca oleracea, Amaranthus retroflexus, Stellaria media etc. The experiment was conducted in 2018-2019 in the laboratory of the Department of Agroecology at the Agricultural University - Plovdiv with a test plant - Tomato, variety `Banonia` by the method of Grozdinsky and Rudakov (1976). Seed germination percentage, biometric parameters, biomass were recorded. The allelopathic activity was estimated using the inhibition rate (IR) parameter according to the formula of Ahn & Chung (2000). Statistical data processing was performed using Microsoft Office Excell- St.Dev. and Duncan`s multiple range test. Based on the results obtained from the interaction between weedy vegetation and the crop - tomato weed control can be effectively implemented.

Key words*: allelopathy, organic farming, tomato, weed species.*

FLORICULTURE, ORNAMENTAL PLANTS, DESIGN AND LANDSCAPE ARCHITECTURE

THE EFFECT OF FOLIAR APPLICATION OF POTASSIUM SILICATE AND NANOSILICON ON GROWTH, PHYSIOLOGICAL AND BIOCHEMICAL PROPERTIES OF (*FRANKENIA THYMIFOLIA* DESF.) PLANTS UNDER DIFFERENT IRRIGATION REGIMES

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Abstract

The paper aimed to present the effect of foliar application of potassium silicate and nanosilicon on growth, physiological and biochemical properties of (Frankenia thymifolia Desf.) plants under different irrigation regimes in Iraq. It is based on the statistical data provided by Ministry of higher education. This experiment was conducted in order to investigate the effect of silicon sources (potassium silicate and nanosilicon) spraying to modulate drought stress on Frankinia (Frankenia thymifolia Desf.) in 2022-2023. The experiment was conducted as a factorial based on a completely randomized design (CRD) in 3 replications. Experimental treatments include drought stress at three levels (control, 75 and 50% field capacity (FC)) and foliar applied silicon at 5 levels (control, potassium silicate at 10 and 20 mM, and nanosilicon (silicon dioxide) at 1.5 mM and 3 mM). The results showed that drought stress led to a significant reduction in growth.

Key words*: frankinnia, nanosilicon, tench, DPPH.*

IN VITRO MULTIPLICATION AND ACCLIMATIZATION OF THE ROYAL FERN, *OSMUNDA REGALIS* L.

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Abstract

Osmunda regalis L. *(royal fern) is a species with special ornamental values that can reach 2.5 m in height. The species is extinct in Romania and threatened in several European countries, it prefers humid habitats with spores having a short viability period. . Our studies focused on the introduction of this species in in vitro culture, in order to propagate the sporophytes and subsequent acclimatization. The spores were sterilized and inoculated on the nutrient medium MS ½, the differentiation of the protalli being achieved after approximately 3 weeks from the initiation of the culture. Sexual multiplication was achieved by differentiating sporophytes in gametophytic cultures on nutrient depleted medium MS½ without ammonium nitrate and vitamins. Later, clonal multiplication was achieved by detaching the sporophytes and subcultivation on the same type of medium. Acclimatization was carried out on seven substrate variants, with different pH, composition and granulation, the best results being obtained on the substrate which contained 80% peat and 20% humus. Through this technique, it was possible to obtain viable sporophytes, also, rooting and acclimatization at the greenhouse level for horticultural exploitation or the repopulation of suitable habitats.*

Key words*: Osmunda regalis, fern, gametophyte, sporophyte.*

ENVIRONMENTAL FACTORS AFFECTING THE CONDITION OF *PLATANUS ACERIFOLIA* (AITON) WILLD. URBAN STREET TREES IN SOFIA

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Abstract

Street trees are the most vulnerable element of the urban green infrastructure, subjected to many stressors. One of the most popular street tree species worldwide is Platanus acerifolia (Aiton) Willd. In recent years, its number in the streetscapes of Sofia has shown a noticeable increase. The aim of these research is to identify the most important environmental abiotic and biotic and anthropogenic factors affecting the condition of London Plane urban street trees. Along with the phytosanitary status assessment of the trees, the poor maintenance practices and design with the city`s infrastructure conflicts were considered. The results provide guidance for the management of London plane street trees in the urban green infrastructure in order to enhance its environmental benefits.

Key words*: London plane, green infrastructure, stressors.*

EFFECT OF SOME STIMULANTS ON SEED GERMINATION OF *CANNA* × *GENERALIS* `CANNOVA SCARLET`

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Abstract

The research presents the effect of commercial stimulators on seed germination, sprouting rate, speed and vigor index in Canna x generalis `Cannova Scarlet`. The experiment consisted of 4 variants with 3 replicates, each replicate with 15 seeds. Seed wetting was performed with water for control V1, Atonik for V2, Keyasol for V3 and Verde Start for V4. The results obtained in the study show that Atonik and Keyasol had the best effect on germination, sprouting rate, speed and plant growth in Canna x generalis `Cannova Scarlet`. In all variants treated with the stimulator, an increase in germination percentage was obtained compared to the control variants (43% V2, 45% V3 and 15% V4). The plant vigor index increased in all variants in which the seeds were treated with the stimulator, with the highest values being obtained in variants V2 and V3. The correlations between root number and root length showed a positive correlation in most variants, stronger in V2 and V3 plants.

Key words*: pre-sowing treatment, sprouting rate, seed germination, velocity, vigor index.*

BUTTERFLIES IN THE URBAN LANDSCAPE – CASE STUDY: TEILOR PARK FROM BUCHAREST, ROMANIA

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Abstract

In the Teilor Park (Linden Tree Park) in Bucharest, we carried out observations on the species of butterflies between July 2022 and November 2024. Butterflies are appreciated for their beauty, being a source of inspiration, they are pollinators and indicators of environmental quality. Pesticide pollution and urbanization through fragmentation of habitats cause a decrease in the diversity of insect species, including butterflies. We made a list of plant species in the park, to identify possible food sources for larvae and adults. Periodic visits carried out along the transects organized along the alleys, as well as observations on the slopes, noting: the species of butterflies, the number for each species and the plants on which the feeding behaviour of the adults was observed. We took photos of the butterflies and especially photos of the butterflies visiting flowers. We were able to identify 21 species of butterflies. As the investigated area is relatively small (7 ha), we can appreciate that the park supports relatively well the diversity of butterfly species.

Key words*: butterflies, biodiversity, urban landscape.*

FRACTAL ANALYSIS IN THE COMPARATIVE STUDY OF *GINKGO BILOBA* L. TREES

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Abstract

The study aimed to detect female and male plants of the species Ginkgo biloba L. based on the fractal properties of leaf geometry. Leaf samples (40 leaves) were taken from female and male tree specimens, from different locations (Timisoara and Deva). To obtain representative samples, by leaf size category, samples were taken randomly, in autumn after leaf fall, on the leaf carpet on the ground, under the crown projection. The box-counting method was used to analyze the leaf geometry and obtain the values of fractal dimensions (D). The fractal analysis led to the fractal dimensions (D), denoted D(F1), D(F2) for female tree specimens and D(M1), D(M2) for male tree specimens. The mean values of the fractal dimensions were D(F1) = 1.6737 ± 0.0069, D(F2) = 1.5842 ± 0.0125, D(M1) = 1.4947 ± 0.0107, D(M2) = 1.5146 ± 0.0051. Each sample D(F1), D(F2) was analyzed compared to each sample D(M1), D(M2). Comparative analysis of fractal dimension values (means, medians) from female and male specimens led to statistically significant differences ($p<0.001$). Fractal analysis was a reliable method for detecting the two categories of trees, female and male, under the study conditions.

Key words: *box-counting, comparative analysis, fractal dimension, ginkgo leaves, hierarchical clustering.*

STUDIES ON THE DEVELOPMENT OF A *PAULOWNIA* PLANTATION IN ROMANIA

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Abstract

Paulownia is a remarkable tree, known for its rapid growth, being one of the most promising horticultural species in Romania. With impressive development, this plant can reach commercial maturity in just 3-6 years, provided that certain essential factors are respected, such as pedological, agrochemical, and agrotechnical conditions, along with specific maintenance work. In a detailed study, two hybrid varieties of Paulownia were analyzed: 'Cotevisa 2' and 'Superhibrid Z07F1'. These are cultivated in the Paulownia Sipote plantation, located in the picturesque village of Sipote, in Iași County. The plantation was established in 2021, which is also when the measurements began. During the first four years of development, the establishment and maintenance work, as well as the growth of these varieties, were closely monitored. Rigorous statistical calculations were performed to evaluate progress and identify the factors contributing to the successful cultivation of Paulownia in Romania. The main goal is to collect and analyze valuable data to support farmers in the efficient cultivation of this promising tree.

Key words: *Paulownia, tree, variety, irrigation, diameter, experimental variants.*

REVIEW ON THE CHEMICAL COMPOSITION OF THE ESSENTIAL OIL OF *LAVENDER* SPP. AND ITS APPLICATIONS

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Abstract

Lavandula spp., known as lavender, is part of the Lamiaceae family, is an aromatic plant with various uses, the most important of which are pharmaceutical (medicinal), food, cosmetic, detergent, industrial, perfumery, etc. The Lamiaceae family includes 47 species of flowering plants, and from Lavandula spp. we can mention: Lavandula angustifolia, Lavandula dentata, Lavandula lanata, Lavandula latifolia, Lavandula multifida, Lavandula pedunculata, Lavandula stoechas, Lavandula viridis, etc. The present work reviews studies and research carried out from the literature of the last 10 years (2014-2024), regarding the characteristics and properties of Lavandula spp., thus providing a comprehensive picture regarding the use of essential oils and extracts in various fields. Variability of essential oil is discussed depending on lavender species, geographical area (where it is grown), plant material (flowers, leaves, whole plant) as well as extraction methods. Key words: chemical compounds, essential oil, Lavandula, multiple applications, oil variability.

Key words*: chemical compounds, essential oil, Lavandula, multiple applications, oil variability.*

SALT-TOLERANT CROPS: A KEY TO RESILIENT AND SUSTAINABLE CROP SYSTEMS

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Abstract

Understanding the germination conditions of seeds, especially in saline environments with varying salinity, is crucial for developing horticultural systems that are resilient to climate change. Recent studies highlight the importance of understanding plant behavior in such environments to optimize the use of natural resources and develop crops that can survive under high salinity conditions. Adapting to these extreme conditions can significantly contribute to food security and protect ecosystem diversity, positively impacting both agriculture and urban landscapes. In this context, research on the germination of salt-tolerant seeds is essential for creating sustainable solutions that support the development of edible and ornamental crops, capable of meeting social and economic needs in an era marked by rapid climate change. By understanding these processes deeply, we can promote innovative solutions that help both adapt to current climatic conditions and mitigate future impacts. This study highlights the morpho-anatomical characteristics of seedlings during the germination period in different saline conditions.

Key words*: climate change adaptation, halophytes, resilient horticultural systems.*

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

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Abstract

Pestalotiopsis funerea is one of the most frequently reported fungus on thuja plants from nurseries, landscape arrangements and gardens. The species of Pestalotiopsis are 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.*

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

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Abstract

Carulaspis juniperi (Bouché) (juniper scale) is known in general as pest of the coniferous, and especially of the juniper (Juniperus spp.). It belongs to Diaspididae family, genus Carulaspis. In Romania, the literature is poor regarding the information available about this pest that 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, the plants losing their aesthetic value. Identification of the pest was performed with classic methods (visual analyses of plants and at stereomicroscope in laboratory). There were collected samples from 15 thuja plants from Timișoara and Calacea area (Timiș County). On the plants were observed juniper scales located individually or in colonies on leaves, young stems 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 and 4 (marks according with Borhsenius scale). The frequency of the attacked plants was 100%.

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

INNOVATIVE FORESTRY SOLUTIONS APPLIED IN URBAN GREEN AREAS FOR MICROECOSYSTEMS REGENERATION

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Abstract

Increased urban temperatures and poor precipitation have a significant impact on mature trees, which are essential for urban ecosystems. In the present research, a share of 40% trees lost in the past two years was replaced with 6000 young trees from 20 native species, using the Miyawaki method of Tiny Forests (miniature forests). These dense forests of native species can not only quickly recreate natural ecosystems in small spaces, but also have many benefits such as restoring biodiversity, absorbing pollutants, reducing temperatures and increasing ecological resilience. The method was applied in an urban park, as an innovative solution not only for the rapid regeneration of green spaces, but also to complement the loss of mature trees and reduce pollution and urban heat islands effects. This planting solution required interdisciplinary team of landscape architects, forestry and horticultural experts, highlighting the need of long-term planning for more resilient and sustainable urban green spaces.

Key words*: Tiny forest, resilience, extreme weather, trees, shrubs, sustainable ecosystem.*

EVALUATION OF *PHYLOSTACHY PUBESCENS* SPECIES IN TERMS OF SUITABILITY FOR PROPAGATION BY AERIAL MARCOTTING

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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 by vegetative propagation. As a result, the present research was undertaken in order to identify an appropriate method of vegetative macropropagation in the bamboo species Phylostachis pubescens, the only bamboo species acclimatized for regions with a temperate climate, including for Romania. 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 regarding in particular the vegetative propagation. The results of the present research have shown that by using alternative multiplication methods, it is possible to produce an abundance of seedlings in the bamboo species Phylostachis pubescens within 12 months, covering market requirements, under minimal input conditions.

Key words*: bamboo, Phylostachys pubescens, vegetative propagation, aerial marcotting, rooting biostimulants.*

THE BEHAVIOR OF *ARUM ITALICUM* MILL. IN IAŞI ECOLOGICAL CONDITIONS (NORTHEASTERN ROMANIA)

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Abstract

The genus Arum includes approx. 29 species and is the only genus of the family Araceae with representatives reaching the temperate zone of Europe. The present study aims to bring to attention a species of Arum native to the Mediterranean area (A. italicum Mill.), in order to establish the possibility of being cultivated in Iași, in the NE area of Romania. Phenological and biometric observations of plants in experimental crops were compared with data from the literature reported for plants in natural habitats. It was found that in the conditions of Iași, A. italicum wintered in the field without protection (it behaved like a rustic geophyte), but the foliage, formed in autumn, disappeared during the summers when very low temperatures occurred and reappeared in spring (March), and flowering began at least a month later. The biometric determinations on morphological characters of decorative interest were within the limits specified in specialized bibliographic references. The results obtained show a good ability of the species to adapt to a temperate continental climate with excessive variations and can be recommended for garden decoration.

Key words*: ecological adaption, italian lord-and-ladies, ornamental characteristics, photosynthetic pigments.*

MORE THAN JUST AESTHETICS: QUANTIFYING THE MONETARY VALUE OF TREE ALIGNMENTS IN "CATACUZIONO" PARK FROM FLOREŞTI – PRAHOVA COUNTY

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Abstract

Floresti Domain embeds a historic park designed by landscape architect Karl Friedrich Wilhelm Meyer, that features tree lines that contribute significantly to its aesthetic and ecological value. This study quantifies the economic value of these trees using the BEVA (Bareme d'Evaluation de la Valeur d'un Arbre) method. This method considers factors like tree size, species value, aesthetic contribution, health, and location to determine a monetary value for the presence of each tree within the general setup. The research relies on a smart tool used to make the tree inventory and to analyse data from three main tree lines: Aesculus hippocastanum L. (horse chestnut), Juglans regia L. (walnut) and Tilia tomentosa Moench (silver linden). The paper describes the evaluation process and provides an estimation for the total value of the targeted tree population. The study also reveals that inadequate management and vandalism have resulted in a 26% reduction in the potential value of these trees. The BEVA method provides a practical tool for assessing the financial value of trees in urban landscapes, facilitating informed management decisions and promoting better tree care.

Key words*: tree value, BEVA, TreePlotter, Cantacuzino Domain, Karl Friedrich Wilhelm Meyer.*

CENOLOGY, ECOLOGY AND DISTRIBUTION OF POPULATIONS OF *VIOLA HYMETTIA* BOISS. & HELDR. (VIOLA, SECT. MELANIUM) ON THE SANDS OF SOUTHERN OLTENIA, ROMANIA

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Abstract

The thematic area is located between Tâmbureşti and Sadova localities, in the southern part of Oltenia, south-east of Dolj county, in an area with sandy soil, also called "Oltenia Sahara". The relief consists in plains and meadows covered by sand dunes. During the geobotanical research carried out in this area in the 2023-2024 period, several populations of Viola hymettia Boiss & Heldr. (Viola, sect. Melanium) were identified. As a result of field studies, the presence of this rare species was found in the floristic structure of the plant communities specific to the sandy soils from south Oltenia. These populations were analyzed from a chorological, ecological and phytocenotic point of view in close correlation with the climatic changes of recent years and the degree of expansion of the surface of sandy soils in this part of Romania. Also, the species under study itself edify a community of plants Violaeto hymettiae-Cynodontetum Cîrţu 1973. The importance of this association lies in the fact that the participating species contribute to the stabilization of the sands and the enrichment of their humus content.

Key words*: coenology, chorology, ecology, sandy soil, Viola hymettia.*

RESULTS OF THE INTRODUCTION OF SPECIES OF THE GENUS *SALIX* L. IN UKRAINE

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Abstract

The aim of the study of the study was to analyze the success of the introduction of Salix species in the Right-Bank Forest-Steppe of Ukraine based on the characteristics of their growth and development, winter hardiness and drought tolerance. Ten of the autochthonous species are found in Ukraine on the southern or southeastern border of their ranges, which is explained by climate change from the northwest to the southeast of the country. Two species change their life form from a "tree" to a "bush" under conditions of introduction. Six species have not fully lignified shoots at the end of the growing season, which is an indicator of their lower winter hardiness. In Ukraine, the introduced species of the Salix genus form viable seeds, however, they do not form self-seeding and have a full (10 species) or good (6 species) degree of acclimatization. It has been established that the limiting factors for the expansion of the Salix cultural range in Ukraine are high temperature and low humidity of air and soil in summer, which leads to a decrease in their drought resistance.

Key words: *cultural area, introduction, acclimatization, life form, «tree»-«shrub», winter hardiness, drought tolerance.*

THE ROLE OF RESIDENTIAL GREEN SPACES IN ENHANCING WELL-BEING, BIODIVERSITY, AND SUSTAINABILITY: A CASE STUDY OF IAŞI, ROMANIA

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Abstract

Recent studies have painted a compelling picture of the beneficial impact of rigorously designed open spaces on quality of life and urban social cohesion. These spaces significantly influence community closeness, urban viability, safety, sustainability, and vitality. Inter-community interactions embedded in open spaces' planning and design process are vital in shaping and valuing them, influencing social interaction's level of use, value, and intensity. This study focuses on the impact of residential green spaces on the resident's well-being, urban biodiversity, and sustainability. Based on international examples, case studies, and rigorous local context analysis, we proposed a landscape design for the Tatarasi district in Iasi, Romania. The proposed landscape design offers multiple functional zones, such as recreational areas or community gardens, using sustainability principles and urban biodiversity. The results can guide urban planners and officials to create regions that benefit residents' well-being and foster a greener environment. This study employs a multi-method approach, integrating spatial analysis, biodiversity assessment, and case study comparisons to develop an adaptive landscape intervention.

Key words*: biodiversity, sustainability, urban design, well-being, landscape architecture.*

DENDROBIUM ANTENNATUM LINDL. MICROPROPAGATED UNDER THE INFLUENCE OF VARIOUS CONCENTRATIONS OF FERBANAT L®

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Abstract

Orchids are among the most sought-after cut and potted plants in the 21st century. Dendrobium antennatum Lindl. is widely used as potted plant or as a cut flower. Due to this aspect, breeders need new propagation methods. In the present study, green antelope orchids were micropropagated using axillary buds at different concentrations of Ferbanat L® medium (0.1, 0.5, 1, and 5%) to assess its positive or negative effects regarding the plant's growth and development compared to control. The plants' survival rate was the highest when 5% Ferbanat L® was added to the medium. In the case of the chlorophyll a + b and total carotenoids no significant changes were observed, in the case of the peroxidase activity significant changes were observed by the different treatments. From the study, it can be concluded that control and 5% Ferbanat L® results were almost similar, however the treated plants (5%) recorded a higher survival rate, as well as the healthiest and most size-optimal plants. The results of the present research could positively improve the propagation of the D. antennatum.

Key words*: biostimulators, green antelope orchid, growth medium, propagation, tissue culture.*

RESEARCH ON THE USE OF MOLECULAR MARKERS TO IDENTIFY THE NPTII GENE INVOLVED IN GENETIC MUTATION PROCESSES.

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Abstract

Because, for medicinal and aromatic plants there is the ease of being genetically modified both naturally through mutations and through external intervention. In this context, the effectiveness of the present protocol to produce good quality DNA suitable for the detection of genetically modified crops was evaluated. Genomic DNA isolated from different parts of coriander, fennel and sage plants through a modified protocol by our team compared to the conventional method. For this, through the PCR technique, three molecular markers were used to amplify the neomycin phosphotransferase gene (NPTII), which is used as a marker gene in mutation identification processes. The existence of NPTII (target of 173 bp) was investigated in the plant material studied in the 3 plant species (coriander, fennel and sage), vegetative parts (leaves) but also the seeds considered in this work. Successful PCR amplification of the NPTII gene with a randomly amplified polymorphic DNA primer and complete digestion of the isolated DNA with the restriction enzyme HindIII validated the quality of the isolated DNA.

Key words*: Salvia officinalis, genomic DNA, mutations, Coriandrum sativum, Foeniculum vulgare, genes.*

THE EFFECT OF GROWTH STIMULANTS ON THE ROOTING OF CUTTINGS OF PLANTS OF THE GENUS *COTONEASTER* MEDIC. ON DIFFERENT SUBSTRATES

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Abstract

The results of studies on the regeneration ability of green and semi-woody cuttings of plants of the genus Cotoneaster Medic. for obtaining high-quality planting material are presented. The effect of plant growth stimulants (Heteroauxin, Epin +, Kornevin, Charkor) on rooting and biometric indicators of cuttings in protected soil conditions in different substrates peat + sand 2:1 (pH 4.8), sand (pH 5.7), peat substrate Mixkar MKS-10-6 (pH 5.2-6) was analyzed. The object of the study was represented by five species of Cotoneaster - Cotoneaster ascendens Flink & B. Hylmö, Cotoneaster hjelmqvistii Flinck & B. Hylmö, Cotoneaster horizontalis Decne., Cotoneaster nan-shan M.Vilm. ex Mottet, Cotoneaster dammeri C.K.Schneid, which are characterized by high decorativeness and are in demand, which requires maximum efficiency of vegetative propagation and cultivation in the conditions of the Right-Bank Forest-Steppe of Ukraine. Therefore, finding new technologies and improving existing ones for vegetative propagation of species of genus Cotoneaster is an extremely urgent task that requires a scientific solution.

***Key words**: vegetative propagation, cuttings, biometric indicators, growth regulators, substrate.*

LAVENDER GROWTH AND FLOWERING IN COMPARATIVE PLANTING METHODS

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Abstract

In urban green spaces, flowering plants are frequently grown in raised beds mainly to improve soil conditions and water regime. Along streets and boulevards, raised beds are often planted with resilient flowering plants that require minimal maintenance, such as lavender. Effects of the planting method on growth and flowering were investigated on young lavender plants grown in raised beds and at ground level. The results revealed that plants cultivated in raised beds were smaller in height and diameter at the end of the growing season. Also, flowering duration, size of floral stems and flower production were significantly lower, comparing to those grown at ground level. At the end of the second year of growth, lavender plants cultivated at ground level were double in size and produced a significantly increased amount of flowers. Hot and dry summers should be considered for flowering bedding plants in urban green spaces.

Key words*: drought, ground-level planting, Lavandula angustifolia `Sevtopolis`, raised beds, urban conditions.*

RESILIENCE OF URBAN TREES TO EXTREME WEATHER IN BUCHAREST, ROMANIA

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Abstract

In the last years, Europe has experienced extreme weather conditions with significant impact on vegetation. Extremely warm summers and poor rainfall in all seasons transformed Bucharest (Romania) into one of the hottest and driest cities in Europe. In this research, more than 190 trees species, hybrids and cultivars present in the green spaces of University of Agronomical Sciences and Veterinary Medicine Bucharest were investigated for their resistance to extreme weather. The results showed that trees from 24% of the existent species, hybrids and cultivars were affected and lost in the last two years. Over 55% of the dead trees were native species. In 2024, when summer temperatures exceeded 35°C for 28 days, all of the lost trees were placed in areas without irrigation. Monitoring tree under extreme weather conditions can provide essential information for resilient plantations and sustain biodiversity in cities.

Key words*: drought, heatwaves, native and non-native species, resistance.*

DESIGNING A PRIVATE GARDEN WITH AN ORNAMENTAL AND UTILITARIAN CHARACTER

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Abstract

Currently, private gardens tend to have a highly functional character due to the fast-paced lifestyle of our days, the reduction of garden space, as well as the need for consuming healthier foods. The ornamental-utilitarian garden represents an intelligent and balanced way of using the green space around the house, providing both beauty and functionality. It is an concept that maximizes the garden`s full potential to meet the needs and preferences of the owners. Although this approach is relevant in Europe, in Romania, there is a need for the development of this concept. Currently, utilitarian gardens are mostly positioned in the backyard, isolated, without exploring the multiple possibilities of incorporating utilitarian plants into ornamental garden designs. In this work, besides researching the ornamental-utilitarian garden concept, we aim to design a private garden, adhering to the principles underlying this approach to landscaping.

Key words*: garden, ornamental, utilitarian, concept, design.*

THE AUTUMN LEAF CHROMATICS OF FRUIT TREE SPECIES AND THEIR AESTHETIC EFFECT

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Abstract

This study examines the chromatics of fruit trees in autumn and their aesthetic impact on green spaces. Using a Minolta CR400 colorimeter and the CIELab color system, leaf colors from 10 fruit tree species were measured. The analysis revealed significant chromatic variations, with apple, fig, and hazelnut exhibiting higher green tones, while plum displayed the strongest reddish hue. The study emphasizes the importance of integrating fruit trees into urban landscapes, promoting biodiversity, and enhancing aesthetic value. Proper color management, considering interactions with surrounding elements, can create vibrant, functional spaces that counteract the monotony of urban environments, contributing to mental health and social interaction.

Key words*: leaf chromatics, fruit trees, landscape design, autumn color, aesthetic effect.*

COMPARATIVE FLOWER MORPHOLOGY ANALYSIS BETWEEN *IRIS SUAVEOLENS* BOIS. & REUT. AND *IRIS PUMILA* L.

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Abstract

In this study, a couple of dwarf species of the genus Iris (Iridaceae family) are analised regarding the floral morphology. These species are known as very important ornamental plants due to their flowers. The Iris flower is considered a floral complex or a pseudoinflorescence because of their three pollination canals wich serve like an independently zigomorph flower. The floral elements of both species were investigated with biometrical mesurements, cross-sections and microscopical views. These floral complexes are very attractive not only for insects but also for their esthetic potential. The three standards are longer and wider than falls. The falls are reflexed and covered with a band of colored hairs (beards). For both species, the whole floral complex is as tall as the scape, about 4-6 cm and the perigon tube is about 5-7 cm. The oblong, entire stigma, has split crests at Iris pumila L.

Key words*: Iridaceae, morphology, flowers, ornamental.*

TULIPA HUNGARICA BORBÁS – CONSERVATION STATUS, SPECIES DISTRIBUTION AND POTENTIAL THREATS

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Abstract

The yellow gorge tulip (Tulipa hungarica Borb.) is an endemic species of community interest, protected by the Berne Convention and the Romanian laws; it is in Annex 2 of the Directive on the conservation of natural habitats and species of wild fauna and flora and is found only on the territory of Serbia and Romania. In the Romanian literature, the species is described as critically vulnerable. From the point of view of taxonomy, it is perennial, robust, with an ovoid bulb. Among the habitat preferences, the following are mentioned: heliophilic, thermophilic and calciphilous, on moderately moist, fertile, neutral soils. The main pressure on this species refers to collection activities, but the intensity of this pressure is low, probably due to the difficult access of people to the area where the species is found. The main threats we consider climate change with all the general consequences. As limiting factors, we list the fact that there are few individuals, and as conservation measures specialists recommend monitoring populations and preserving seeds in gene banks.

Key words*: conservation measures, endemic, pressure, threat, Tulipa hungarica.*

INFLUENCE OF SOME FERTILIZERS ON THE GROWTH AND FLOWERING OF *CROSSANDRA INFUNDIBULIFORMIS* (L.) NEES PLANTS

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Abstract

Crossandra infundibuliformis (L.) Nees is a highly valued ornamental perennial species, with attractive orange flowers and dark green leaves, cultivated in temperate regions as an indoor plant. The objective of this study was to evaluate the influence of three fertilizers, in concentration of 0.2% (Bionat Plus, Green Feed and Cropmax), on vegetative growth and flowering of plants. The results indicated that the foliar application of these fertilizers caused a significant increase in most of the studied morphological parameters, compared to the control plants. The highest values of plant height (40.35 cm), number of shoots per plant (7.81), leaf length (8.78 cm), leaf width (4.63 cm), number of flowers per spike (18.93), and spike length (8.62 cm) were recorded in plants sprayed with Bionat Plus. Plants fertilization with Cropmax increased the number of spikes per plant, and also promoted the earlier flowering, recording the lowest number of days from planting to flowering (81.33 days).

Key words*: Crossandra; foliar fertilization; growth; flowering.*

THE INFLUENCE OF SUBSTRATE TYPE ON THE MORPHOLOGICAL AND ORNAMENTAL CHARACTERS OF SOME VARIETIES OF *IPOMOEA BATATAS* GROWN IN CONTAINERS

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Abstract

In this study, three ornamental varieties of Ipomoea batatas (`Heart Bronze`, `Black`, `Heart Lime`) were studied to evaluate the influence of substrate type on some morpho-decorative characters. The plants were grown in 70 L containers in which four types of substrate were used: garden soil + peat, garden soil + peat + hydrogel, garden soil + peat + coconut fiber, garden soil + peat + coconut fiber + hydrogel. `Heart Bronze` was characterized by a richer vegetative mass (2-6 times more leaves than the other two varietys) and `Heart Lime` by longer branching. In all varieties, the substrate consisting of garden soil + peat favored stem branching, and in the varieties 'Heart Lime' and 'Heart Bronze' it favored the stem length growth. To increase the number of leaves/plant, the substrate of garden soil + peat + hydrogel can be recommended for all varieties, although good results were also obtained with the substrate containing coconut fiber. The results show that the presence of hydrogel, which helps in solubilization of nutrients and their uptake, ensured the formation of more leaves.

Key words*: sweet potato, ornamental varieties, morphological characters.*

SPREAD AND STABILITY OF ORNAMENTAL ALIEN PLANT SPECIES ON URBAN AND PERI-URBAN RIVERBANKS OF BUCHAREST, ROMANIA

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Abstract

Ornamental horticulture is one of the most significant pathways for the introduction of alien plant species globally. Many ornamental species, initially cultivated in gardens, have demonstrated invasive potential and begin their spread in riparian habitats. While a majority of these introduced plants have not yet become naturalized in local ecosystems, some species exhibit significant invasive potential under favorable environmental conditions or climate change.

This study examines the occurrence and stability of alien ornamental plant populations along the riverbank zones of urban and peri-urban waterways in Bucharest, focusing on the Argeș River, Dâmbovița River, and Colentina lake chain. The results highlight the presence of species with varying degrees of invasiveness in Romania, including, Ailanthus altissima, Alcea rosea, Hemerocallis fulva, Humulus scandens, Ipomoea purpurea, Reynoutria japonica and Solidago canadensis. These species have established stable populations influencing local biodiversity. The analysis brings into focus key aspects such as introduction pathways, invasion status, spread mechanisms, distribution across the three rivers, and relative abundance, offering valuable insights into the dynamics of alien plant invasions within urban and peri-urban riverbanks.

Key words*: alien, horticulture, biodiversity, river, urban.*

BIOECOLOGICAL FEATURES AND PECULIARITIES OF VEGETATIVE PROPAGATION OF SOME *BERBERIS THUNBERGII* DC. CULTIVARS IN THE "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE)

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Abstract

The peculiarities of vegetative propagation and the bioecological features, under new conditions of Berberis thunbergii DC cultivars are presented. The introduced taxa researched as donor plants are resistant to drought, frost, pollutants, do not need special care, only sanitary trims, shaping and compliance with agrotechnical rules for the entire growing season. The researched plant material possesses very high decorative qualities since early spring, due to the bright yellow color of the flowers, the abundance of flowering, the density of flowers per 20 cm long stalk, as well as at the beginning of summer – due to the beautiful shade of the foliage, the shape and size of the habitus, the diverse fruit color (red, light-red, purple-red), the abundance of fruiting, the long flowering and fruiting periods. It is recommended for use in landscaping in the foreground, in small groups, in border mixtures or for hedges of different heights.

The optimal multiplication option for the cultivars studied was the stimulation of lignified cuttings with a 0.01% IAA solution. The yield of the rhizogenesis process of treated lignified cuttings was significantly higher (15-35%) compared to untreated ones.

Key words *Berberis thunbergii DC., taxa, flower, growth, development, propagation.*

BIOECOLOGICAL FEATURES OF SEVERAL NEW TAXA OF *CORNUS ALBA* L. GROWN AT THE "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE)

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Abstract

The article includes the results of a research on the bioecological features of some new taxa from the collection of the genus Cornus L. of the "Alexandru Ciubotaru" National Botanical Garden (Institute). The study includes the taxa of Cornus alba: 'Elegantisima', 'Aurea', 'Cream Cracker' PBR, 'Sibirica'. The studied taxa are known as dogwoods, having high decorative value due to their habit, crown, color of vines, leaves, fruits, long duration of flowering and fructification, all of which are determining criteria in landscape art. They are resistant to drought, frost, pollutant substances, do not require special care, only shaping cuts and compliance with the recommended technology throughout the growing season. They are used in landscaping particularly in the foreground, in small groups, in mixtures at the edges of tree plantations and hedges of different heights and colors.

Key words*: Cornus alba* L., *varieties, biomorphology, growth, development, ornamental parameters.*

ONTOGENETIC ASPECTS OF *EX SITU* CONSERVATION OF THE SPECIES *PAEONIA PEREGRINA* MILL

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Abstract

P. peregrina is a geophyte occurring in the Balkans, in Southern Europe, including the our country. This species has been protected by law since 1975: included in the Red Book of the Republic of Moldova, in the category Critically Endangered (CR). It usually grows in glades or edges of downy oak and sessile oak forests. In the natural habitat, it blooms in the second half of May. The seeds collected from the habitat were included in the collection in 2007. Later, seedlings were obtained at a seed germination rate of 80%. The pregenerative period lasts 4-6 years. In the third year, the seedlings are 20-25cm tall, with 2-3 compound leaves, a root system with 2-3 tuberous roots and 1-2 buds. The flowering phase starts in the first half of May, 5-10 days earlier than in the wild. It bears fruit abundantly: the seeds are oval, brown-black, shiny. In July-August they reach maturity. We noted that under ex situ conditions, the height of the plants is 70-90cm. They form 10-12 floral stems and have a seed productivity coefficient of over 70%.

Key words*: Paeonia peregrina Mill., ex situ conservation, ontogenetic stages, seed productivity.*

THE MORPHOLOGICAL STRUCTURE OF THE RENEWAL BUD IN *KNIPHOFIA NELSONII* MAST.

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Abstract

The study of the ornamental plants morphogenesis is of great importance because it allows the control of growth and development processes, and correction, adjustment and application of cultivation technology. The architecture of the bioform is determined by the vegetative organs. The vital form of the plant is an indicator of vital processes in the organism (Cernei 1994). During most of the year, physiological processes are concentrated in underground organs. Due to this aspect, research was carried out on the rhizome of Kniphofia nelsonii Mast. (red hot poker), in particular, of the buds of renewal. During this study were examined: the morphological aspects of the root; the morphological aspect of the rhizome; the type of renewal buds; its development method during the plant`s vegetative and dormant periods (August, November and February); their shape and disposition; presence or absence of cataphylls; their number, shape, size and their protective role; the type of proliferation and foliation.

Key words*: Kniphofia Mast., morphology, renewal bud.*

BIOLOGICAL, ECOLOGICAL AND MORPHOLOGICAL FEATURES OF SAKURA (*PRUNUS SERRULATA L.)* CULTIVATION FOR FURTHER USE IN LANDSCAPING OF UKRAINE

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Abstract

At present, a great deal of experience has been gained in landscaping and gardening of cities and villages, a rich assortment of landscaping plants has been created and agricultural techniques for their cultivation have been developed, the necessary methods of landscaping specific to cities have been found, and methods of maintaining green spaces have been determined. However, amateur gardeners and professionals working in the field of landscape art are interested in introduced woody ornamental plants that are characterized by high decorative value and have a specific growing season. One of these plants is sakura, a representative of the Prunus L. family - Prunus serrulata L. The main arguments for this are the high decorative qualities of sakura, their resistance to urban conditions, and rapid adaptation to new cultivation conditions. The article presents a brief morphological classification of the most common genotypes of the genus Prunus serullata L. in Ukraine. The biological features of growth, seasonal rhythms of sakura plants development are investigated.

Key words: *sakura, varieties, flowering, cultivation, landscaping.*

EFFICACY OF BIO-INSECTICIDES AGAINST THRIPS (THYSANOPTERA: THRIPIDAE) AS A PEST OF PELARGONIUM CROPS IN A COMMERCIAL GREENHOUSE IN WESTERN ROMANIA

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Abstract

The economic importance of thrips in the last ten years, in terms of both direct (often quality) and indirect (via viruses and phytoplasmas) damage to protected flower crops, in particular pelargoniums, has in most cases necessitated the adaptation of integrated management practices. A rich thrip fauna, with Frankliniella occidentalis, Frankliniella intonsa, Thrips tabaci, Thrips major and Scirtothrips dorsalis being the most abundant species, was revealed by the analysis of the data collected from the greenhouse in Dudeştii Noi (Timiş County). Feeding pattern analysis revealed the consistent presence of very high levels of polyphagous species. In order to maintain a high quality of Pelargomium plants for rapid commercialisation, treatments were carried out in 2024 and the efficacy of bio-insecticides to control thrips species was evaluated. The results showed that the chemical products had the highest efficacy, namely Exalt with the active ingredient spinetoram and among the biological products used, Laser 240 SC (spinosad as active ingredient) had the highest efficacy. The least effective products used to control thrips were those based on diatom powder and neem oil.

Key words*: bio - insecticides, thrips, pelargonium, greenhouses, western Romania.*

PROTECTING *GALANTHUS NIVALIS* L. THROUGH CONSERVATION STRATEGIES AND *IN VITRO* MULTIPLICATION TECHNIQUES

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Abstract

According to the European Red List of Vascular Plants, Galanthus nivalis L. is classified as Near Threatened (NT), facing habitat destruction, deforestation, and overharvesting for ornamental and medicinal use. It is also regulated under CITES Appendix II to prevent overexploitation. Due to its slow propagation through seeds and bulbs, ex situ conservation, including botanical garden collections and seed banking, is essential. In vitro propagation offers an alternative, but high contamination rates and phenolic oxidation hinder culture establishment. To improve initiation, a sterilization protocol with fungicides, sodium hypochlorite, and mercuric chloride ($HgCl_2$) was tested on bulbs. Culture media were formulated to reduce phenolic oxidation, prevent necrosis, and enhance growth. Polyvinylpyrrolidone (PVP) was added to counter oxidative browning, while benzylaminopurine (BAP) and naphthaleneacetic acid (NAA) promoted bulb proliferation. Both media contained FeNaEDTA as an iron source, with increased concentration to support metabolic activity. These optimizations aim to improve in vitro propagation efficiency and contribute to the conservation of G. nivalis.

Key words*: conservation, threatened species, Galanthus nivalis, iron source, micropropagation.*

FROM NEGLECT TO VITALITY: LANDSCAPE DESIGN APPROACHES FOR RECONVERTING LOST URBAN SPACES

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Abstract

A modern city`s landscape reflects the diversity and inconsistency of the processes that occur within it. The changing landscape of the city and its surroundings has become a common phenomenon as urban areas expand and technological capabilities for modeling nature develop. The interaction between the natural and artificial environments becomes more intense as urban development pressures the surrounding landscape. The city constantly expands its borders into neighboring territories, gradually diminishing natural potential and bringing more chaos than harmony to the landscape. In this chaos and rapid pace of modernization, attention has increasingly shifted to appearances at the expense of content. Urban spaces that did not align with external trends and influences were abandoned, leading to community fragmentation and a decline in authentic values and traditions. Using this concept as a starting point, the study aims to propose several landscape design approaches and appropriate solutions for rehabilitating degraded or abandoned urban spaces in Romania..

Key words*: urban renewal, sustainability, reconverting urban spaces, rehabilitation strategies.*

RESEARCH ON THE IMPACT OF THE GROWING MEDIUM ON PRODUCTION AND QUALITY OF *GERBERA HYBRIDA* FLOWERS IN PROTECTED CULTIVATION

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Abstract

Their high productive potential, tenderness and long lasting of flowers in water place the gerbera among the highly valued species for cut flowers grown in protected cultivation regime. Several surveys carried out among European flower growers and buyers rank gerbera 5th after carnations, roses, tulips and chrysanthemums (Frandin P. et all, 1990). Since in Romania, gerbera flowers have beenmuch appreciated and sought after by buyers at greenhouses in Sântandrei, Bihor, in the period 2020-2022 we conducted a research whose goal was to increase the productivity of gerbera plants and flower quality. To achieve the proposed goal, we used the Romeo hybrid variety cultivated on different substrates in six experimental working variants, each variant comprising four repetitions. The statistical analysis of the obtained results shows that the protocols related to variants 5 and 4 provide us with major concrete data regarding the increase of productivity and flower quality. We draw six conclusions which synthesize our research results.

Key words*: Gerbera hybrida, growing medium, peat, leaf soil, sand, fir bark, flower quality.*

GARDENS DESIGN AS OUTDOOR EVENT SPACES

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Abstract

Present research theme aims to design and implement an outdoor garden as event spaces. The subject is addressing the need for more attractive and functional environments, spaces for various social and cultural activities. In the context of a continuous growing demand for outdoor events, our project aims to provide new and functional plant compositions, plant selections well adapted to the specific needs of event spaces, integrating decorative elements and functional facilities (alleys, pots, etc.). Event gardens are spaces especially designed to host various social and cultural activities, such as weddings, parties, concerts or exhibitions. This type of gardens are carefully created to provide an inviting and relaxing atmosphere, combining all landscape design elements, functional facilities and pleasing aesthetics. The theme was chosen based on market research analysis, client requirements and principles of sustainable design. The expectations are linked to the opportunities, innovation and adaptation to ever-changing trends in the field of outdoor events design in particular and landscape architecture in general. These types of gardens are of interest not only because they provide a delightful natural setting for events, but also because promote the connection between people and environment, contributing to community general well-being and of course, environmental sustainability.

Key words*: outdoor events; design; environment; community.*

MISCELLANEOUS

CHARACTERIZATION OF FOREST TREE SEEDS USING VIBRATIONAL SPECTROSCOPY

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Abstract

The biological activity and the pharmaceutical properties of plants are strongly dependent on their structure.
In the current study, the FT-IR spectroscopy technique was applied to detect molecular components in forest tree seeds samples. We used FTIR (Fourier transform infrared) spectroscopy because this tehnique gives information on specific functional chemical groups present in organic matter. However, the whole spectrum may also contain information that relates to more general chemical or biological properties. The FT-IR results revealed the presence of different bio-active compounds in pine such as flavonoids, tannins, sugars, acids, proanthocyanidins, carotenoids, citric metabolites and others. The comparison of the antioxidant activity of the studied forest tree emphasized a hierarchy of the antioxidant capacity in pineseeds and beechseeds. The purpose of the study was to investigate the antioxidant capacity and nutritional value of pineseeds and beechseeds. Antioxidant capacity was evaluated with photochemical assay as well as humidity, protein, fibre, lipid and carbohydrate content. The highest antioxidant capacity was observed in beechseeds 1292.79 ± 5.71 in comparation whit pineseeds 1.78 ± 0.39 (μg/mg equivalent ascorbic acid).
These results can provide useful information providing a research interest for the identification of new molecular compounds from forest tree seeds.

Key words*: pineseed (Pinus sylvestris), beechseed (Fagus sylvatica), FT-IR spectroscopy (Fourier transform infrared), antioxidants.*

ANATOMICAL AND BIOCHEMICAL RESEARCHES OF *ARTEMISIA ABSINTHIUM* L. (ASTERACEAE) SPECIES IN ROMANIA

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Abstract

Artemisia absinthium L. (Wormwood) is a medicinal plant known for its antibacterial, antioxidant, anti-inflammatory, antifungal, antimalarial, and choleretic properties. Anatomical analysis was performed on cross-sections of the stems and leaf lamina. Transverse sections of the stems and leaves were examined under an optical microscope. The images reveal the anatomical features and secretory tissues involved in essential oil synthesis. The essential oil was analyzed for the stems, leaves, and flowers of Artemisia absinthium L. The essential oil, extracted through hydrodistillation, was analyzed using GC-MS. The main chemical compounds identified in the essential oil were linalyl isovalerate (16.65%), sabinene (8.90%), myrcene (8.85%), geranyl isobutyrate (6.97%), and β-cymene (6.92%) in the stems; sabinene (23.67%), myrcene (20.53%), β-cymene (9.74%), and α-phellandrene (9.23%) in the leaves; and chrysanthenone (5.48%), sabinene (11.18%), beta-pinene (15.53%), and linalool (17.97%) in the flowers.

Key words*: Artemisia, essential oil, chromatography, secretory tissue.*

CONSERVATION CHALLENGES FOR *LIPARIS LOESELII* (L.) RICH.: A CRITICALLY ENDANGERED ORCHID IN ROMANIA

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Abstract

Liparis loeselii is a rare and highly threatened orchid species in Europe. With a European conservation status of Near Threatened (IUCN), this species is strictly protected under many EU and national regulations. It is present in 475 Natura 2000 sites across Europe, with only 10 sites from Romania. In Romania, L. loeselii is classified as Critically Endangered (CR), marking the southeastern limit of its distribution range. We monitored the species in the context of Article 17 of the Habitats Directive for EU specific reporting of Romania. The species inhabits hygrophilous, eutrophic fens characterized by calcium-rich, neutral to alkaline pH conditions, cold water, and black soil with a humus-turf layer overlaying a silt horizon. These habitats are increasingly threatened by drainage and fragmentation, leading to significant population declines. Historical records indicate that many populations previously cited in literature have not been confirmed in recent surveys, suggesting a critical need for updated assessments and conservation measures. This study underscores the urgency of habitat protection and restoration to prevent further decline and ensure the survival of L. loeselii within its natural range.

Key words*: Liparis loeselii, fen orchid, conservation status, extinction threats, protected species.*

STUDY ON THE STRUCTURE, DYNAMICS, ABUNDANCE AND OTHER ECOLOGICAL INDICATORS OF ARTHROPOD SPECIES IN PEA CROPS IN NORTH-EAST ROMANIA

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Abstract

The research was carried out during two years, 2023 and 2024, in a pea crop located in the north-east of Romania, in the Răducăneni locality of Iaşi county. In the study, the pitfall traps, filled with a 2.5% NaCl solution. We are used 12 traps, arranged in two rows of 6 traps for each, to carry out the research. The traps were placed at distances of 8-10 meters between them, and a distance of 12 meters was maintained between rows. The material collected in the traps was appropriately labeled, each label indicating the trap number and the date of harvest. In 2023, the collection of material from traps was carried out on 10 harvested, but in 2024, a number of 6 harvests of the material from the traps were carried out. The species most frequently collected and which also had the most specimens collected were Opatrum sabulosum, Coccinella 7 punctata, Dermestes laniarius, orthopters species, Arachnids etc.

Key words*: ecological indicators, pea crops, arthropod species.*

RESEARCH ON THE STRUCTURE, ROLE AND ECOLOGICAL INDICATORS OF EPIGEIC ARTHROPOD SPECIES FOUND IN SOME SWEET CHERRY OCHARDS IN THE RĂDUCĂNENI AREA, IAȘI COUNTY, DEPENDING ON THE APPLIED CHEMICAL TREATMENTS

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Abstract

The research was conducted for a period of three years, in a cherry plantation in Răducăneni area, Iaşi county. The material was collected using Barber soil traps, inside the traps using a 2,5% NaCl solution to capture arthropod species. The collected material was cleaned, brought to the laboratory where the species were identified by harvest date, traps and variants. A number of 12 traps were used, installed in two rows at a distance of 12 m between rows and 6-8m between traps per row. In 2022, seven collections were made from May to October, and the most frequently collected species were: Harpalus distinguendus; Anisodactylus binotatus. In 2023, collections of arthropods from Barber traps were made and the most frequently collected species were: Anisodactylus signatus, Anisodactylus binotatus, Pseudophonus pubescens; Calathus fuscipes. In 2024, a total of 6 collections were made and the most frequently collected species were those belonging to the genera: Amara, Anisodactylus, Harpalus, Calathus, all belonging to the Carabidae family. In addition to insects, species of arachnids and millipedes were also collected.

Key words*: ecological indicators, sweet cherry ochards, arthropod species, chemical treatments.*

BENEFICIAL MEDICINAL EFFECTS OF *ROSA* SP. EXTRACTS

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Abstract

This article is a comprehensive review on pharmacological effects of Rosa sp. Rosa sp. is one of the most important species of Rosaceae family. Rosa sp. is an ornamental plant and beside perfuming effect, several pharmacological properties including anti-HIV, anti-cancer, anti-aging, antibacterial, antioxidant, antitussive, hypnotic, relaxant, the treatment of inflammation, diabetes, dysmenorrhea, depression, stress, seizures, have been reported for this plant. Various parts of the plant such as fruits, flowers, leaves, and bark can be used in various products, including cosmetics and pharmaceuticals. Rose oil and rose hydrolate are obtained from the petals of different Rosa species, especially Rosa centifolia L. and Rosa damascena Mill. The aim of the present study was to review the rose oil and rose hydrolate therapeutic effects which had been clinically evaluated in trial studies. Rosa species and cultivars, having so many beneficial effects, deserve more interest, having also beneficial effects on soil erosion and being resilient to climate change, drought, biotic and abiotic stress, important features that make the roses an ecological, sustainable and regenerative horticultural crop.

Key words*: pharmacological properties, rose essential oil, rose hydrolate, Rosa sp.*

COMPARATIVE RESEARCH ON THE SITUATION, STRUCTURE AND ECOLOGICAL INDICES OF ARTHROPOD SPECIES ENCOUNTERED IN SOME FOREST AND APPLE ORCHARDS IN THE NECHIT AREA, NEAMȚ COUNTY

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Abstract

The research was carried out in an apple orchard, located in the Nechit area, Neamț County and in a forestry plantation managed by the forestry district in the same area. For the collection of the material, pitfall traps were used during 2024. The samples were collected from both the apple orchard and the forestry plantation on the same dates, as follows: Harvest I: July 20 Harvest II: July 22 Harvest III: July 31 Harvest IV: August 14 Harvest V: August 28 Harvest VI: September 11 In the apple orchards, 8 material harvests were carried out on the same dates as in the forest plantations. The largest number of specimens was collected at the first harvest, 1,066 specimens, followed by the 6th harvest, on September 11, with 458 specimens. Then, 420 specimens were collected at the 7th harvest, on September 25, and 410 specimens at the 8th harvest, on October 16. The most frequently collected species, which also recorded the largest number of specimens, were Armadillidium vulgare, Pterostichus cupreus, Dermestes laniarius and arachnids.

Key words*: arthropod species, forest, apple orchards.*

MINERAL CONTENT IN FRUITS AND NON-EDIBLE PARTS OF *ARONIA MELANOCARPA* (MICHX.) ELLIOT CULTIVATED IN THE REPUBLIC OF MOLDOVA

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Abstract

Species of Aronia melanocarpa (Michx.) Elliot are well known for the numerous health benefits of their fruits` phenolic compounds and essential minerals. The aim of this study was to determine the mineral content in both the fruits and non-edible parts (leaves, one-year-old and three-year-old twigs, and the bark of one-year-old and three-year-old twigs) of two A. melanocarpa cultivars ('Nero' and 'Alexandrina'). Mineral content was analyzed using ICP-MS method. The results (expressed in mg/kg) revealed that the highest concentrations of macroelements were found in leaves (for calcium) and fruits (for potassium) in both cultivars. Notably, phosphorus had the highest concentration in 'Nero' leaves and 'Alexandrina' fruits. Additionally, sodium levels were highest in 'Nero' one-year-old twigs and 'Alexandrina' one-year-old twig bark. Regarding microelements, the highest levels of iron were detected in 'Nero' three-year-old twig bark and 'Alexandrina' leaves, while the highest zinc concentrations were found in one-year-old twigs for both cultivars. These findings suggest that fruits, and also non-edible parts of A. melanocarpa can be valorized depending on the cultivar as valuable sources of macro- and microelements essential for human health.

Key words*: aronia, mineral content, fruits, non-edible parts.*

MINERAL COMPOSITION OF WILD CRANBERRIES HARVESTED FROM APUSENI MOUNTAINS, ROMANIA

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Abstract

Wild cranberries represent a constant source of income for many local communities, however during the last decade, a few studies were published concerning their nutritional quality. The aim of the present study is to identify the influence of harvest time and location on mineral concentrations of wild cranberry berries from Apuseni Mountains, Mărgău county, Romania. Fifteen cranberry samples from Apuseni Mountains from 3 different locations were collected in August and September 2024. Minerals such as Ca, Mg, K, Zn Fe, Cu, B, Sr, were analyzed in all samples by ICP-OES. The highest Calcium concentration (177.40 ± 1.27 mg/kg) was identified for Vlădeasa – Răzoare location (September harvest). No significant differences (P>0.05) were identified for Ca, and K concentrations (regardless of the harvest time) and no significant difference for Zn and Fe total concentrations (August harvest) for berries from Vladeasa–Razoare and Vlădeasa-High locations. The characterization of the mineral profile of wild cranberry from Apuseni Mountains, Mărgau county, is facilitating the identification of the best harvest time and location for the development of local produces with protected designation of origin.

Key words*: cranberry, minerals, harvest time.*

ENERGY CONSUMPTION OF A SOLAR GREENHOUSE WITH NOCTURNAL THERMAL PROTECTION USING DOUBLE LAYERS COMPARED TO A CONVENTIONAL POLYCARBONATE SOLAR - CASE STUDY: FEBRUARY 2025

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Abstract

This study investigates and compares the thermal performance and net energy efficiency of two types of greenhouse structures during winter conditions: a double-layer greenhouse with nocturnal insulation and active heating, and a conventional polycarbonate greenhouse. Based on hourly measurements collected in February 2025, net energy balance was calculated daily using both internal-external temperature gradients and solar radiation input. Results show that although the double-layer system requires higher energy input, it maintains a more stable interior climate and demonstrates superior energy retention. Correlation analysis highlights the impact of wind and humidity on thermal losses. The study proposes a practical efficiency indicator, expressed in MJ/day, to support future design and optimization decisions for protected cultivation systems.

Key words*: greenhouse efficiency, net energy balance, double-layer insulation, protected horticulture, thermal losses.*

THE EFFECTIVENESS OF SOME BIOLOGICAL PRODUCTS USED TO CONTROL *CYDIA POMONELLA* L. POPULATIONS AND THEIR POTENTIAL FOR INTEGRATED PEST MANAGEMENT IN APPLE ORCHARDS

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Abstract

The codling moth Cydia pomonella L. is a major pest of apple and other Rosaceae worldwide. Because in practice chemical control is intensively used to limit the damage of the codling moth, there is an urgent need for the development of sustainable control practices, involving non-chemical means. The aim of the study was to evaluate the efficacy of Bactospeine Df (T2), Laser 240 SC (T3) and Madex Top (T4) applied for C. pomonella control compared with chemical reference Coragen (T5) and untreated check (T1). The research was performed in the period 2023-2024, in an intensive apple orchard at R.S.F.G. Voinesti, with disease-resistant varieties Florina. In 2023 and 2024, the treatments efficacy at harvest ranged from 91.5% in treatment 4 to 95% in treatment 2 and 5 while the apple attack in untreated check was 24,25% and 33%. As a main conclusion, all the biological control products tested during the study have good potential for C. pomonella control and further inclusion in the integrated pest management in apple orchards from Dâmboviţa fruit growing basin.

Key words*: Cydia pomonella, codling moth, biological control, apple orchards, integrated pest management.*

ANALYTICAL METHODS FOR THE DETERMINATION OF ORGANIC ACIDS IN HORTICULTURAL PRODUCTS - A REVIEW

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Abstract

Organic acids are essential constituents of fruits and vegetables, contributing to their nutritional value and flavor. Beyond their natural presence, these compounds play a crucial role in the food and beverage industry serving as acidulants, flavor enhancers, and preservatives. Accurate analysis of organic acids is essential to ensure product quality, authenticity and regulatory compliance. This paper provides a comprehensive review of analytical methods used to determine organic acids in horticultural products. It compares spectrophotometric, chromatographic, mass spectrometry, electrochemical, and capillary electrophoresis techniques for their effectiveness in identification and quantification. Liquid and gas chromatography are widely employed for separating and quantifying organic acids, while ion-exchange chromatography is particularly effective for complex samples. UV-Visible spectroscopy enables rapid qualitative analysis, whereas mass spectrometry provides precise identification. Fourier Transform Infrared Spectroscopy detects functional groups, and electrochemical methods, along with capillary electrophoresis highly sensitive detection of trace organic acids. These advanced analytical techniques ensure accurate and reliable assessment, supporting quality control and consistency in the food industry.

Key words*: organic acids, fruits, vegetables, analytical techniques, chromatography.*

RESEARCH ON THE DEVELOPMENT OF A LOW CARB MINI-BAGUETTE FORTIFIED WITH *SPIRULINA* POWDER, INTENDED FOR DIABETICS AND OBESE INDIVIDUALS

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Abstract

Diabetes mellitus is a condition with a high incidence both nationally and internationally. In Romania, according to data provided by the Romanian Society of Diabetes, Nutrition, and Metabolic Diseases, 1 in 10 romanians suffer from diabetes mellitus. In diabetes and obesity, diet is an essential therapeutic element, and therefore, the development of low-carb bakery products is of real interest. This paper presents research on the development of a mini-baguette fortified with Spirulina powder (fortification levels 1-4%), intended for diabetics and obese individuals. The low-carb mini-baguette fortified with 4% Spirulina powder exhibits superior sensory qualities and has the lowest total carbohydrate content (39.47%) and available carbohydrates (30.57%). It stands out due to its protein content (13.98%), total fiber (8.90%), mineral elements (K =315.67 mg/100 g; Mg =92.85 mg/100 g; Ca =68.47 mg/100 g; Fe = 3.576 mg/100 g; Zn = 2.387 mg/100 g), total polyphenols (158.75 mg GAE/100 g) and demonstrates antioxidant capacity (182.45 mg Trolox Equivalents/100 g).

Key words*: fortification, mini-baguette, Spirulina, diabetics, obese.*

RESEARCH ON THE UTILIZATION OF NUTRIENTS AND BIOACTIVE COMPOUNDS FROM CAULIFLOWER STALKS, THROUGH THE DEVELOPMENT OF A FUNCTIONAL INGREDIENT WITH HIGH NUTRITIONAL VALUE AND ANTIOXIDANT CAPACITY

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Abstract

Agricultural production and the food industry generate a large amount of waste, with a major impact on the environment. The Action Plan for the European Strategy for the Circular Economy includes a zero-waste strategy targeting agri-food waste to reduce environmental pollution. The aim of this study was to valorize cauliflower stalks in order to obtain a functional ingredient rich in nutrients and bioactive compounds, which confer antioxidant capacity. This functional ingredient appears as a powder with characteristic taste and smell, in a whitish-yellow or whitish-gray color, with a high content of proteins (23.12-24.09%), available carbohydrates (29.21-31.81%), total fiber (23.27-26.85%), mineral elements (K: 1785.35-2175.23 mg/100 g; Ca: 505.35-598.86 mg/100 g; Mg: 97.56-128.56 mg/100 g; Fe: 28.43-43.57 mg/100 g; Zn: 4.27-5.62 mg/100 g), bioactive compounds (total polyphenols: 4.52-5.47 mg GAE/g d.w.; glucosinolates: 7.28-8.20 µmol/g d.w.; vitamin C: 45.03-48.12 mg/100 g). The functional ingredient obtained from cauliflower stalks stands out for its ability to neutralize free radicals (10.72-12.94 µmol Trolox Equivalents/g).

Key words*: antioxidant capacity, cauliflower, functional ingredient, stalks.*

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/100 g; Ca = 165.86 mg/100 g; Mg = 87.44 mg/100 g; Fe = 4.75 mg/100 g), total polyphenols (486.25 mg GAE/100 g), total carotenoids (7.12 mg/100 g), β-carotene (5.38 mg/100 g), and demonstrates antioxidant capacity (940.72 mg Trolox Equivalents/100 g).

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

HOLOSEU: ADVANCING CLIMATE-RESILIENT AGRICULTURE THROUGH INTEGRATED DECISION-SUPPORT TOOLS

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Abstract

The European Council`s commitment to reducing greenhouse gas (GHG) emissions by 80-95% by 2050, while achieving climate-resilient agricultural systems, underscores the urgency of developing effective strategies. Current assessments are limited due to high variability, the limited effectiveness of technological adoptions, and measurement challenges. The HOLOSEU project proposes to develop a comprehensive decision-support tool for European agriculture to replace traditional whole farm model by integrating soils, climate variables and environmental impacts for climate-resilient agricultural land use planning. We aim to incorporate extreme weather events to assess climate change adaptation and generate data through living labs consisting of mixed farming systems for the calibration and refinement of HOLOSEU. This includes improved quantification of sectoral GHG emissions, carbon and energy footprints, and the role of agroforestry in achieving carbon-neutral farms while enhancing ecosystem services. This leads to optimizing resource use and support the transition towards a socio-economically viable and sustainable agricultural sector across Europe.

Key words*: climate-resilient, GHG emissions, decision-support tool, agroforestry, sustainable agriculture.*

THE CHEMICAL COMPOSITION OF THE ESSENTIAL OIL AND ASSOCIATED HYDROSOL OBTAINED FROM TWO PLANTS OF THE ASTERACEAE FAMILY, *SANTOLINA CHAMAECYPARISSUS* L. AND *TANACETUM VULGARE* L.

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Abstract

The use of plants throughout the centuries has been essential for the survival and development of human civilizations. Plants have been used in multiple fields, such as food, medicine, construction, religion, and even in art and culture. In recent years, natural compounds have attracted considerable attention in various fields due to their wide-ranging biological activities. Essential oils and their associated hydrosols, in particular, are being explored for their ability to control plant pests, as well as their, antimycotic and antiparasitic effects. These substances are typically faster and more cost-effective to produce, and are generally considered safer for the environment and non-target organisms than conventional pesticides. Earlier studies have demonstrated that the primary components found in the essential oil of Tanacetum vulgare L. were oxygenated monoterpenes, including compounds like camphor, trans-chrysantenyl acetate, cis-verbenol, thujone, eucalyptol, and α-campholenal. For Santolina chamaecyparissus L., the primary components identified were artemisia ketone, camphor, and beta-phellandrene. This study highlights the chemical composition of the essential oil and associated hydrosol obtained from two plants of the Asteraceae family, Santolina chamaecyparissus L. and Tanacetum vulgare L .

Key words*: chemical composition , essential oil, hydrosol, Santolina chamaecyparissus, Tanacetum vulgare.*

EFFECTIVENESS OF META-TOPOLIN IN *IN VITRO* PROPAGATION AND GENETIC STABILITY ASSESSMENT OF MEDICINAL AND AROMATIC PLANTS

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Abstract

Meta-Topolin (mT), a compound from the cytokinin class that promotes plant growth and development, is characterized by lower toxicity than other cytokinins. This study explores the effect of mT on the in vitro multiplication of Hypericum perforatum L., Mentha x piperita L., and Stevia rebaudiana Bertoni. After six subcultures on Driver and Kuniyuki Walnut (DKW) medium supplemented with 2 mg/L mT, growth parameters were evaluated, including the number of shoots per explant, shoot length, the number of roots per explant, and root length. In the presence of mT, S. rebaudiana produced the highest number of shoots per explant (4.2 ± 0.12), while the longest shoots were recorded in M. piperita (6.2 ± 0.68 cm). The highest in vitro rooting percentage was observed in M. piperita, reaching 80%. The rooted shoots were acclimatized in perlite. Molecular analysis using Start Codon Targeted (SCoT) and Inter simple sequence repeat (ISSR) markers confirmed the genetic fidelity of the acclimatized plants compared to the mother plants, affirming the stability of in vitro cultures using mT as a cytokinin source.

Key words*: Hypericum perforatum, Mentha x piperita, ISSR, SCoT, Stevia rebaudiana.*

TRACING MINERAL PATHWAYS IN HALOPHYTES: FROM ROOTS TO AERIAL PARTS

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Abstract

Soil salinization is a growing global challenge, affecting agricultural productivity and ecosystem stability. This phenomenon results from human activities, such as improper irrigation and deforestation, and climate change-driven factors like rising temperatures and altered precipitation patterns. With increasing soil degradation, effective and sustainable solutions are urgently needed. Halophytic plant species offer a promising strategy for mitigating soil salinization. These plants naturally tolerate high salt concentrations by absorbing and transporting excess salts to specific tissues, thereby reducing soil salinity. Additionally, halophytes hold economic potential, as they can be utilized in various industries, including bioenergy, pharmaceuticals, and agriculture. Some species provide alternative food sources or raw materials for cosmetics and medicine. Degraded soils can be rehabilitated by integrating halophytes into land management practices while generating valuable resources. However, further research is needed to optimize species selection and large-scale implementation. This study highlights the extraction potential of halophytes in addressing soil salinization and emphasizes their role in sustainable land use strategies.

Key words*: elemental analysis, inductively coupled plasma with mass spectrometry, phytoremediation, salinization.*

STRUCTURAL CHARACTERISTICS OF TREES OBTAINED THROUGH THE TRANSFORMATION OF SILVOPASTORAL SYSTEMS

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Abstract

The stands resulting from the transformation of silvopastoral systems present a series of specific structural, qualitative and synthesis characteristics. The structure of these stands is influenced by the species, their regeneration method and the time in which the massif state was achieved. The case study was carried out within the Codrii Cămării Forest District in Dobreşti, Bihor County, and has as its objectives the silvotechnical analysis and diagnosis of the stand formed by the transformation of a silvopastoral system. From the analysis of the horizontal, vertical and three-dimensional profiles made on the experimental samples in the studied stand, a series of differences are found between the base diameter, the base area, the total height, the pruned height and the crown diameter, for the analyzed trees. In some portions of the stand, the consistency index k varies in the range of 0.6 - 0.8, an aspect that negatively influences its growth and development process. Consequently, for the sustainable management of these stands with a specific structure, a series of works related to both mixed regenerations and young stands are necessary.

Key words: *silvopastoral system, transformation, stand, structural characteristics, silvotechnical interventions, sustainable management.*

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, and 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 (155.45-171.58 Trolox equivalents/100 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.*

OXALIS ACETOSSELA IN FORESTS. A SYSTEMATIC BIBLIOMETRIC STUDY OVER THE LAST 47 YEARS

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Abstract

Oxalis acetosella (wood sorrel) is an herbaceous plant commonly found in beech and spruce forests, indicating fertile areas. By analyzing articles in Web of Science and using VOS viewer, Excel, and Geochart, 91 publications from 1976 to 2023 were reviewed. These articles span 19 research areas, with the highest numbers in Environmental Sciences-Ecology, Plant Sciences, Forestry, and Biodiversity Conservation. Around 2-3 articles have been published annually, with a peak of seven articles in 1998. The studies feature authors from 27 countries, primarily from Sweden, Germany, and the USA, with affiliations mostly at Lund University, Swedish University of Agricultural Sciences, and the University of Tartu. Articles were published in 61 journals, with Forest Ecology and Management, Ecography, and Vegetatio being the most representative. Frequently used keywords include "vegetation," "Oxalis acetosella", "growth". "dynamics" and "plants". The evolution of keywords shows a shift from "beech forest", "nitrogen deposition", and "Oxalis acetosella" to terms that reflect the effects of various factors on wood sorrel, such as "impact", "disturbance", "dynamics", and "diversity".

Key words*: topic, articles, wood sorrel, keywords, journals.*

EFFECT OF ESSENTIAL OILS ON QUALITY AND SHELF LIFE OF STRAWBERRIES DURING COLD STORAGE

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Abstract

Strawberries hold significant economic value in many countries. However, due to their delicate texture and thin skin, they are prone to rapid spoilage and susceptible to various pathogens. Currently, chemicals are the primary method used to prevent pathogen infections and degradation of fresh fruits. Therefore, this research focuses on identifying organic, eco-friendly treatments that can extend the shelf life of these fruits. Essential oils (EOs) are potential candidates for prolonging strawberry shelf life and protecting against post-harvest fungal pathogens. Current study evaluates the in vitro activity of several EOs against Botrytis cinerea and the in vivo effects of EO treatments on the quality and physicochemical properties of strawberries (Fragaria × ananassa cv. Alba) stored at 4 ± 1°C for 15 days. Parameters such as weight loss, decay percentage, fruit firmness, soluble solid content, and total polyphenols were measured at three intervals over 15 days of cold storage. Cinnamon EO was particularly effective in reducing rot by inhibiting fungal growth, aligning with in vitro results. Notably, EO treatments extended the shelf life and delayed decay of strawberries up to 15 days under cold storage.

Key words*: Botrytis cinerea*, *essential oils, fruit quality, shelf life, strawberries.*

CRAFTED BARREL - AGED BEER: TRADITION AND INNOVATION IN FLAVOR EVOLUTION - REVIEW

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Abstract

Barrel-aging beer is a practice that dates back to the early days of brewing, when wooden barrels served as essential tools for storage and transportation. Over time, brewers observed that barrels could enhance the flavor of beer, transforming a practical necessity into a valued tradition. This process has been revitalized in the modern brewing industry to craft beverages with unique and complex sensory profiles. Barrel-aging involves storing beer in barrels made from various types of wood, often previously used to age spirits such as whiskey or rum. The interaction between beer and wood releases aromatic compounds like vanillin, γ-nonalactone, and volatile phenols, which contribute to the beer's enhanced flavor and character. This paper investigates the key factors influencing the sensory characteristics of barrel-aged beer, focusing on oxidation, wood compound extraction, and biochemical transformations during aging. It also highlights the beer styles best suited for barrel-aging, such as stouts, porters, and strong ales, which benefit most from the process. Finally, this paper underscores how barrel-aging merges tradition and innovation, offering brewers new ways to diversify and refine the sensory profile of modern beers.

Key words*: barrel-aged beer, aromatic compounds, yeast, flavor, craft beer.*

RHIZOSPHERE, PHYLLOSPHERE, AND CARPOSPHERE MICROBIAL COMMUNITIES OF GRAPES *(VITIS VINIFERA* L.)

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Abstract

Plants constantly interact with diverse microbial communities, and in the case of grapevines, these interactions are particularly important. Grapevines (Vitis vinifera L.), like many other plants, rely on the support of beneficial microorganisms in the rhizosphere, phyllosphere, and carposphere to promote growth, optimize nutrient absorption, and protect the plant against pests and diseases. The interaction between the grapevine and its microbiome is crucial, especially in the carposphere, as the microbes in this zone can significantly influence the quality of the grapes, as well as the microbial population involved in the wine production process. This study analyzes microbial communities in the rhizosphere, phyllosphere, and carposphere of some grapevine varieties to better understand the structure and diversity of microbial communities.

Key words*: Vitis vinifera, phyllosphere, carposphere, rhizsophere, microbiome.*

THE INFLUENCE OF HORTICULTURAL BY-PRODUCTS IN BAKERY PRODUCTS – A REVIEW

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Abstract

Horticultural by-products (HBP) are valuable functional ingredients and natural preservatives that enhance the nutritional value and shelf life of foods. The review includes articles examining HBP addition in bakery products. Following the PRISMA Guidelines, a total of 1,970 articles were identified, comprising 373 from Google Scholar, 617 from ResearchGate, and 980 from ScienceDirect. The selection process yielded 47 articles, of which data were extracted and analysed to answer the research questions, investigating variations in total phenolic content, physicochemical composition, changes in colour, rheological, and sensory properties in bakery products containing various HBP. The published data suggests that increasing the concentration of HBP positively correlated with high phenolic content and antioxidant capacity in bakery products. The main limitation of the published data was that no articles were found to contain a complete characterisation of the products: physicochemical parameters, rheological parameters and sensory analysis. Moreover, no standardisation of rheological methods was identified. Further investigations into HBP properties and usefulness will help optimize formulations, meet consumer preferences and increase the use of HBP to produce more healthy and sustainable food.

Key words*: bakery; horticultural by-products; phenols; minerals; rheology.*

RESEARCH ON THE APPEARANCE AND EVOLUTION OF *MONARTHROPALPUS BUXI* (LABOULBÈNE) IN THE BOXWOOD PLANTATIONS OF IAŞI COUNTY

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Abstract

Boxwood species, valued for their ecological adaptability, face growing threats from pests, notably the boxwood leafminer (Monarthropalpus buxi Laboulbène), which has severely impacted landscapes and nurseries in recent years. The aim of this study was to monitoring the evolution and ecology of Monarthropalpus buxi according to the local biotope and testing two insecticides in order to control the pest in North-Eastern part of Romania. The life cycle of boxwood leafminer was described in relation to GDD. The appearance of the first adults in 2022 was recorded at an accumulation of 196.2 GDD on 09th May, and the appearance of adults began at an accumulation of 191.7 GDD on 02nd May in 2023. The maximum flight curve was recorded at accumulations between 262.7 GDD (2022), respectively 246.3 GDD (2023). Last appearance of adults was observed on 28th May (2022) and 25 Mayth (2023). The larval stages in 2022 developed at accumulations between 675.7-1298.3 GDD and in the following year the larvae developed between 670.4-1317.1 GDD. Statistical methods were used to interpret the obtained results.

Key words*: buxus, boxwood leafminer, Growing Degree - Days, monitoring, temperature.*

ECOSYSTEMS IN BALANCE: HORTICULTURE, CLIMATE CHANGE, AND PEAT REDUCTION

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Abstract

In 2024, global temperatures surpassed 1.5 °C above pre-industrial levels, intensifying pressure to reduce greenhouse gas emissions from agriculture. Vegetable production, particularly sensitive to climate shifts, faces declining yields, quality issues, and increased pest and disease risks. Although elevated CO_2 may enhance photosynthesis, it also shortens growth periods and degrades product quality. Climate-smart practices—renewable energy use, efficient irrigation, precision fertilization, and resilient crop varieties—are vital for adapting horticultural systems. Peat-based growing media significantly contribute to emissions and habitat loss. In response, Europe has advanced efforts to reduce peat use, shifting from biodiversity concerns to climate mitigation. Alternatives such as wood fiber, coir, and compost show promise, though they present challenges in availability, cost, and consistency. In Germany, press pots used for vegetable seedlings rely on decomposed peat for compressibility and stability. Growers value these pots for reducing transplant shock. To improve sustainability, we trialed media containing 30–50% peat substitutes - wood fiber, coir pith, compost - with added clay. Trials demonstrated approximately 95% transplant success, indicating viable peat reduction without compromising pot integrity. However, nitrogen immobilization due to microbial activity in organic components remains a constraint and warrants further study. Addressing such limitations is essential for scaling peat-free systems. This work underscores the potential of integrating peat alternatives into climate-adaptive horticulture. Reducing peat reliance, alongside other sustainable practices, can lower environmental impacts while supporting resilient vegetable production in the face of ongoing climate change.

Key words*: horticulture, peat, resilient vegetable.*

LEONTOPODIUM NIVALE SSP. *ALPINUM* (CASS.) BIOTECHNOLOGY APPLIED FOR ECONOMIC AND CONSERVATIVE PURPOSE

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Abstract

Plant biotechnology ensures the production of a wide range of compounds for industry, pharmacy, cosmetics and medicine. Tissue cultures can provide useful metabolites all-round the year under controlled conditions with reduced expenses. L. nivale subsp. alpinum (Cass.) is a protected taxon, of ornamental value and economic importance.
Our aim was to produce highly regenerative cultures for mass production and synthetic seeds development, as mean for multiplication and preservation.
The effect of different growth factors was studied concerning regeneration through direct morphogenesis and somatic embryogenesis. The presence of 2.4-D and Dicamba alone or combined with low levels of kinetin favoured somatic embryogenesis. Histological samples of embryogenic aggregates were analysed using optical and scanning electron microscopy. Somatic embryogenesis provides a large mass of plant material for basic studies and for economic purposes.
For synthetic seeds production, embryogenic aggregates of 2-3 mm diameter were incubated in 3% sodium alginate in a modified $CaCl_2$-free MS liquid medium. Subsequently, dehydrated seeds were cultured on MS agar solidified medium added with growth regulators to test the artificial seeds' growth.
We improved the regeneration rate through somatic embryogenesis and, subsequently, produced artificial seeds useful for multiplication and conservative purposes.

Key words*: Leontopodium nivale, somatic embryogenesis, synthetic seeds.*

EX SITU CONSERVATION OF *SERRATULA BULGARICA* ACHT. & STOJ. IN THE REPUBLIC OF MOLDOVA

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Abstract

The study refers to an Asteraceae taxa – Serratula bulgarica Acht. & Stoj., a very rare species in the flora of the Republic of Moldova, reported only in the phytocenoses of Quercus pubescens Willd. in the vicinity of the Batîr commune in the Cimişlia district, whose actual number does not exceed 50 phytoindividuals. This is a Critically Endangered taxa, protected by law, included in the Red Book of the Republic of Moldova, 3rd ed., the 1997 IUCN Red List of Threatened Plants. For the conservation and multiplication of the Serratula bulgarica species in ex situ conditions, fragments of rhizomes collected in natural habitat in the autumn of 2022 were planted in the experimental plot. Ex situ the species develops well, goes through all ontogenetic stages, forms a vigorous habitus. The seeds are viable and the germination rate in laboratory conditions is about 90%. Vegetative propagation by plantlets from renewal buds on rhizomes is high.

Key words*: Serratula bulgarica Acht. & Stoj., rare taxa, conservation, Republic of Moldova.*

VARIATION AND CORRELATION OF TEXTURAL AND FRUIT MATURITY PARAMETERS DURING STORAGE OF DALINBEL, JONAFREE, AND REAL APPLE CULTIVARS

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Abstract

The paper aims to identify the influence of 82 days of storage of the Dalinbel, Jonafree, and Real apple cultivars on their textural parameters: hardness, fracture force, cohesiveness, and chewiness. It also aims to identify a possible correlation between the textural parameters and fruits' maturity, characterized by chlorophyll absorbance index IAD (index of absorbance difference), glucose, and fructose concentrations. Textural parameters were measured by puncture test and texture profile analysis (TPA). Dalinbel, Jonafree, and Real apples cultivars had particular variations of textural properties during storage. No significant differences were found for cortex (pulp) tissue's hardness, cohesiveness, chewiness, and fracture force (measured by TPA) for Dalinbel apples from day 47 to 82 of storage and from day 1 to day 82 of storage for the Jonafree apples. Linear correlation analysis over all apple cultivars revealed that after 47 days of storage, there was a negative correlation between glucose concentration and fracture force ($r = -0.9995$; $p = 0.0196$). Additionally, a linear correlation was observed for IAD and fruits hardness ($r = 0.9878$, $p = 0.0028$) measured by TPA.

Key words*: apple cultivars, storage, textural parameters, fruit maturity parameters, correlation.*

INFLUENCE OF MEDIA COMPOSITION ON *IN VITRO* SEEDLING DEVELOPMENT OF SOME HOT PEPPER (*CAPSICUM ANNUM*) VARIETIES

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Abstract

Hot pepper (Capsicum annuum L.) is an economically and nutritionally important species, widely cultivated for culinary, medicinal, and industrial purposes. The success of in vitro propagation depends on multiple factors, including the composition of the culture medium, which influences germination rates and early seedling development. This study investigates the effect of different nutrient media on the in vitro growth of six hot pepper varieties - 'Coarne de capră', 'Milenium', 'Nemțesc', 'Halep', 'Fideluță', and 'Habanero' - obtained from The Plant Genetic Resources Bank for Vegetable, Floriculture, Aromatic and Medicinal Plants, Buzău, Romania. The seeds were surface sterilized and cultured on four distinct media formulations: MS (-), B5, MS (-) supplemented with GA_3, and MS (-) with an elevated concentration of copper sulfate. Germination percentage, seedling height, root elongation, and overall plant vigor were recorded and analyzed. The findings provide insights into the role of media composition in optimizing tissue culture protocols for Capsicum annuum and related species.

Key words*: in vitro, culture media, hot pepper, germination, seedling growth, Capsicum annum.*

TESTING BIOLOGICAL FERTILIZERS USEFUL FOR SUSTAINABLE AGRICULTURE

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Abstract

Biofertilizers represent an ideal alternative for sustainable agriculture, ensuring, in addition to increasing crop productivity, low costs and easy handling. The aim of this work was to test commercialized biofertilizers (Symbiomyco Grow - organic product based on mycorrhizal fungi), as well as potential biofertilizers (algae culture - Chlorella sorokiniana UTEX 1230 - with Symbiomyco Grow) to highlight the possible beneficial influence on some physiological and biochemical parameters in cucumber, Cucumis sativus L. Symbiomyco Grow was tested in two concentrations (1 and 0.1 g L^{-1} respectively) and 4 variants (with and without algae culture) and applied to the seeds before germination (experiment 1) and at the seedling stage (experiment 2). At the end of the experiments, the root and stem lengths were measured, and the fresh weight, total phenolic content, and concentration of the assimilatory pigments were determined. Among the parameters significantly increased compared with the control, after applying the algae culture with Symbiomyco Grow, we mention: axial organ length, fresh weight, and chlorophyll b.

Key words*: biofertilizers, cucumber, growth, assimilatory pigments, polyphenols.*

IN VITRO ANTIFUNGAL EFFECT OF *ROSMARINUS OFFICINALIS* L. ESSENTIAL OILS AGAINST *FUSARIUM* SPP.

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Abstract

The in vitro antifungal activity of essential oils extracted from plants of Rosmarinus officinalis L. against species of Fusarium was studied using three samples: a laboratory-extracted essential oil and two commercial samples. The tests were conducted using two methods: the "incorporation into medium" method and the "diffusion method with filter paper discs." The results showed that all three essential oils exhibited significant inhibitory effects on the growth of Fusarium spp., with variations in efficacy between samples. The oil extracted in the laboratory demonstrated the highest antifungal activity compared to commercial samples. Both methods provided consistent results, with the diffusion method highlighting the inhibition zones, and the inclusion method quantifying the degree of fungal growth inhibition.

Key words*: Rosmarinus, Fusarium spp., essential oil.*

IN VITRO ANTIFUNGAL EFFECT OF *ROSMARINUS OFFICINALIS* L. ESSENTIAL OILS AGAINST *BOTRYTIS* SPP.

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Abstract

The study analyzes the in vitro antifungal activity of essential oils extracted from Rosmarinus officinalis L. plants against Botrytis spp., a phytopathogenic fungus of major importance in modern agriculture, known for its negative impact on various crops. The research was conducted using three essential oil samples: one obtained in the laboratory and two commercial samples. The antifungal efficacy was evaluated using two complementary methods: the `incorporation method` and the `filter paper diffusion method`. The results demonstrated a significant inhibition of Botrytis spp. growth, with major differences between the samples. These suggest the use of Rosmarinus officinalis essential oil as a sustainable and ecological solution for controlling phytopathogens in agriculture, to the detriment of synthetic control methods.

Key words*: Rosmarinus, Botrytis spp, essential oils.*

CARBON STABILIZATION AND SEQUESTRATION PROCESSES IN SOIL THROUGH SYNTHETIC MICROBIOMES

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Abstract

The soil microbial community plays a crucial role in the carbon (C) cycle, acting as a primary driver of variability in the soil's carbon storage potential. The taxonomic composition, through its structure and level of activities, ensures the regulation of nutrient delivery and the rate of decomposition of organic matter. The paper presents the results of the research carried out to assess the role of soil inoculation with synthetic microbiomes (M1, M4, M5, M7) containing performing heterotrophs, in priming the processes responsible for carbon sequestration. Specifically, the study evaluated the influence of these microbiomes on soil glycoprotein level, exopolysaccharide (EPS) production, dissolved organic carbon (DOC) and microbial biomass content. Significant differences were observed among experimental variants, particularly in microbial biomass accumulation. Among the tested microbiomes, M5 demonstrated superior performance, inducing the highest increases in glycoprotein content (1.73 mg·g^{-1}), EPS (594 µg·mL^{-1}), microbial biomass (363.2 mg C·kg^{-1}), and the lowest DOC content (10.13 mg·L^{-1}). These results indicate M5's enhanced integrative capacity and compatibility with soil conditions, supporting its potential role in improving carbon stability and sequestration.

Key words*: dissolved organic carbon (DOC), exopolysaccharides (EPS), glycoprotein, microbial biomass, synthetic microbiome.*

DIFFERENCES IN MICROBIAL DIVERSITY AND COMMUNITY STRUCTURE AMONG TWO VERMICOMPOST GRANULATIONS

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Abstract

This paper presents the results of the research concerning the influence of two vermicompost granulations, C1<2 mm and C2>2 mm, obtained by sieving, on bacterial and fungal diversity and community structure. Both bacteria and fungi have colonized the vermicompost granulation C2>2 mm with higher counts as compared with C1 fraction. Global microbial activity was expressed by higher values of soil respiration in C2 granulation (123.809 mg CO_2 x 100g^{-1}soil) as compared to 116.833 mg CO2 x 100 g^{-1}soil in C1 granulation. A rich bacteria population with high diversity (H'=2.104 bits) and homogeneity (ε=0.662) was found in C2 granulation. C1 granulation contained a less diverse bacteriobiome, with H'=1.750 bits and ε=0.594. Fungi presented lower biodiversity values than bacteria. Conditions from C1 were more favourable than those from C2 granulation (H'=0.921 bits, ε=0.324 in C1 and H'=0.403 bits, ε=0.089 in C2 fraction). Bacterial microflora from C1 granulation was dominated by bacillaceae, accompanied by Pseudomonas and actinomycetes and a mix of species (Bacillus, Micrococcus, Pseudomonas, Arthrobacter and actinomycetes) in C2 granulation. In both fractions identified strong cellulolytic species (Fusarium, Scopulariopsis, Penicillium, Cladosporium).

Key words*: vermicompost; granulation; bacteria; fungi; microbial communities; biodiversity.*

CLIMATE TRENDS IN OLTENIA. CASE STUDY: DĂBULENI WINE CENTRE

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Abstract

The Dăbuleni viticultural centre differs from other centres in Oltenia by the nature of the ecological factors. Located near the extreme south of Romania, it is characterized by sandy soils, high temperatures and a reduced rainfall regime. Under these conditions, viticulture acquires a series of particularities about culture technology and the choice of varieties for planting. All of these can be influenced by climate change. Meteorological data provided by the Research and Development Station for Plant Culture on sandy soils in Dăbuleni (Romania) for 10 years were interpreted to show the current viticultural climate and its trend. For this, several statistical indices were calculated (e.g. arithmetic mean, standard deviation, coefficient of variation), the Martonne aridity index was calculated, and the climagram of the period was made. The results were included in tables and represented graphically and show the evolution of the climate that characterizes viticulture on sands, in the Oltenia region (Romania).

Key words*: climate, monitoring, trend, agroecology.*

SURVIVAL AND QUALITIES OF *STEVIA* SEEDLINGS DEPENDING ON THE METHOD OF REPRODUCTION

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Abstract

In the conditions of Bulgaria, Stevia is propagated by planting seedlings. Seedlings are produced by cuttings from stored rhizomes, from seeds and from in vitro micropropagation and rooting techniques. In the laboratory of tissue cultures of the Agricultural Institute - Shumen, methods have been developed for efficient preservation of elite clones and micropropagation. In the 2020-2023 study, the influence of genotype on the proportion of rooting in vitro was evaluated. A comparative analysis of the survival of rooted in vitro regenerants during their adaptation to external conditions was performed, compared to that of cuttings from rhizomes and propagation from seeds. Seedlings are qualified according to biometric parameters - length and mass of the stem and roots. In vitro techniques remain the safest method for preserving and propagating elite material of Stevia for Bulgaria`s conditions.

Key words*: Stevia, reproduction, micropropagation.*

THE EVOLUTION OF CLIMATE CHANGE IN THE WESTERN REGION OF ROMANIA AND THEIR INFLUENCE ON CROPS

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Abstract

In this paper, we have made an interpretation of how climate changes and certain risk factors have influenced the evolution of the climate in the western part of Romania. With the help of meteorological data provided by the representative stations in this part of the country, the influence of abiotic factors was analyzed for different study intervals. The first part of the paper presents a period with a normal multiannual evolution of the thermal regime, the pluviometric regime and extreme phenomena, and in the second part, the years with significant deviations are interpreted. The analysis of meteorological parameters was carried out for the representative stations in the western and northwestern areas of the country, stations belonging to the Banat Crișana Regional Meteorological Center, respectively those in the counties of Timiș, Arad and Bihor. The results obtained led to the formulation of some conclusions regarding the influence that these climate changes have on the crops in the analyzed counties.

Key words*: climate change, risk factors, puviometric regime, meteorological stations, crops.*

PORTULACA GENOTYPES BREEDED AND BIOBANKED AT BRGV BUZAU

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Abstract

Portulaca grandiflora and P. oleracea were introduced into breeding studies at BRGV Buzău. The germplasm collection of P. grandiflora contains several genotypes highlighted by a varied color palette, while for P. oleracea several genotypes have been developed that can be cultivated and have great production potential. Among them, the cultivar G2 stands out, demonstrating distinct phenotypic expression and will be presented in this article. Following biometric measurements and phenological observations, average values were recorded with a height of 68 cm, a diameter of 82 cm, and a plant weight of 1570 g, with the note that the production potential could be doubled if staggered harvesting is practiced. The results recommend Portulaca as a viable food alternative with valuable nutritional and medicinal properties, especially in the context of climate change.

Key words*: germplasm collection, production potential, phenotype, food alternative, climate change.*

UMBRELLA EFFECT OF EUROPEAN PROTECTED SPECIES OVER NATIONAL RED LISTED *BETULA HUMILIS* SCHRANK- "MESTECĂNAȘUL DE LA COȘNA" AS A NEW NATURA 2000 SITE

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Abstract

Betula humilis Schrank is a rare, glacial relict species primarily found in eutrophic peatlands. In Romania, it is limited to the Carpathian depressions of Transylvania and Bukovina, marking the southernmost boundary of its European distribution. Due to drainage and land-use changes, Betula humilis populations have declined and are nationally endangered. Despite these threats, a population of over 50 shrubs was mapped from Coșna area (Suceava County), making it one of the largest known populations in Romania. As part of a peatland restoration project, our efforts aimed at restoring the optimal hydrological regime to protect Betula humilis. During the area's flora and fauna inventory, two European protected species were discovered: Lycaena helle (an endangered butterfly) and Ligularia sibirica (a rare glacial relict plant). These findings highlight the site`s exceptional conservation value, leading to an expansion of the initial proposal for a Botanical Reserve of local interest to a broader Natura 2000 site covering 21 hectares. A management plan is needed to protect both Betula humilis and its umbrella species.

Key words*: Betula humilis, endangered species, Natura 2000, peatland restoration.*

INFLUENCE OF CULTURE MEDIUM ON *IN VITRO* MICROTUBER PRODUCTION IN S*OLANUM TUBEROSUM*

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Abstract

Solanum tuberosum is a species highly susceptible to viral diseases. In vitro propagation of this species is crucial for producing disease-free seed planting material, as it eliminates pathogens and viruses that commonly affect conventional tuber propagation. Microtubers can be used as nuclear material to generate disease-free, certified material for propagation of Solanum tuberosum. Moreover, those microtubers also play a crucial role in the conservation of potato germplasm, as under slow-growth culture conditions, they can have extended periods of dormancy. For the in vitro tuberization of potato explants, several medium variants were tested, using different concentrations of sucrose (3%, 4%, and 8%) with or without the addition of 6-Benzylaminopurine. After harvesting, microtubers were stored in MS medium, at 4°C in the refrigerator and their viability and regrowth capacity were tested over several storage periods.

Key words*: germplasm conservation, growth regulators, micropropagation, potato, slow growth storage.*

ECOLOGY AND PHYTOSOCIOLOGY OF THE SPECIES *CIRSIUM CANDELABRUM* GRISEB. (SECT. CIRSIUM, ASTERACEAE, CYNAREAE) IN THE UPPER BASIN OF THE GILORT RIVER, CARPATHIANS MOUNTAINS

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Abstract

According to Flora Europaea, Cirsium candelabrum Griseb. (Asteraceae) includes the territory of the Balkans (Balkan endemic): Bosnia and Herzegovina, Montenegro, Albania, Serbia, Kosovo, Macedonia, Greece, Bulgaria and southwest Romania. Cirsium candelabrum occurs in ruderal habitats along roads, especially when natural vegetation has been removed by road construction or reconstruction. The species is found in intensely sunny and extremely dry areas, newly filled warehouses with construction waste, most often in urban and suburban areas. It is an anthropogenic species with tendencies to spread in natural habitats and agro-ecosystems. From a phytosociological point of view, two plant communities built by this species have been described in Europe: Picrido hieracioidis-Cirsietum candelabri Jasprica, Milović & Pandža 2015 (Croatia) and Cirsietum candelabri Matvejeva ex Čarni, Kostadinovski & Matevski 2001 (North Macedonia and Bosnia) and Herzegovina. In Romania, the species is found sporadically, especially on skeletal, sandy or stony soils, in Hunedoara, Caras-Severin, Mehedinți, Gorj and Vâlcea. From an ecological and phytosociological point of view, the species shows a relatively high variability corroborated with the current eco-pedo-climatic conditions.

Key words*: Cirsium candelabrum, distribution, ecology, Gilort basin, phytosociology.*

SOME ASPECTS OF THE MORPHO-ANATOMICAL FEATURES OF THE MEDICINAL PLANT *ARNICA MONTANA* L.

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Abstract

The objective of this work was the morphological and anatomical study of vegetative organs in the species Arnica montana L. it belongs to the Asteraceae family. The genus includes approximately 30 species, herbaceous, perennial, has yellow or orange flowers, reaches a height of approximately 60 cm. It originates from the mountain regions of Europe, North America. It is commonly found in alpine meadows, on wetlands and in forests. Arnica montana L. is an endangered medicinal plant species endemic to Europe. Traditionally used in Romania for its anti-inflammatory and analgesic properties, it stimulates blood circulation, reduces edema, has a healing and antimicrobial effect. After analyzing the morphology and anatomy of arnica leaves, it was found that in both epidermises there are peri tectors and glands, short and long, the mesophyll is bifacial type, differentiated into palisade tissue with 1-2 rows of cells, under upper epidermis and lacunate tissue, with 4-5 rows of cells, with intercellular spaces, below the lower epidermis. The leaf blade is amphistomatic, with stomata in both epidermises.

Key words*: root anatomy, leaf anatomy, endemic, morphology.*

METHODS OF COMBATING AND CONTROL REGARDING FALSE INDIGO-BUSH IN CLOSE CORRELATION WITH INVASIVE CAPACITY IN THE FORESTRY PLANT COMMUNITIES IN THE JIU-DANUBE CONFLUENCE ZONE

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Abstract

The false indigo-bush – Amorpha fruticosa L. is an invasive shrub, native to south-western North America. It was acclimatized in Europe as an ornamental shrub, its invasive-aggressive nature being noted over time. Areas of this species have greatly expanded in recent years across the country. The current eco-pedo-climatic conditions as well as the geographical position allow the installation of invasive species within these meadow phytocoenoses, some of them having a very high abundance-dominance. Among the species with high abundance-dominance, we studied the species Amorpha fruticosa which has an increase aggressive character both in the Jiu meadow, but especially in the Danube meadow. Although both 2022 and especially 2023 were dry years, the false indigo-bush had a massive development, most populations having a high number of individuals/m^2 within phytocoenoses. This species influences the successional dynamics and the floristic composition of the forest plant communities, occupying increasingly more and more space. Each tested method (mechanical and chemical) has its advantages and challenges and often a combination of strategies is necessary for sustainable management of the species.

Key words*: Amorpha fruticosa, combating methods, forest habitat, invasive species, Jiu-Danube Confluence.*

STUDIES REGARDING THE CYTOTOXICITY OF A BIOPRODUCTS BASED ON POLYSACCHARIDES DERIVED FROM *PLANTAGO* SP.

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Abstract

Cytotoxicity studies performed on HUVEC and $CaCo_2$ cell lines with a polysaccharides-based bioproduct isolated from Plantago lanceolata as well with inulin (for comparison) revealed moderate cytotoxicity after 24-hour exposure to inulin and polysaccharides from Plantago lanceolata. Inulin showed a high selectivity index (SI = 11) for the $CaCo_2$ tumour cell line, indicating specificity for this cell line. After 48 hours, the polysaccharides from Plantago lanceolata showed no cytotoxicity on either studied cell line. Inulin showed no cytotoxicity to HUVEC cells but exhibited cytotoxicity to $CaCo_2$ cells, giving a higher selectivity index (SI = 25.3) after 48 hours of exposure. Overall, the polysaccharides from Plantago lanceolata showed similar physicochemical properties to inulin, without cytotoxicity on HUVEC cells and moderate cytotoxicity on $CaCo_2$ cells after 48 hours of exposure.

Key words*: cytotoxicity, Plantago lanceolata, selectivity index.*

MODELLING THE DISTRIBUTION OF THE RARE, ENDEMIC, TERTIARY RELICT AND VULNERABLE SPECIES *SYRINGA JOSIKAEA* JACQ. FROM APUSENI MOUNTAINS (WESTERN ROMANIAN CARPATHIANS)

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Abstract

The spontaneous species Syringa josikaea Jacq. (Transylvanian lilac, wind wood) is a very important species in Romanian flora (rare, endemic, tertiary relict, and vulnerable), being under Romanian and European special protection. Small populations with a low number of individuals are distributed only in western Romanian Carpathians (Apuseni Mountains) and Ukrainian Carpathians (Latorica River watershed). We developed, in Maxent, a distribution model based on the following parameters: ecological (climatic, geomorphologic, soil distribution), biological (interactions among species, characteristic plant species communities), anthropic (land use, biodiversity conservation), and cultural (local and traditional practices). The development of such a model leads to: the assessment of the impact of climate, and to analyze projections that may affect the distribution of the species in the future, the conservation of the characteristic habitats by developing management strategies thus ensuring the sustainability of the species. This model is also a direct support for the EU-specific reporting of Romania in the context of Article 17 of the Habitats Directive. Due to its beauty, the Transylvanian lilac is cultivated in the gardens and urban parks of the world.

Key words*: Syringa josikaea, distribution, modelling, Maxent, Western Romanian Carpathians.*

LOW TEMPERATURE PASSIVE STORAGE OF SOLAR ENERGY USING MACROENCAPSULATED PHASE CHANGE MATERIAL FOR GREENHOUSE HEATING

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Abstract

In this experimental study, the storage of solar energy as short-term (day-to-night) latent heat for heating of a plastic greenhouse with a floor area of 60 m^2 was investigated. Coconut oil was used as phase change material (PCM) for latent heat storage. In the greenhouse compartment where PCM was used, higher temperatures were determined between 1.25°C and 4.49°C compared to the control greenhouse. The temperatures of the pots in the greenhouse compartment where PCM was used and the control compartment were found to be between 0.9°C and 2.12°C during the day and 1.08°C and 1.76°C at night. Total daily energy, fuel and emission savings for the greenhouse where PCM was used were determined as 12.9%, 19.2% and 42.1% for February, March and April, respectively. In addition, it was determined that the yield of tomato plants grown in the greenhouse where PCM was used was 8.61% higher than the yield values in the control compartment.

Key words*: phase change material, coconut oil, heat storage, greenhouse heating.*

ANTIOXIDANT CAPACITY AND SEASONAL MINERAL COMPOSITION VARIATION IN *ARONIA MELANOCARPA* FRUITS

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Abstract

Aronia melanocarpa fruits have been linked to a variety of health benefits due to their nutritional, antioxidant, antiviral, and anti-inflammatory properties. The main objective of this study was to identify the optimal harvest time for maximum nutritional antioxidant potential and nutritional mineral concentrations. Ten berry samples of 'Nero Eggert' Aronia melanocarpa variety were harvested twice per week over 5 weeks (August – September). Aronia berries harvested in early August contain high concentrations of dietary macronutrients: Ca (807.17 mg/kg), K (3,070.15 mg/kg), Mg (201.94 mg/kg), Na (116.77 mg/kg), dietary ultratrace elements: B (168.65 mg/kg) and Sr (1.14 mg/kg) and total flavonoid content (TFC – 1,722.87 mg CE/100 g). Berries harvested in early September contain high total polyphenol concentrations (TPC – 2,358.65 mg GAE/100 g), total antioxidant capacity (TAC - 41,58 mmol TE/ 100 g), total anthocyanin content (TA - 357.17 mg CGE/100 g) and ferric reducing antioxidant power (FRAP - 69.33 mmol Fe(II)/100 g), high concentrations of dietary micronutrients: Cr (0.39 mg/kg), Cu (1.53 mg/kg), Fe (110 mg/kg), Mn (9.2 mg/kg), Zn (108.32 mg/kg), which make them recommended for functional and personalized foods with high polyphenol content.

Key words*: chokeberry, nutritional value, minerals, polyphenols.*

A COMPREHENSIVE REVIEW OF MINT ESSENTIAL OILS – COMPOSITION, QUALITY AND APPLICATIONS

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Abstract

Mint essential oils, extracted from various species of Mentha, are highly valued for their aromatic, therapeutic, and industrial uses. This comprehensive review examines the chemical composition, quality assessment techniques, and broad applications of mint essential oils. Key bioactive compounds such as menthol, menthone, and isomenthone play a pivotal role in the characteristic aroma and functional properties of these oils. Emerging tools, including chemometric models combined with spectroscopy, promise rapid, non-destructive quality control. Advanced techniques like liquid chromatography-electrospray ionization time-of-flight mass spectrometry (HPLC-ESI-TOF/MS), headspace solid-phase microextraction coupled with gas chromatography-mass spectrometry (HS-SPME/GC-MS), and ATR-FTIR spectroscopy offer improved detection of adulteration and detailed profiling of both volatile and non-volatile components. Nonetheless, factors such as processing, storage, and environmental conditions can significantly alter oil composition, emphasizing the need for standardized protocols to ensure consistent quality. These advancements are set to solidify the role of mint essential oils in aromatherapy, pharmaceuticals, and diverse industrial applications.

Key words*: esential oil, Mentha sp., analytical techniques, volatile and non-volatile compounds, quality.*

DEVELOPMENT AND CHARACTERISATION OF AN INNOVATIVE JAM OF HOT PEPPER

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Abstract

Our research consists in 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 were added ginger and anise. We have developed a manufacturing process, and technological stages to obtain this sweetness prototype. Our work has focused on evaluation of the main nutritional components and sensorial 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 from the market have been made.

Key words*: jam, sweetness, ginger, anise, organic product.*

NEW GENOTYPES OF COTTON (*GOSSYPIUM HIRSUTUM*) BRED AT BRGV BUZAU

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Abstract

Plant Genetic Resources Bank Buzău owns a rich collection of cotton (Gossypium hirsutum) varieties, predominantly ornamental cultivars, which are part of the institution's activity. Among these genotypes, two varieties with distinct phenotypic expressivity have been obtained as a result of intensive breeding work: L1, a cultivar with multiple uses, appreciated for its ornamental characteristics, and L2, which stood out for its earliness and high fiber production capacity. Biometric determinations revealed specific characteristics: L1 with an average height of 57 cm and mass/ boll 6.61 g and L2 with an average height of 109 cm and mass/ boll of 8.53 g. L1 was obtained from the crossing of the Romanian variety known as Brâncoveni and a local population from India and the L2 cultivar was based on the Adelin variety, one of the first cotton varieties in Romania. The present paper highlights the research carried out on the stabilization of two phenotypically distinct genotypes, to be approved and patented under the aegis of BRGV Buzau.

Key words*: biobanking, germplasm, phenotype, fiber, ornamental.*

CONTRIBUTIONS TO THE KNOWLEDGE OF THE DISTRIBUTION OF SOME RARE TAXA IN THE FLORA OF OLTENIA (ROMANIA)

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Abstract

Oltenia is a region located in southwestern Romania and it is characterized by great climatic, pedological, geomorphological, and floristic diversity. In this part of Romania, many southern elements find their habitat, some of them being rare in the flora of the country (e.g., Cirsium creticum). Climate changes in recent years have led to obvious changes among plant taxa, both in terms of distribution in nature and especially in their phenology. For some taxa, these changes led to the widening of the area (e.g., the psammophilous elements: Erodium hoefftianum subsp. neilreichii, Mollugo cerviana, Bassia laniflora, Achillea ochroleuca, Salvia sclarea, Silene borysthenica, Limonium tomentellum, Polycarpon tetraphyllum, Hordeum bulbosum), while for others on the contrary, to its restriction (Aldrovanda vesiculosa, Pisum sativum subsp. elatius).

Key words*: flora, ecology, distribution, Oltenia, Romania.*

DISCUSSIONS ON SOME ALIEN SPECIES FROM THE FLORA OF OLTENIA (ROMANIA)

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Abstract

Alien plants from Romania have drawn the attention of researchers since the beginning of this millennium. A first attempt to create an inventory of alien species in the flora of Romania was made about 20 years ago. In less than 10 years, the number of such plants included on the list has increased by about 35%. Annually, contributions are made to the spread of these taxa or new taxa are mentioned for the adventitious flora of Romania. In this paper, the author discusses certain alien taxa that develop on areas located in southern Romania (especially in Oltenia). The following species are analyzed: Echinocystis lobata, Amaranthus palmeri, Azolla filiculoides, Vallisneria spiralis, Asclepias syriaca, Prunus cerasifera, Oenothera glazioviana, Abutilon theophrasti, Datura wrightii, Symphyotrichum lanceolatum, Eleusine indica. Voucher specimens collected in the field are deposited in the Herbarium of the University of Craiova.

Key words*: alien species, comments, new records, Oltenia, Romania.*

PRECISION AGRICULTURE EXTENSION MODEL BASED ON INTERDISCIPLINARY COLLABORATION

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Abstract

This article presents the technical development of an autonomous irrigation system designed to optimize water delivery and support precision agriculture. Developed through a collaboration between the National University of Science and Technology Politehnica Bucharest and the National Institute of Research–Development for Machines and Installations Designed for Agriculture and Food Industry Bucharest and tested by the University of Agriculture and Veterinary Medicine Bucharest, the system integrates advanced engineering principles and agronomic expertise to address challenges in modern agriculture. The system architecture includes an embedded control unit and wireless sensor nodes with microcontrollers, wireless communication transceivers, and soil-crop interaction sensors such as capacitive moisture probes. Real-time data acquisition enables adaptive irrigation management using predictive algorithms, ensuring precise water application aligned with crop phenological stages and environmental variability. The system's modularity ensures scalability across various farm sizes, from smallholders to large-scale operations. This initiative strengthens a cooperative agricultural extension framework, facilitating knowledge transfer between students and faculty from the involved universities. By bridging technical and agronomic expertise, the system represents a leap forward in integrating precision agriculture into sustainable farming practices.

Key words*: precision agriculture, cooperative extension, interdisciplinary collaboration, wireless sensors, irrigation.*

FRUITING BIOLOGY OF *STAPHYLEA PINNATA* L. (STAPHYLACEAE) IN THE REPUBLIC OF MOLDOVA

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Abstract

The study presents the results of the fruiting biology in the interaction with the environmental factors of the Staphylea pinnata L species, a rare species for the Republic of Moldova, protected by law (1998). At the European level, the species is included in the national red lists of Switzerland, France, the Czech Republic and Poland, while in Armenia and Ukraine, it is even included in the Red Cards with different degrees of endangerment. European bladdernut is a relict species with a fragmented distribution area and includes the Mediterranean, Central and East Europe regions. It grows under the canopy, in forest phytocenoses: of oak with lime and ash; of pedunculate oak with hornbeam. During the study, the morphometric parameters of the fruits and seeds of the european bladdernut were studied to determine the productivity of the species in different stations. The collected seed samples are to be preserved in the seed collection `Rare Plants of the Republic of Moldova`, within the research project `The safe conservation of the germplasm of rare plants from the Republic of Moldova` (24.80012.7007.08TC).

Key words*: Republic of Moldova, Staphylea pinnata L., fruiting biology, morphometry, rare species.*

THE GERMPLASM COLLECTION "RARE PLANTS OF THE REPUBLIC OF MOLDOVA" IN THE "ALEXANDRU CIUBOTARU" NATIONAL BOTANICAL GARDEN (INSTITUTE) OF THE STATE UNIVERSITY OF MOLDOVA

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Abstract

In a world of constant movement and development, the methods of saving and conserving genetic resources become paramount. The high need of vegetal genetic resources conservation is stipulated in the Global Strategy for Biodiversity Conservation. One of the prioritized directions of this strategy is ex situ conservation – by creating germplasm collections. The stability of a country`s plant biodiversity is ensured by the synergy of in situ and ex situ conservation strategies. `Al. Ciubotaru` National Botanical Garden (Institute) owns an impressive fund of plant biological material, such as: collections of live plants, collections of herbized plants and collections of seeds preserved for the short and medium term. The establishment of the `Rare Plants of the Republic of Moldova` germplasm collection have a primary role in ensuring the ex situ conservation of some rare species from the native flora, as well as essentially presenting a scientific basis for further: regeneration; multiplication; evaluation of the indices of quality preservation and distribution to interested parties, especially through the international exchange of seeds between Botanical Gardens for research purposes.

Key words*: Rare plants, ex situ conservation, germplasm, republic of Moldova.*

DISTRIBUTION OF INVASIVE SPECIES *METCALFA PRUINOSA* IN GREEN FOREST OF WESTERN ROMANIA

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Abstract

The Green Forest around Timişoara is home to numerous species of harmful insects. We would like to focus our attention on the species Metcalfa pruinosa known as Citrus Flatid Planthopper through this work. Uncontrolled, it is clear that the species can become dangerous for both woody plants in forests and those that constitute ground vegetation. Our study included observations of the size of nymph groups through the specific wax secretion left on the leaves of deciduous trees, 60-80 years old, but also older. The analysis was carried out in 7 sectors of the forest and had macroscopic techniques on site, by marking the target trees. All 8 plant species analyzed were affected in percentages ranging from 4.5% to 38%. The results showed that in sectors with predominant plants of Ulmus sp. and Acer sp. there were the most foliage with secretions, nymphs and adults. Also, the inner part of marginal trees and those near wide, airy paths were more affected by Metcalfa colonies. Regular monitoring could lead to reduction of damage.

Key words*: Metcalfa pruinosa, pest, Green Forest, trees, monitoring.*

ASSESSMENT OF *BUXBAUMIA VIRIDIS* FROM TWO NATURA 2000 SITES: RETEZAT (ROSCI0217) AND RUSCA MONTANĂ - ȚARCU - RETEZAT CORRIDOR (ROSCI0292)

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Abstract

Buxbaumia viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl. is a moss species included in the Habitats Directive 92/43, being an umbrella species for mature forest habitats, especially spruce forest, well-conserved or with adequate forest management for long-term conservation. The results are based on field data collected in 2022-2024 and literature data. Research revealed that the species is undervalued, since at the beginning of the study there was a lack of data on the presence of the species in the Rusca Montană -Țarcu - Retezat Corridor site (ROSCI0292). Based on the field data, the number of B. viridis individuals and microhabitats (rotten wood) for the two sites were estimated.

***Key words**: Buxbaumia viridis, bryophyte, moss, threatened species, Habitats Directive 92/43.*

DEVELOPMENT OF PLANT TISSUE CULTURE AND IN DOOR FARMING SYSTEMS IN A CONTROLLED ENVIRONMENTAL CONDITIONS USING LIGHT-EMITTING DIODES (LEDs) FOR THE PRODUCTION OF HIGH VALUE CROPS

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Abstract

The plant tissue culture system makes it possible to produce plants in a controlled environment under sterile conditions in large quantities and at a constant and faster rate. Light is one of the most important variables that can affect the growth and development of plant tissue culture, influencing photosynthesis, morphogenesis and physiological processes. Light-emitting diodes (LEDs) is useful in this scenario as they allow the irradiation of a narrow spectrum of light that meets the requirements of plants for their growth and development. Different LED-generated spectra with uniform intensity are used in plant tissue culture to enhance plant growth, development and proliferation. In a vertical farming system, LEDs can be used as energy-efficient light sources to produce high-quality products with high nutritional value. Commercially viable growing systems for high-value vegetables such as premium lettuces, herbs, microgreens, edible flowers and strawberry plants have been developed. The continuous acquisition of new concepts and knowledge in photobiology and plant morphogenesis, complemented by the rapid development of LED technology will make the application of solid-state lighting more remunerative.

Key words*: Plant Tissue Culture, In Door Farming, LEDs, Secondary Metabolites.*

CREATING A CLIMATE CAMERA FOR GROWING MICROGREENS: DESIGN, PARAMETERS AND POSSIBILITIES FOR APPLICATION

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Abstract

Microgreens are a new category of specialized vegetable crops that are included to the concept of fresh functional foods. The increased interest in this type of products has focused producers on the search for technological ways to produce them. One way to provide a practical application based decision is through the use of a climate camera. The creation of a climate camera with precise control of the growth and development conditions of microgreens is a key element of their production technology.
This publication discusses the parameters necessary for optimal growth of microgreens. It describes the basic principles for the design of a climate camera for their cultivation. As a result of the review, it presents practical guidelines for successful design and application.
The main conclusion is, the design of a climate chamber for microgreens is based on the correct choice of materials and creating the opportunity to control the main growth factors - temperature, humidity and light.

Key words*: microgreens, growth, climate control, smart box design.*

RESEARCH ON THE VALORIZATION OF MELONS AND THEIR BY-PRODUCTS

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Abstract

The efficiency of watermelon peel valorization has made the study of this paper to present an interest in the potential valorization of citrulline-rich watermelons in various foods, as well as solving a management and environmental problem.
Consumers are becoming increasingly health conscious and are showing interest in various novel food products.
The objective was to realize two different products based on watermelon rind. The obtained products fall into the groups of canned products, "Jam" and "Acidified vegetable preserves (in vinegar)".
The fresh rind of watermelon (Citrullus lanatus) was washed, the green layer was removed and the rind was divided into close sizes. The blanched rind was used for the jam, to which the syrup (water, sugar and lemon juice) was added and allowed to diffuse. For the vegetable mix, the original peel was used, mixed with vegetables (carrot, celeriac, gogon, bell peppers, celery leaves) and a vinegar solution.

Key words*: watermelon, consumers, valorization potential, products, watermelon rind.*

STUDY ABOUT THE INFLUENCE OF GIBBERELLIC ACID AND NAPHTHYL ACETIC ACID ON *IN VITRO* DEVELOPMENT OF FOUR ROMANIAN POTATO VARIETIES

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Abstract

*In 2024 within the Research Laboratory for Plant Tissue Cultures of National Institute for Research and Development for Potato and Sugar Beet Braşov, Romania an in vitro study was performed to determine the optimum concentration of gibberellic acid and naphthyl acetic acid for growth and development of plantlets belonging of four Romanian potato varieties, created at our institute. The minicuttings were cultured in Murashige and Skoog medium (MS). Gibberellic acid and naphthyl acetic acid were applied in different concentrations. The bifactorial experience of the 4*4 type included 16 variants, on 3 repetitions. Factor a is represented by the variety with 4 graduations (Azaria, Braşovia, Cosiana and Cezarina) and factor b is the culture medium with 4 graduations (0 mg GA_3: 0.005 NAA; 3 mg GA_3: 0.005 mg NAA; 4 mg GA_3: 0.01 mg NAA; 5 mg GA_3: 0.2 mg NAA). Measurements were made for: number of leaves, vitroplants height, root length and internodes number. For the analyzed parameters, the varieties behaved differently with each hormonal treatment applied.*

Key words*: potato, in vitro, variety, gibberellic acid, naphthyl acetic acid.*

GLOBAL DEVELOPMENT TRENDS AND STRATEGIC OUTLOOK OF VERTICAL AGRICULTURE

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Abstract

This paper aims to comprehensively understand the global development trends of vertical agriculture, analyze the key factors influencing its development, and then formulate forward-looking and feasible strategic plans. This research has both theoretical and practical significance. It can enrich the theories of agriculture and industrial development, guide enterprise decision-making, and assist in policy formulation, thereby ensuring global food security and promoting the sustainable development of agriculture. This paper systematically introduces the development history and trends of the vertical agriculture industry, comprehensively analyzes the key technologies and breakthroughs in the current vertical agriculture field, and examines the bottlenecks, challenges, and feasible countermeasures in industrial application. From a strategic perspective, it puts forward policy suggestions to promote the development of vertical agriculture, providing references and guidance for industry decision-makers and researchers.

Key words*: vertical agriculture, light efficiency, development suggestions, urban agriculture, smart agriculture.*

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