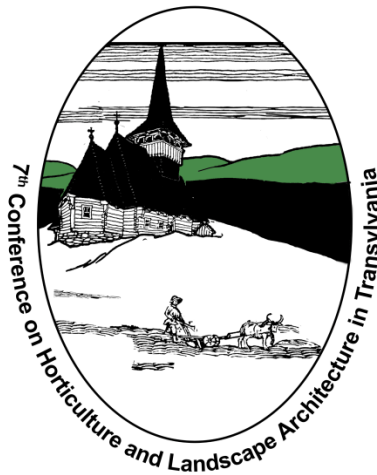


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May 11-13. 2023

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PLENARY COMMUNICATIONS

ENVIRONMENTALLY FRIENDLY FARMING: CROP PRODUCTION USING SUSTAINABLE TECHNOLOGIES

RESEARCH TOPICS OF ÖMKI HORTICULTURAL TEAM FOR A MORE SUSTAINABLE ORGANIC VEGETABLE, GRAPE AND APPLE PRODUCTION

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Introduction/Goal/objectives: The aim of the Horticulture Research Group of ÖMKi (the Hungarian Research Institute of Organic Agriculture) is to support the organic horticulture sector by investigating technological alternatives, taking into account sustainability aspects. Our main topics are: (1) peat substitution with compost from vegetable matter (in our case municipal green waste compost) in organic potting mixtures, (2) comparison of organic vegetable nutrition protocols, (3) early detection of late blight (*Phytophthora infestans*) in tomato with machine vision, (4) applying various cover crop mixtures in the interrows of vineyards and apple orchards to enhance ecosystem services.

Material and methods: To find the best research protocols of each topic, besides literature search and discussion with other research institutions (domestic and international), we consult organic growers from the on-farm partner list of ÖMKi. Laboratory tests and Living Lab trials complement each other during the research projects.

Results: (1) Peat substitution with compost from municipal green waste is possible in potting mixtures, but the source of compost is a crucial point. (2) Organic fertilisation strategy should be based on the complex assessment of soil health. (3) Machine vision is a promising tool for early detection of late blight in tomato, but technical advancements are still necessary, leading to a simplified custom sensor. (4) Species of interrow cover mixtures should be draught-tolerant to survive in an increasingly arid and extreme domestic climate, and thus provide their role in ecosystem services.

Conclusions: Productivity, stability and sustainability of organic vegetable, grape and fruit production can be enhanced successfully with relevant on-farm research efforts. We encourage researchers and growers to work jointly to map and solve problematic issues of the recent production practices. All our research results are available besides scientific publications also on our website and on social media platforms..

Keywords: peat substitution, compost from vegetable matter, municipal green waste, organic vegetable nutrition, tomato late blight early detection, machine vision, interrow vegetation, ecosystem services in vineyards and orchards

WATER DEMAND OF FRUIT TREES AND METHODS SUITABLE FOR DETERMINATION OF ACTUAL WATER NEEDS

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Introduction/Goal/objectives: Under changing climatic conditions water shortage is one of the most serious challenges for fruit production. Artificial water supply is an essential technological tool in recent fruit production practice, however water saving is a general requirement. Reliable information about water demand of trees is crucial in irrigation scheduling. The most important biotic and abiotic factors will be overviewed which affect fruit tree water relations including climate factors, trees age and phenological stage, plant density and management practice, crop load and rootstock. In the second part of the presentation several methods will be described which are suitable for estimating actual water demand and/or water stress level of the trees.

Keywords: fruit crops, climate change, water shortage, water demand, irrigation scheduling,

THE NECESSARY INTERDISCIPLINARITY: SCIENCES FOR THE RESPONSIBLE SHAPING OF THE NATURAL AND MAN-MADE ENVIRONMENT

THE BARK BEETLES OF THE CONIFERS: PESTS OR KEY SPECIES.

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Introduction/Goal/objectives: The forests of Europe's have 227 million ha (35% of land area), 6.9 million ha of it being in Romania (29% of land area). SoEF report (2020), characterized Europe's forests as follow: 46% of forests are conifers, 37% broadleaved, 17% are mixed; ¾ even-aged; 33% are single tree species; growing stock of 169 m³/year (with 40 m³/year more than 30 years ago); the volume of deadwood represents 7% of growing stock; the average annual sequestration of carbon in forest biomass is equivalent of 10% of gross greenhouse gas emission. In present, a series of disturbing factors affect European forests: warmed temperature, severe drought in South and Central Europe, increasing of speed and frequency of storms, large areas affected by fires, pollution, pests and diseases, intensive anthropogenic activities.

Material and methods: The bark beetles monitoring has been done with traps type Theysohn baited with synthetic pheromones in managed and unmanaged spruce stands (48 sites in total) of the Apuseni Natural Park, western Romanian Carpathians, Romania. The predators and parasitoids related to bark beetles monitoring has been done by using of infested wood materials (3 sites in managed and 3 sites in unmanaged forests). Cached biological material has been analysed in the laboratory.

Results: The conifers forest stands, affected by biotic and abiotic stress factors, contribute to the appearance and extension of the bark beetles outbreak with major impact on forest ecosystems. A particular aspect is the dynamics of bark beetle outbreaks in protected natural areas with spruce forests and the relation between bark beetles and it's predators and parasitoids. In this paper we present a case studies on the monitoring of the bark beetles and associated useful entomofauna in managed and unmanaged spruce stands of the Apuseni Natural Park. Intervention types and risks in managed forests, advantages and disadvantages in unmanaged forests, are presented.

Conclusions: Climatic factors as temperature and precipitations influence more than management strategies the dynamic of the bark beetles outbreak in spruce stands. Diversity and population levels were comparable in forests with different management strategies. Parasitoids were significantly higher in unmanaged sites in comparison with managed ones.

Keywords: Conifers, Bark beetles, Pests, Key species

USING THERMOGRAPHY TO VALIDATE GENOTYPIC VARIATION FOR ABIOTIC STRESS RESPONSE IN CYCLAMEN

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Under the effects of future climate change, drought and heat stresses represent significant barriers affecting crop yield, making resistant cultivars highly regarded. The theory behind the use of thermography for determining agricultural water status is that adequate soil moisture enhances plant transpiration, resulting in a cooler canopy compared with the ambient air temperature. Conventional measurement techniques, such as pressure chambers are time-consuming and require skilled operators to determine leaf water potential (Ψ_{leaf}). With the availability of remote sensing technology, interest in using infrared thermal images for irrigation scheduling has grown in order to address these impediments. In the current study, the canopy temperature and crop Ψ_{leaf} were assessed and their association was examined by the use of thermal-RGB images of different Cyclamen genotypes. Furthermore, the effects of drought stress and canopy pixel temperature on total, wilted, and dead leaves were assessed. In contrast to the control, where leaf senescence was only visible in the higher, older leaves, drought accelerated leaf senescence and paleness due to the canopy's loss of chlorophyll. Reduced soil and leaf water content, daily total plant water consumption, and intrinsic water use efficiency were the results of water restriction. Canopy temperature and Ψ_{leaf} were inversely connected, showing that a greater temperature was associated with extreme water stress. This outcome is predicted due to the fact that water stress causes stomatal closure, which on the one hand reduces the rate of transpiration and lowers evaporative cooling, and on the other increases leaf temperature. According to the results, thermal imaging may be utilized as a non-invasive approach to evaluate crop water status at the canopy level of Cyclamen genotypes. To use cutting-edge data processing techniques to enhance the performance of the sensing technology, more research is required.

Keywords: canopy temperature, Cyclamen genotypes, plant phenotyping, thermal imaging, water deficiency

MECHANISMS OF ADAPTATION TO THE MAIN ABIOTIC STRESS FACTORS FOR SOME ROMANIAN PROVENANCES OF ABIES ALBA

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Introduction/Goal/objectives: Compared to the research carried out in the field of forestry and silver fir breeding, the study entitled "Mechanisms of adaptation to the main abiotic stress factors for some Romanian provenances of *Abies alba*" stands out for its originality, as it completes the evaluation of phenotypic and biochemical variability for the species, which is currently at the beginning. The fundamental goal of this work was to identify possible genetic resources with an adequate response to the action of abiotic stress factors (saline, water and cold). The aim is to investigate some features of interest that can be used in afforestation and reforestation programs of *Abies alba* species, using as biological material seven provenances from Romania. The multidisciplinary character of the study results from the combination of classical research methods with modern ones and by applying techniques from several fields: forestry, biology, statistics, chemistry and breeding. Such a results may have both theoretical and practical importance for the future fir breeding programs in Romania and also for the afforestation programs, especially in the context of current climate changes.

Keywords: abiotic stress; climate change; forests; provenances; silver fir.

SECTION COMMUNICATIONS

SENIOR

CONSERVATION VALUE OF ORTHOPTERA ASSEMBLAGES OF A HISTORICALLY INTENSIVELY USED AGRICULTURAL LANDSCAPE: A CASE STUDY IN THE CARPATHIAN LOWLAND (EAST HUNGARY)

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Introduction/Goal, objectives: Nature conservation in Europe emphasizes the safeguarding of biodiversity in secondary habitats formed by agriculture. Past studies have primarily examined the wildlife of natural habitats, while overlooking cultivated landscape elements. Investigating these habitats (croplands, country roads, roadsides, etc.) is crucial to understanding system functionality. Orthoptera assemblages, known as sensitive indicators of habitat structure and conservation value, were analyzed in a traditionally intensively used agricultural region to determine how arable land and ruderal linear habitats collectively maintain Orthoptera diversity.

Material and methods: Sampling was performed along the Sajó and Tisza rivers to ascertain which landscape elements can better preserve diversity compared to semi-natural sites. From 2018 to 2020, 36 sites representing all relevant habitat types for orthopterans were sampled using sweep nets and transect counts.

Results: In the mostly unexplored study area, 29 Orthoptera species were identified, including protected species *Gampsocleis glabra* (Her.), *Acrida ungarica* (Her.), and *Celes variabilis* (Pall.). Four distinct Orthoptera assemblages were determined. Intensively cultivated croplands (maize, sunflower, and wheat fields) exhibited lower diversity and distinct assemblages compared to less intensively cultivated red clover and lucerne fields, roadsides, country roads, and semi-natural sites (hayfields, pastures). Assemblage composition and diversity were primarily influenced by habitat use intensity and secondarily by the culture. Lucerne and red clover fields with grass-like vegetation structure preserved a greater portion of the natural fauna. Crop rotation also contributed to increased diversity.

Conclusions: The results made it possible to identify habitat types that effectively preserve the diversity of insects even with long-term intensive land use. Landscape and cultivation planning based on these results can facilitate sustainable agriculture that supports a more diverse wildlife.

Keywords: biodiversity, cropland, land use, secondary habitats, species composition, vegetation structure

EFFECT OF TANNINS ON FEEDING BEHAVIOUR AND FOOD PREFERENCE OF COLORADO POTATO BEETLE (*LEPTINOTARSA DECEMLINEATA* SAY)

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Introduction/Goal, objectives: Potato is amongst the most widespread and important crops in the World. Because of wide distribution, eurytopic nature and high resistance against numerous pesticides the Colorado potato beetle is one of its most harmful insect pests. The effective control of the pest, with parallel consideration of the consumer preferences determined by quality (appearance, content of biological and chemical contaminants) is a great challenge of today's plant protection. Here we study the effect of tannins on the feeding behaviour of the pest to help development of pesticide based on these seconder plant metabolites.

Material and methods: During our study the effect of tannins were studied on the feeding behaviour of potato beetle imagoes. Untreated control potato leaves and leaves treated with different concentrations of tannins were parallelly proffered for beetles and their preference was measured with the amount of the consumed leaf surface. The amount of consumed leaves was determined with image processing software (ImageJ) using photos taken during the laboratory test. The modifying effect of an adjuvant (surfactant) were also studied.

Results: Both antifeeding effect of tannins and its dose-dependence were proved. Tannin significantly decreased the feeding activity of beetles, especially in case of the 1% concentration. The negative effect of tannin appeared already a day after the treatment, but it became dramatic in the fourth day of the study. The additional effect of adjuvant could not be detected.

Conclusions: Our preliminary result may serve basis for further investigations toward a development of pesticide based on seconder plant metabolites. The successful development may significantly decrease the use of pesticides and can prevent the resistance of this dangerous pest.

Keywords: tannins, secondary plant metabolites, bio-pesticide, repellent, anti-feeding effect

SECTION COMMUNICATIONS JUNIOR

ENDOPHYTIC TRICHODERMA STRAINS WITH BIOCONTROL AND BIOSTIMULANT EFFECTS

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Introduction/Goal, objectives: Today's consumer requirements and social tendencies favor environment-friendly, sustainable farming techniques providing high quality crop without chemical residues. The legislation and subsidization, based on the Green Deal and Farm to Fork Strategy of the European Union, push the farmers toward this direction. Biocontrol agents and biostimulants, like *Trichoderma* spp. can be excellent alternatives to chemical pesticides..

Material and methods: Ten endophytic *Trichoderma* spp. were isolated from grapevine vessels from the Tokaj Wine Region, Hungary. The strains were identified on species level, based on multilocus phylogeny of ITS and *tef-1*. The growth profiles were determined on six temperatures and the biocontrol efficacy was tested with co-culture confrontation. Biostimulant efficacies were measured by the photosynthetic activity, yield quality and growth parameters.

Results: Isolated *Trichoderma* strains are within *harzianum*, *longibrachiatum* and the *viride* clades. *T. afroharzianum* TR04 and *T. simmonsii* TR05 were chosen for further studies, since their excellent growth on wide heat range. Both of them showed high biocontrol efficacy (86-100 %) against some tested fungal species. In field *Trichoderma* application resulted higher yields, photosynthetic activity and better vigor for tested crops.

Conclusions: *T. afroharzianum* TR04 and *T. simmonsii* TR05 met the requirements of a biopesticide/biostimulant strain. These strains were patented (P1800012/18), and are active ingredients of a commercial product in Hungary.

Keywords: *Trichoderma*, biocontrol, biostimulant, *Trichoderma simmonsii*, *Trichoderma afroharzianum*

FOOD WASTE COMPOST IN HORTICULTURE

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Introduction/Goal, objectives: Food waste is one of the major contributors to municipal solid waste, in fact, it can amount to almost half of the garbage produced. To alleviate the stress on the environment, a sustainable alternative to landfilling or incineration must be employed. One of the possible waste management methods is composting, which would allow the nutrients within the food waste to be circulated back into food production.

Material and methods: To understand the challenges and possibilities of food waste composting and its uses in plant growing, scientific literature from international sources was studied.

Results: The effects of using compost depend largely on its quality, maturity, nutrient content, all of which are greatly affected by the origins, chemical and physical composition of the raw materials, and the method of composting. The characteristics of food waste can vary, and may contain plastic, or may be contaminated by pesticides (banana peel, citrus fruit peels), both of which should be taken into consideration.

Conclusions: More research is needed to fully understand the long-term effects of applying food waste compost of various origins on the soil life and plant seed germination.

Keywords: food waste, compost, thermophilic composting, compost maturity

STUDY OF PHYSICAL, CHEMICAL AND BIOLOGICAL SOIL PARAMETERS IN RELATION TO THE DISTRIBUTION OF THE SOUTHERN ROOT-KNOT NEMATODE (MELOIDOGYNE INCOGNITA) DAMAGE IN CUCUMBER

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Introduction/Goal, objectives: In the control of *Meloidogyne incognita*, understanding and testing soil suppression can be a key factor and can open the way to alternative control methods. Our study investigated the spatial distribution of nematode infestation in a polytunnel in Csány (Heves County, Hungary).

Material and methods: We investigated soil moisture, chemical parameters (calcium carbonate, organic matter and nutrient content) of the soil samples taken from three infestation categories, as well as the number and composition of nematodes in these samples. We looked for correlations between the data from the sample points and the degree of root-knot nematode symptoms of the plants present. We also mapped the distribution of earthworms in the polytunnel. Based on the knowledge of the nematode community, Maturity, Structure and Enrichment Index using the c-p scale were calculated.

Results: None of the abiotic soil parameters showed significant differences between infestation categories. Based on the data, we concluded that due to the very high salinity and accumulated nutrients, soil life showed a change and presumably the organisms with higher tolerance were proliferated.

Conclusions: The area shows a low level of successional advance. In the present case, we were unable to demonstrate the phenomenon described in the literature that the presence of earthworms can decrease nematode infestation, but the Enrichment Index suggested that an increase in bacterivore and fungivore nematodes due to high organic matter content may be associated with lower infestation levels.

Keywords: soil suppression, *Meloidogyne incognita*, soil parameters, root-knot nematode, earthworm

POSTER PRESENTATION

SENIOR

INFLUENCE OF NITRATE AND PHOSPHATE CONCENTRATIONS COMBINED WITH DIFFERENT WATER SUPPLIES ON GROWTH AND PRODUCTION CHARACTERISTICS OF SEED HEMP (CANNABIS SATIVA L.)

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Introduction/Goal, objectives: At present, hemp seed and its oil have several new uses in the production of health-promoting food supplements, of pharmaceuticals for skin care, of biodiesel as a renewable biofuel, of gluten-free flour etc. In this context, it became important to modulate its development and metabolism through specific cultivation methods and growth conditions. The aim of this work is to study the influence of different ratios between inorganic nitrogen and phosphorus supply, combined with drought stress, on growth parameters, seed production and seed biochemical content of hemp plants grown under controlled conditions.

Material and methods: Seeds of two hemp varieties (Jubileum and Zenit) were germinated and grown individually in large pots filled with a mixture of sand, perlite and vermiculite, placed in a foil house. Four experimental variants were set, with ten plants for every variant. Two nitrate to phosphate ratios (4N:1P as control, in Hoagland's nutrient solution, and 1N:2P) were combined with two water supply regimes (900 mL per day and 300 mL per day). Growth parameters were determined weekly during the entire vegetation period. At the end, fresh biomass of plants, seed production, oil, protein, vitamin E (tocopherol) and zinc content of seeds were determined. The oil content was extracted with n-hexane in a Soxhlet apparatus, protein and vitamin E contents were measured photometrically, while zinc content was determined with microwave plasma atomic emission spectrometry.

Results: Shoot growth index was reduced in both hemp varieties by the association of lowered nitrate to phosphate ratio with decreased water availability. Drought conditions and 1N:2P ratio moderately increased the oil content of seeds. Dry biomass of seeds was the highest in plants developed under water shortage. The highest protein content of seeds (about 35% of dry weight) was registered in plants provided with higher nitrogen to phosphorus ratio and low water supply, while the lower protein quantity in seeds developed under decreased N:P ratio was compensated by the drought conditions.

Conclusions: Plant growth, seed production and seed biochemical content can be modulated by varying the nitrogen to phosphorus ratio in the mineral nutrient solution, and by water shortage during the vegetation period. Our results may represent a starting point for optimization of hemp growth for production of seeds with improved biochemical quality.

Keywords: drought, N:P ratio, oil content, proteins, seed production, vegetative growth

PROPAGATION OF ROSE VARIETIES BY CUTTINGS UNDER EFFECT OF DIFFERENT ROOTING HORMONES

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Introduction/Goal, objectives: Roses are one of the oldest and perhaps most noble and beautiful plants in the world. The propagation of roses by stem cutting is the simplest and it is largely used method to multiply them. The aim of the experiment is to determine which rose varieties are better suited to propagation by cuttings, which varieties have a higher rooting tendency and that the rooting could be influenced by rooting hormones [Incit-8 (0.8% of 1-Naphthaleneacetic acid) and Radi-Stim®].

Material and methods: For the present experiment, it was selected seven varieties of noble roses as followed: 'Monika', 'Mr. Lincoln', 'Queen Elisabeth', 'The Fairy', 'Peace', 'Kings Ransom', and 'Don Juan'. To assess the differences between the variety's growth, root length, root number, and frost damage were determined.

Results: From our results could be determined that the Incit-8 positively influenced the number of roots of all varieties.

Conclusions: In conclusion, our research suggests that the rooting hormones increases rooting of the rose varieties, moreover the proper rooting could also be depending on the appropriate conditions.

Keywords: Cuttings, Rooting hormones, Rose, Varieties, Vegetative propagation

HORTICULTURE 4.0 VOCATIONAL EDUCATION FOR DIGITAL TRANSFORMATION IN HORTICULTURE

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Nowadays, interdisciplinary technical and IT developments have significantly penetrated the agricultural activities, both arable and horticultural sectors. Thanks to these, the cultivation process, as well as the complex operation of agricultural units, becomes easily traceable, controllable and cost-effective. New concepts such as *precision farming*, *agriculture 4.0*, *horticulture 4.0* or *smart farming* have become popular.

Unfortunately, secondary school and university vocational education could not catch up with these practical developments and introduce these changes into the training content. The structure of the teaching materials is still very incomplete in this area.

In order to partially eliminate this shortcoming, the Sapientia Hungarian University of Transylvania entered into a tender partnership upon request with the Alföldi AszC Galab József Mezőgazdasági Technikum és Zakképző Iskola (Makó, Hungary), as a coordinator, and with the iTStudy Hungary Ltd. (Hungary), the Hungarian University of Agriculture and Life Sciences (Hungary), and with the Foundation „Pro Scientia Naturae” (Senta, Serbia), as members.

In cooperation, the institution operating in three European countries has won a three-year (2022-2023) tender in the Erasmus + KA220-VET category, which aims to provide innovative, high-quality training material for teachers participating in horticulture vocational training in smart greenhouses about the use of applied technologies, mainly regarding the automation and remote controls used in them. The subject matter of the training material is developed with the involvement of the actors of the labor market.

The project includes the following five planned results:

- the digital competence map of the specialists who operate smart greenhouses (implemented);
- developing the structure and thematics of the planned curriculum (in progress);
- development of practice-oriented learning content (in progress);
- creating an e-learning learning platform and testing the developed curriculum through trial training in partner countries (in progress);
- finalization of the e-book entitled *Horticulture 4.0 - Technologies of intelligent greenhouses* in four languages (English, Hungarian, Serbian and Romanian) (in progress).

The expected effect of the project at the European level is to support the digital and green transition of agriculture. The tender offers flexible, future-oriented digital vocational training for horticulture teachers in the agricultural sector. The results of the project will be transferable and recognized throughout Europe, as the developed subject matter is structured according to European educational standards (e.g. EQF, ECVET, EQAVET, DigComp and DigCompEdu).

According to the project concept, the modular structure of the learning material multiplies its future usability. In addition to the main modules on smart technologies, the curriculum will also include modules containing the knowledge and professional skills required for horticultural professions, so it will be useful not only for horticultural professionals, but also for other professionals with IT qualifications, for example. This approach enables the project's results to be widely used in basic vocational training and higher education in the partner countries and beyond.

On behalf of the Faculty of Technical and Human Sciences- Târgu-Mureş within the Sapientia Hungarian University of Transylvania, the following persons participate in the project: Imre-István Nyárádi, Gyöngyvér Márton, Sándor Papp and Zsolt László Túrós as teachers, and Annamária Babos, Béla Biró-Janka, Katalin Molnár and Kinga Nagy as administrative staff.

Keywords: e-agriculture, greenhouses, smart technologies, flexible, future-orientated, digital training, teaching material

POSTER PRESENTATION JUNIOR

METHODOLOGY OF COMPLEX AGROBOTANICAL ASSESSMENT OF WILD PEAR

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Introduction/Goal, objectives: Some of the genotypes of the wild pear species were described and evaluated by several different fields of science according to their own system of criteria. Due to dwindling habitats, both the number and diversity of the wild pear are endangered. The National Centre for Biodiversity and Gene Conservation (NBGK) started the genebank collection and agrobotanical evaluation of wild pear varieties in 2022 for the purpose of surveying and evaluating the Hungarian wild pear populations. There are international guidelines for the description of fruit-bearing plants (IBPGR, ECPGR, UPOV), which can be used for the phenotypic description of cultivated varieties of fruit species, but in the case of wild fruit species, it is necessary to develop a new, comprehensive descriptive system.

Material and methods: It was necessary to develop a collection- and description method for the on-site collection of fruit-bearing plant species and varieties in the wild. This applied both to the development of the survey methodology and to the development of the work method. Before the beginning of ripening of the wild pears, we carried out a trial collection trip, at which time we collected 20 batches at one location, after which it was formulated that we needed a special collection sheet to document the batches on the field.

Results: We developed a complex methodology for the collections. We have prepared a special collection sheet, which we specialize in on-site recording. The first page of the questionnaire details the general conditions of the collection, while the second page is crop-specific and describes the collected access. We defined the method of photo documentation, the methodology of documenting the on-site recordings and the following descriptors. We apply the complex methodology in practice.

Conclusions: In 2022, we collected 57 accesses of wild pears at 6 different additional production sites based on the developed methodology. The method was successfully applied and easily adapted to practice. The recorded data can be easily organized and later evaluated using the new method.

Keywords: wild pear, gene conservation, biodiversity, descriptors, method

PLENARY COMMUNICATIONS

LANDSCAPE DESIGN AND PLANNING, AS CONTEMPORARY INSTRUMENTS OF SUSTAINABILITY

LANDSCAPE SPACE AND REGENERATION: ECOLOGICAL, SOCIAL, AND CULTURAL CONSIDERATIONS FOR SUSTAINABLE DEVELOPMENT.

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Introduction/Goal, objectives: The typical feature of a landscape stems from the fact that it is a living system. We believe that regeneration refers to the function of the landscape to achieve dynamic equilibrium, and in different situations, reflects the response mechanisms characteristic of living systems, such as adaptation, resilience, recovery and growth.

Material and methods: Mixed Methods, multi-disciplinary approaches.

Results: Space is the medium that connects landscape research and practice, and it is ecological and cultural, emphasising on temporality and wholeness. With landscape space as the core, we try to provide support for the innovation and expansion of human settlement environment theory and social practice. From the three levels of ecology, society (economy) and culture, the qualitative analysis and quantitative evaluation of the form, characteristics and performance of landscape space are carried out, providing theoretical guidance, method support and technical platform for urban and rural construction and development.

Conclusions: We are committed to explore and practice "知行合一" [zhī xíng hé yī] through action and collective wisdom on the basis of understanding ecological wisdom.

Keywords: Landscape regeneration, open spaces, landscape heritage, landscape ecology, China

TREES PLANT THEMSELVES-ESTABLISHMENTS OF TREES IN URBAN AREAS BY NATURAL SUCCESSION

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Introduction/Goal, objectives: Raising awareness that besides experts planning and planting trees in urban areas, natural succession contributes an important part to urban trees. Awareness, appreciation, evaluation and conservation of "self-planted trees" - where suitable and appropriate - should be encouraged.

Material and methods: Observation, documentation, identification of three establishment strategies

Results: Three strategies can be identified.

Conclusions: This is not a scientific paper, rather a lecture and eye-opener, it was presented as a farewell lecture after 30 years of teaching landscape architecture, including "proper and professional" vegetation techniques.

Keywords: Urban vegetation, Natural succession, Tree management, Environmental awareness, perception, tree protection, tolerance, appreciation

SECTION COMMUNICATIONS

INNOVATION AND TRADITION IN THE TRANSYLVANIAN LANDSCAPE

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Introduction/Goal, objectives: Present paper aims the rediscovery of the traditional landscape in Transylvania, its place in present cultural-ecological context of sustainability, the necessity for a new professional approach, and within it its possible protection, reinterpretation and rehabilitation.

Materials and Methods: In the age of new technologies and fast communication, the ever faster way of life, the climate problems it is easy to state that heritage, locality and regional identity are old fashioned, weird and irrelevant terms. It seems like it is easier to put aside connections brought about by cultural heritage, than cope with inherent challenges. Neglecting this heritage puts on risk losing the cultural variety of the built and natural environment, the cultural landscape and consequently the collective memory. Present day environmental, ecological and economic crisis resulted in challenges that has to be dealt with in shaping approach to landscape, urban planning and architecture. The shift in focus, from modernization based on forced landscape development to resilience and rehabilitation, requires a professional reshuffling.

Results: Spatial and urban planning is due to be shaped by an ecological approach and coordinated landscape architecture/planning instead of the urban planning profession often with an exclusive architectural-built environment focused approach.

Conclusions: The previous, but still prevalent visual and aesthetic interpretation is to be replaced by a more complex landscape ecology approach, defined by a delicate balance between innovation and tradition, still existing in the present day Transylvanian rural landscape. An upcycling of an old house could be greener than a passive house, while preserving inherent sentimental, environmental and historical values.

Keywords: tradition and innovation of a landscape, cultural landscape, urban and spatial planning, ecological approach, ecoregional sustainability, local and global

"CANALUL MORII VERDE"- URBAN WATER CHANNEL RENATURATION AS PILOT PROJECT IN REGHIN

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Introduction/Goal, objectives: This research tracks the pilot renaturation and water access democracy initiative of an urban water stream in the city of Reghin, Romania, started as a reaction to a grey-solution riverbed construction initiated by the water authorities in 2014. The goal of the project is to experiment and to find the social, institutional, educational and financial tools to fulfil green policies in Romania on an 80m segment of an urban water channel in the city of Reghin, Romania.

Material and methods: Qualitative research methods were used like observations on interdisciplinary cooperation, participatory and persuasive processes on different levels in order to implement the urban channel renaturation.

Results: The renaturation part was implemented but the water access democracy part was not implemented well because of legal and noncooperative matters.

Conclusions: The challenge of riverscape design is given by the willingness for cooperation of different riveran landowners. Transdisciplinary knowledge, interdisciplinary cooperation, participatory and persuasive processes on different levels made the implementation of an essential part possible. Nevertheless reinterpretation of legislative limitations played an essential role keeping in mind the aim of green policies.

Keywords: Renaturation, Canalul Morii, Reghin, nature based solutions, NBS

LANDSCAPE WOUND - FOR WHICH A BANDAGE IS NOT ENOUGH CASE STUDY FROM TRANSYLVANIA, ROMANIA: THE SUSENI QUARRY

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Introduction/Goal, objectives: Transylvania is a region in Romania, with a rich mining history dating back to the Roman Empire. Historically the region was known for its abundant deposits of gold, silver, copper, and other metals (Borco & Uduba, 2012). Today, mining operations in the area are primarily focused on extracting salt, coal, and other minerals, with quarries being a common sight. These open-pit mines where various types of rock, stone, sand, and gravel are extracted can be found in mountainous areas of Transylvania, including limestone, granite, sandstone, and marble quarries.

Material and methods: Mining and quarrying activities have significant impacts on the environment and local communities. The excavation of large open pits and the disturbance of soil and vegetation can result in soil erosion, deforestation, habitat destruction, and water pollution. The creation of landscape wounds caused by mining can also have long-lasting effects on the environment, leading to a range of ecological problems.

Results: Rob Krier, an architect and urban planner, once stated that „I have yet to see a tree which looked aesthetically wrong or defective. The same is true of landscape...” (KRIER, 1979). However, the interventions of contemporary humans have significantly changed the landscape, resulting in many "wrong or defective" landscapes that require remedial action. Landscape planning, as defined by Professor Mihály Mőcsényi, aims to shape the human environment using modern ecological and technical knowledge and aesthetic principles to increase the productivity, visual value, and physiological conditioning effect of the landscape, improve the performance of human inhabitants, and expand their physiological and visual-aesthetic life enjoyment (CSEMEZ, 1996).

Conclusions: The marks of human intervention are evident in many places in the Gheorgheni Basin, and the Suseni quarry area is one such location that requires a complex rehabilitation concept and comprehensive landscape rehabilitation. A landscape rehabilitation concept plan is the first step in a task of such nature and at this scale. It represents the initial moment of landscape healing, which can be a critical step in the successful rehabilitation process and outcome.

Keywords: quarry, mining reclamation, rehabilitation, landscape wound, footprints

LANDSCAPE-BASED DESIGN AS AN INSTRUMENT FOR SUSTAINABLE DEVELOPMENT IN HERITAGE CONSERVATION

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Introduction/Goal, objectives: The wave for valorification the historical monument has an upward direction at the moment and is reflected predominantly on the object and less in relation to the landscape and the local communities. The goal of our study is to reveal the importance of reconnecting the object to its context, which gives it meaning at the scale of the (in)visible landscape in enriching the heritage experience but also in taking advantage of the benefits of the sustainable development.

Material and methods: The study proposes landscape research as a method to reintegrate the monument at landscape scale and to include the sustainable development as a solution for the integrated heritage conservation. The case study is the "Jumelț" iron smelting furnace in the Village of Zimbru, the County of Arad, a pre-industrial technical monument of the 18th Century, a part of the cultural layers of the landscape and of the identity of that place. The landscape-based research covers a wide interdisciplinary area of study, which ranges from evolutionary landscape analyses based on historical, geographic and ecological data to site survey and non-invasive terrain investigations (DEM, DSM, magnetometry), preventive archeology and others.

Results: The multidisciplinary approach to the landscape at various scales has revealed visible, diffusible and invisible connections in relation to the monument. At landscape scale, the identification of the geographical specificity of the area, the discovery of the natural resources used in the Transylvanian pre-industrial metallurgy and of the similar technical monuments nearby have facilitated the proposal of themed itineraries for visiting the area. On the other hand, the identification of the functional technical ensemble at plot scale (water course, constructions, etc.), and also the vertical connection of the successive cultural layers on the monument plot have determined directions for their conservation and reinterpretation in the design solution.

Conclusions: The incorporation of the landscape research into the heritage valorification projects leads us to the conclusion that the reconnection of the historical monument with its cultural landscape highlights complex relationships and valences in the study area and facilitates sustainable development measures in the use of heritage.

Keywords: landscape-based design, sustainability, landscape, pre-industrial heritage, interdisciplinary

PLENARY COMMUNICATIONS

REDISCOVERING THE HISTORICAL LANDSCAPE

MASTERS FROM HERE AND BEYOND. WORKS OF FOREIGN LANDSCAPE DESIGNERS IN TRANSYLVANIA IN THE MIRROR OF THE PAST CENTURIES

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Introduction/Goal, objectives: To enhance the role and importance of landscape designers spreading cultural messages without borders

Material and methods: The research is based on archival survey of written and depicted sources and their interpretation

Results: Exploring dozens of international collaborations in the field of landscape architecture from the past five centuries

Conclusions: Owners and masters together shaped transylvanian gardens and landscapes, according to principles and norms from Western Europe

Keywords: landscape architecture, archival sources, landscape design

SARMIZEGETUSA REGIA BETWEEN AN ARCHEOLOGICAL SITE AND A NATURAL PROTECTED AREA. CULTURAL LANDSCAPE AS THE MISSING LINK

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This study focuses on the challenges posed by the dual protection of the Sarmizegetusa Regia archaeological site in the Orăștie Mountains of Romania, which is both a part of the UNESCO World Heritage List and the Natural Park Grădiștea Muncelului - Cioclovina (IUCN category V). This site is the most renowned archaeological site of the Dacian period, but its management is being hindered by the conflicting protection regulations. The lack of coordination between the two management plans, as well as the absence of a specific heritage category for the cultural landscape, are major issues that need to be addressed. The paper aims to offer solutions for a comprehensive and harmonized management plan, based on landscape values and methods, to tackle the current pressing problems faced by the Dacian site. This study is based on the first comprehensive landscape and biodiversity survey conducted in Romania on an archaeological site

SECTION COMMUNICATIONS

REDISCOVERING THE HISTORICAL LANDSCAPE

CASE STUDY: GELENCE, LANDSCAPE AND NATURAL HERITAGE PROTECTION

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Introduction/Goal, objectives: In recent decades, social and economic transformations have taken place in Central and Eastern Europe that have greatly influenced the social needs of the population. Because of these processes, landscape use phenomena have developed that accelerate the disappearance of the lifestyle that shapes the landscape. The direction of the current global economic culture poses an increased threat to people living in unity with the landscape. These demands are not coordinated with the regeneration rhythm of the landscape. From the point of view of landscape heritage protection, it is very important to have current basic surveys, appropriate legal regulations, and transparent methods of declaring them protected

Material and methods: The methodology is collaborative research that will be created with the involvement of the communities. Conducting interviews, as necessary in the form of questionnaire surveys. Examining legislation and regulations. The main methodological points of the research: planning, data collection, data analysis, report preparation.

Results: A complex value cadaster is prepared. Description of the social effects associated with its specific landscape heritage. Defining the constituent elements of the landscape. Basic research necessary for landscape protection.

Conclusions: Determining the breakout points that serve the purpose. Formulation of conclusions that contribute to the management and protection of a sustainable landscape.

Keywords: landscape heritage protection, value protection, complex value cadaster

FORGOTTEN HISTORICAL LANDSCAPE HERITAGE IN THE BANAT AREA

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Introduction/Goal, objectives: The subject of the research has developed around the historical gardens associated with historical buildings, more specifically in relation to the castles and manor houses of noble families in the Banat area.

Material and methods: Understanding the environment, time and historical and social coordinates, the stages of theoretical and practical heritage accumulation presented a particular interest for this study; thus, the present work aimed at investigating these still existing landscape arrangements and the main factors that led to their transformation. The stages of the transformation of these historic gardens were studied in comparison with their present state, the issues being treated from both historical, architectural and social-cultural perspectives.

Results: The work is addressed primarily to specialists in the field, who implement development and rehabilitation projects, regeneration of these historical monuments, but also to theorists and public institutions. Thus, with the help of the information gathered, the historical documents obtained and the cadastral maps, the specialists are given a picture of the original historical park, as well as the possibility of restoring the historical garden of the past.

Conclusions: The present work aims to contribute to the positive development of attitudes towards the historic garden and, not least, towards the historic monument. It is addressed to all those directly or indirectly involved in cultural heritage protection works, local, national and European decision-makers, representatives of funding sources, planners, the local population interested in the subject, tourists, people of culture, the commercial sector, services, etc.

Keywords: Banat region, heritage, historical gardens, cultural landscape

TREE VEGETATION ANALYSIS OF HISTORICAL MONUMENT GARDENS COMBINING VISUAL ASSESSMENT, LIDAR TECHNOLOGY AND SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) METHOD. CASE STUDY: CENTRAL GREEN SQUARE - CENTRAL MILITARY EMERGENCY UNIVERSITY HOSPITAL "DR. CAROL DAVILA"

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Introduction/Goal, objectives: The objective of the study was the detailed analysis of the state and composition of the vegetation in the Central Green Square area in the context of the restoration of the site. Simultaneously with the vegetation analysis, a reconstruction of the historical shape of the square (1900-1910) and an analysis of the plant composition from a historical perspective was carried out. In addition to the qualitative analysis of the vegetation, the study aimed to identify the tree species and specimens that were not part of the initial composition.

Material and methods: Central Green Square has the code in the List of historical monuments B-II-m-B-19408.18 and is part of the Military Hospital, ensemble category, value group A, with the code in the List of historical monuments B-II-a-A-19408. A number of 105 trees and 29 shrubs from the Central Green Square were analyzed. The analysis method included the following: measurements and direct observations in the field, topographic survey based on LiDAR method and SLAM technology. A mobile scanner was used to objectively determine the physical characteristics of the trees. The scanner 3D mapped the analyzed area and then the characteristics of the individual trees were extracted. Additionally, a 360 camera was used to record photospheres from the area of interest.

Results: In addition to the images taken during the in-situ study, the following data were extracted from the SLAM scan: panoramic images; views for existing trees and for the facades of buildings; a KMZ file in which the position of the trees was overlaid with the Google Earth map; orthophotoplanes and point cloud that allowed the extraction of the crown diameter; the diameter at breast height (DBH, a height of 1.30 m); the height of the trees. The data were used to establish the tree protection zones (Structural Root Zone - SRZ and Tree Protection Zone - TPZ) in order to provide guidelines for the design and implementation stage of the development proposal. The views extracted from SLAM scan highlight the shape of the trees, the degree of deviation of the axis; the degree of deviation of the tree crown.

Conclusions: The type of analyzes and applied methods demonstrate the potential of Simultaneous Localization and Mapping (SLAM) method for the estimation of parameters used in vegetation assessment and demonstrate an increased efficiency in data collection and their accuracy.

Keywords: Historical garden, LiDAR, landscapes inventory, simultaneous localization and mapping (SLAM)

RECOVERING FRAGMENTS OF THE HISTORICAL TRANSYLVANIAN LANDSCAPE

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Introduction/Goal, objectives: Present paper proposes a research on the complex phenomenon of historical cultural landscape in Transylvania, on its possible protection and rehabilitation instruments.

Materials and Methods: Though a bucolic, romantic Transylvanian landscape is very much present in public consciousness, in community imaginary or professional and academic debate, its traces one can discover only isolated in decomposing disorderly urbanized places through church belfries, fragments of former castles, abandoned fortresses, historical gardens and landscapes, that can hardly be distinguished amongst the mix of various new, residential, commercial or industrial buildings. A traditional landscape fabric finely layered in time is broken, the historical organic unity of built and natural environment is lost.

Following a brief introduction into a relevant literature and specific vocabulary, current analysis takes into account examples of such broken traditional landscape through case studies (historical castel and gardens in Bontida, Corunca, Gornești etc.), recent landscape design, urban and spatial planning practice in the context of professional legal framework.

Results: An unfolding landscape is yet again confirming the complexity of any historical landscape, dealing with it being not only a technical or aesthetic but very much an ethical problem.

Conclusions: Recovering, protecting and integrating existing fragments of a historical landscape into the context of current urban and territorial development is an emergency, that is needed to be tackled through meaningful and sensitive measures, tools and instruments of contemporary landscape design, planning and management.

Keywords: traditional landscape, integrated perspective, regulation documentation, General Urban Plan, Local Urban Regulation, historical castel and garden restoration-conservation project

PROTECTION OF HERITAGE LANDSCAPES IN HISTORICAL AND CONTEMPORARY CONTEXTS. LEGISLATION, PROCEDURES, RESEARCH, DILEMMAS AND CONFLICTS IN THE CONSERVATION PROCESSES

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Introduction/Goal, objectives: Initiatives towards landscape protection date back to the 19th century, major steps being made particularly after the Second World War and especially in the 1970s-1980s, with the ICOMOS and IFLA meetings and congresses and the drafting of the Florence Charter for Historic Gardens (drafted May 1981, registered December 1982). The growing interest in historic gardens (first castle and manor gardens, and later municipal public parks) and, more recently, in cultural landscapes, led to the development, at an international level, of several programs dedicated to training and education for landscape protection; research, conservation-restoration and management of historic gardens and cultural landscapes; popularization of landscape heritage, etc. and resulted in the development of guidelines for historic urban landscapes and historic urban public parks (UNESCO Recommendation on the Historic Urban Landscape, 2011; ICOMOS-IFLA Document on Historic Urban Public Parks, 2017), the revision and adaptation of the Florence Charter to the contemporary context and nowadays pressures (Florence, 2021), etc. The international efforts dedicated to the preservation of landscape heritage also echoed in Romania, and although much still has to be made in order to properly preserve landscape heritage, small steps have been made in this respect. The paper therefore begins with the international and national historical backgrounds regarding the preservation of landscape heritage and presents an overview of the current situation regarding the protection of historical gardens and cultural landscapes in Romania, as well as a selection of programs and projects carried out throughout different regions in the country and dedicated to the research, inventory, listing, conservation, restoration and management of historical gardens and cultural landscapes.

Keywords: Garden history, cultural landscapes, cultural heritage, preservation, historic monuments, legislation, procedures, ICOMOS, IFLA

SECTION COMMUNICATIONS

+ SYMPOSIUM ON LANDSCAPE ARCHITECTURE EDUCATION

GUSTAV LANGE AND THE ROLE OF DESIGN PHILOSOPHY

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Introduction/Goal, objectives: Landscape architect Gustav Lange has been one of the most successful designers in the 1990's in Germany. Lange is well-known for following design principles that are based on formal-geometrical visual arts while his intricate and multi-layered design philosophy is much less revealed and studied. The purpose of this paper is to gain and synthesize knowledge on Lange and key elements of his overarching personal design philosophy.

Material and methods: Information was provided through Lange's rare written comments and descriptions of projects, and occasional public talks. Other information was retrieved through personal recording of notes during an intense four-year collaboration and exchange with the author.

Results: Four leading, correlating themes and concepts could be identified to be key to Lange's design philosophy: the entertaining a dialogue of nature and culture, the inclusion and legibility of historic layers, and interstitial space and coincidence.

Conclusions: Therefore, the paper adds knowledge to Lange's well-known focus on form-led design principles and compositions.

Dialogue of nature and culture, the inclusion and legibility of historic layers, and interstitial space and coincidence are overarching design principles that are pursued by Lange on the large scale and the detail scale. While this study adds knowledge and more comprehensive material for further research on Lange it also reinforces the necessity of thinking in larger dimensions, contexts and concepts. These are elementary for critical design thinking and entertaining discussions about meaning and purpose in design.

Keywords: Mauerpark, Design Philosophy, Interstitial Space, Coincidence, Nature and Culture

“FROM PICTURE - TO MONTAGE” A COMPLEX VISUAL TEACHING PROGRAM OF LANDSCAPE SKETCHING AT MATE

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Introduction/Goal, objectives: For 12 years we have been teaching landscape architecture drawings according to a new, creative method which was summarized in two books („Landscape Sketching”, 2009 and The Language of Landscape Sketching, 2019). Looking at new trends of data visualization, and site analysis it is obvious that more and more attention is paid on “visual explanation” instead of written description.

Material and methods: Within this 13 years new direction appeared which takes a step into a complex visual teaching program leaving behind the traditional „one image on a sheet approach”. As landscape architecture is a compound field, so do want we reflect the complexity of “space – time – form – function – detail and information” in one image. With various drawing activities, we teach student how to integrate more images and more information in one picture frame.

Results: Within the year we worked out and tested 20 art (drawing) activities which focus on combining: image + image, image + text, image + detail, detail + plan, plan + section, image +history, texture + item, distance + close-up, design + text, ... etc. Our approach is based in the fact, that LA is so complex, that our visual representation must reflect LA involvedness. In the presentation we will show these combined, montage-like art activities.

Conclusions: Finally the students were able to compose complex visual montages of a LA-project containing: plan, sections, design aims, pictures, details and description. The expansion of abilities such as: good composition, mixing layers, linking images, joining topics, positioning texts was recognisable in their final freehand drawing exam as well as in their digital tasks.

Keywords: field sketching, montage, collage, landscape drawing, art teaching

GREEN CITY PUNCTURE: BUILDING NOT ONLY FOR HUMANS- LEARNING BY DOING

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Introduction/Goal, objectives: Present paper proposes a research on the idea of designing, planning and building not only for humans, through learning by doing academic-educational projects and programs focused on the concept of green citypuncture.

Materials and Methods: Nowadays, as all things are linked on our planet in a delicate balance, we ought to take care of butterflies too. When designing and building urban open space/landscape for ourselves, not only humans should be the measure of our projects.

After a general contextualization within the relevant literature and specific terminology, current analysis takes into account examples of academic-educational projects through the case study of the Erasmus+ Builder Method Târgu Mureș 2022 projects. The project aimed to activate forgotten, abandoned public open space in the city of Târgu Mureș by the means, instruments of green urban acupuncture, where one can get into touch with nature, landscape, flora and fauna elements. The permanent or temporary, installation like buildings were modular. The modular system of bee hexagons served as the model for the proposed wooden modules. These constituted the frame for several in built smaller objects (urban furniture,

planting boxes and frames, insect hotels, kneipp surfaces), filled in materials that facilitated contact with nature in the city through multiple sensorial experiences.

Results: Building and designing process included finding the place of a built object on a site/landscape and its impact on the object design, experimenting different textures and structural attributes of the wood, ways of assembling different modules, verifying their functioning and getting aware of the importance of building an urban environment in a sustainable way, not only for humans.

Conclusions: Learning by doing academic, mostly experimental projects represent one of the most efficient tools in familiarizing students in the particularly important, stressing questions of ecological perspective, sustainability, sensitive approach to nature, to complex habitats.

Keywords: learning by doing, educational projects, ecological perspective, sustainability, citypuncture, complex habitat

POSTER PRESENTATIONS

FORGOTTEN HISTORICAL GARDENS-CASE STUDIES

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Introduction/Goal, objectives: The aim of the paper was to analyse the current situation of historic gardens in Banat by means of detailed case studies, which documented the situation of historic gardens at present and their evolution over time. All the case studies were analysed and researched according to the adopted methodology and by describing all the activities that contributed to the modification of the original situation after the moment of construction. Their presentation and evaluation from a landscape point of view could be made with the help of on-site research and the comparison of the current state with the documents discovered with the help of archival research and historical maps studied.

Material and methods: The case studies identified proved to be unitary in terms of the programme chosen, the period of study, which ranges from the 18th to the 21st century, and covers the territories between the Western Carpathians and Crişana. The study focused on the architectural ensembles listed as historical monuments, but also included those not listed, but considered significantly valuable on the basis of the traces preserved in the landscaping and taking into account their relationship with the noble residence.

Results: From our research, we can see that in most of the cases studied no major changes were made to the historic built heritage, i.e. to the extent and structure of the period sites (with few exceptions). The basic construction remains the castle, which has remained in its identical form over time, without any additions or extensions to the original planimetric image and volumetry. Minor changes to the built environment can be seen by studying the historical maps, which show the disappearance of secondary buildings in some cases and the appearance of other annexed buildings. The accumulated historical documents present a reliable basis of information for specialists in the field who are motivated by the desire to rehabilitate these parks, while offering a free theme with the possibility of completing this data through further detailed research. In the case of the gardens studied, which are not classified as historical monuments, some of which have completely disappeared, while others still possess valuable architectural and landscape elements and contain testimonial elements from the gardens of the period, they can be considered of recognised historical importance. They are attested by documentary sources such as specialist books, articles or old illustrated postcards, which give a more or less clear picture of these former landscape arrangements. The amount of historical and current information is significantly less than for listed gardens. Not in all the cases studied have we been able to gather sufficient information to provide a reliable basis for the rehabilitation/restoration of the garden. With the help of the cadastral maps studied, we can observe in most cases a large-scale landscaping, with spectacular dimensions, which was mainly extended behind the building, stretching over the whole site with long paths and walks, with a play of lines and symmetry typical of the neoclassical period, which in some cases renounces any kind of rigidity, rigour and axial symmetry, leading the eye following oval shapes, thus giving the image of a landscaping. However, the present situation is less readable in terms of frequency, rarity or uniqueness because of the deserted and wild state of these gardens.

Conclusions: The study on the gardens not classified as historical monuments was carried out in order to make an inventory and study the current situation compared to the initial situation. The research of these gardens was carried out in detail, following the steps of research and study of parks and also of gardens classified as historical. The classification of these unclassified gardens was carried out according to criteria that were outlined following the information gathered. Obviously, the information discovered about these gardens is significantly less in terms of quantity than in the case of gardens classified as historical monuments. The main aim of the redevelopment must therefore be to evoke the atmosphere of the gardens of that era, while protecting the landscape, dendrological and architectural values that still exist and should be valued and restored.

Keywords: case studies, classified historical gardens, non classified, research,

URBAN WILDERNESS AND MENTAL WELL-BEING: THE BENEFITS OF NATURE EXPERIENCES IN LANDSCAPE DESIGN

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Introduction/Goal, objectives: The positive impact of wild natural areas on human mental well-being is well-established. However, the benefits of the wilderness experience can also be found in small-scale urban environments that have been meticulously designed and managed.

Material and methods: The research is based on an interdisciplinary literature review that examines the contribution of experiencing nature in the city to mental well-being. By synthesizing existing literature from different fields, the study provides insights into the potential benefits of urban wilderness areas.

Results: These urban wilderness areas offer a sense of adventure, freedom, and transcendence that can lead to increased self-confidence, clarity on personal issues, and reduced stress levels. The combination of dense and sparse vegetation can create a soothing and stimulating mosaic that enhances mental well-being during passive recreation. Compared to other green spaces, wild areas have the highest stress-relieving effect and provide visitors with unforgettable nature experiences, including interacting with wildlife and the thrill of getting lost in the wild.

Conclusions: It is important for landscape architects to incorporate wild natural areas into open space design practices, as a balance between ordered and wild spaces is crucial for human growth and well-being. The wilderness experience is not limited to expansive areas and can be found in small-scale urban environments too. Therefore, it is essential to consider urban wilderness as a valuable design tool for enhancing human well-being.

Keywords: landscape design, urban wilderness, mental well-being, nature experience, interdisciplinary research

DESIGNING FOR NATIONAL PARKS - THE INFLUENCE OF THE NATURAL SITE ON THE LANDSCAPE DESIGN PRINCIPLES AND DETAILS

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Introduction/Goal, objectives: This paper focuses on the analysis of the influence of the natural site on its LA-interventions of the designer point of view. The characteristics of the special natural site (including topography, geology, vegetation, scenarios and climate) should play a significant role in the design process. Understanding these natural features is essential to creating a landscape design that is both functional and aesthetically pleasing, while enhancing the natural power of a place. The goal of this paper is to comprehend essential natural elements that impact its interpretation on the design making decisions. The objective is to analyze how designers interpret the essence of a natural site and incorporate it into their designs.

Material and methods: The study is conducted through an analysis of landscape architectural project plans, with a focus on six contemporary examples in Europe.

Results: The expected results of the study are to identify new trends in landscape architecture and how designers articulate the power of natural elements in their designs (landforms, local materials, artistic interventions, fine – site-specific details). Through this analysis, the study result is to provide insights into the importance of understanding and incorporating the natural site into the design process for National Parks.

Conclusions: The paper emphasize the critical role of landscape architecture in preserving and enhancing the landscape characters of National Parks, while also providing aesthetical and practical solutions for visitors to enjoy these sites in a sustainable way.

Keywords: design process, natural environment, landscape design, geology.

ART AND NATURE: THE STEEL SYMPOSIUM PARK AT DUNAÚJVÁROS - EXPERIENTIAL ON-SITE LEARNING FOR LANDSCAPE ARCHITECT STUDENTS

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Introduction/Goal, objectives: This research focuses on enhancing the understanding Steel Symposium Park in Dunaújváros, Hungary, through experiential on-site learning. Bachelor-, International master-, and Erasmus students from MATE University participate in an elective subject called "Sculpture Park Theory - Designing Sculpture Park Experiences" (created by the authors S. Benkaid Kasbah and A. Eplényi, participant G. Iszlai). Site: <https://steelsculpture.art/hu/>

Material and methods: The research methodology involves site visits to Dunaújváros S. Park., on the shoreside, which is an open-air, free-access, informal public park with a Steel Sculpture collection from the middle of the '70s. Here students conduct hands-on research using feedback sheets and landscape aesthetic descriptions. The feedback sheets are designed specifically for this assignment and include tasks and questions for on-site observations. Detailed landscape aesthetic descriptions of three characterized zones of the sculpture park are also documented.

Results: The results highlight the importance of experiential on-site learning in analyzing sculpture parks. Through direct engagement with the park, students gain a deeper understanding of the design and aesthetic aspects of this Sculptural – Artistic Landscape. The feedback sheets collected from the students provide comprehensive information about the design and aesthetic aspects of the park, allowing for a detailed analysis of its aspect: landscape and art-history, landforms, artistic concepts, maintenance, and function.

Conclusions: The conclusion emphasizes the value of experiential learning in enhancing students' understanding of an "artistic site". The hands-on research approach provides a practical application of theoretical concepts, fosters critical thinking skills, and captures diverse perspectives. Experiential on-site learning allows students to gain a holistic and enriched understanding of Dunaújváros Steel Sculpture Park, including its design, aesthetic, history, and sustainability aspects. The findings contribute to the knowledge of sculpture parks and emphasize the significance of incorporating diverse student perspectives in studying and analysing these unique outdoor art spaces.

Keywords: contemporary art, landscape design, fieldtrip, sketching, sculpture-park

FRAMEWORK AND RESULTS OF A DESIGN-BASED LEARNING EDUCATIONAL PROGRAM WITH THE LOCAL LANDSCAPE IN FOCUS IN A HUNGARIAN HIGH SCHOOL

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Introduction/Goal, objectives: The present research work aimed for creating a program using Design-Based Learning methodology with Landscape architecture principles to improve Environmental Education in a school community in Hungary. The partner school was the Polytechnicum of Economics alternative high school. The activities took place on four one-and-a-half-hour occasions and ten students joined the program. The program's goal was to design an intervention for the schoolyard considering multifunctionality and sustainability.

Material and methods: The program was formulated by breaking down the design process into three workshops, each with pre-selected activities, plus a fourth meeting for the solutions' assessment and discussions. The students had the autonomy to develop their designs and were required to improve their understanding of the place, natural elements, and design attitudes through learning by doing. The skills of the 21st century, or 4Cs (creativity, critical thinking, communication, collaboration) were intrinsic to the process.

Results: The program resulted in four designed interventions for the schoolyard that were presented on the school's sustainability day, and the further development of the ideas is still being discussed. The students' productions were varied in proportion, functionality, and application of natural elements, they were assessed following a feasibility criteria list and the student's own development over the program. The applied framework was assessed by the students, teachers, and facilitators. Group discussions and reflection showed the most valuable aspects of the program, the most meaningful limitations, and the weaknesses requiring reviewing.

Conclusions: The work development indicated that the ideas increased in complexity but remained realistic and attended to the schoolyard's needs defined by the students, pointing to an increased application of the 4Cs. Additionally, the students acknowledged understanding the design process, and the effects of natural elements on health and the local environment and changed the way they experience their local landscape.

Keywords: learning by doing, future skills, landscape-human connection, environmental education, landscape design

DIGITAL RECONSTRUCTION OF LOST HISTORIC GARDENS. CASE STUDY: GÉZA TELEKI CASTLE PARK, PRIBILEȘTI, MARAMUREȘ

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Introduction/Goal, objectives: In order to rehabilitate the Géza Teleki Castle, Pribilești - referring mainly to the landscape architecture - an extensive analysis of the existing and historical records was necessary. Currently, the exterior space of the castle is much reduced and the elements that characterized the park have not been preserved. The objective of this study was to identify the exact area of the park, its shape and the main elements that characterized it.

Material and methods: The data related to the surface of the park (data from scientific paper, taken over in various descriptions in which the park of the Teleki castle, Pribilești is mentioned) are erroneous due to mistakes in the translation of the measurement units. We carried out an extensive documentation of the historical measurement units for the correct calculation of the area. For the main characteristics of the park, we used the following methods: the analysis of historical writings (1894-1900) and the accounts of the locals, the analysis of the date of introduction of some new varieties/species of trees in Europe or Romania; correlation between historical images, present-day images of the castle and historical maps. We imported the historical maps into 3D modeling programs for digital reconstruction of the park.

Results: Correlating the historical maps with the correct units of measurement shows that the topographic elevation of 1869-1887 is conforms to the descriptions in the available historical texts and that the area of the park was 3.4528-4.604 ha. In the east, southeast and north there was a large area of land, available for the development of a park according to the existing historical descriptions. It follows that the west, south-west and south area of the property had a functional role that subordinated the aesthetic role (this being concentrated in the east, south-east and north).

Conclusions: Although no component of the park has been preserved, we were able to establish, following the analysis and digital modeling, the surface, the structure, the functional characteristics and the plant composition - data that constitute a solid basis for the restoration of the park.

Keywords: historic, park, digital, landscape, castle, Transylvania, study, 3D modeling

GREEN PLANTATIONS OF THE HISTORICAL DISTRICT OF UZHGOROD (UKRAINE): A CENTURIES' RETROSPECTIVE OF FORMATION AND PRESENT STATUS

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Introduction/Goal, objectives: The history of formation and current status of green tree and shrub plantations of the historical district Malyi Galagov in Uzhhorod town is studied. The district was planned as a governmental quarter and was built in the interwar period, when Transcarpathia was a part of the Czechoslovak Republic.

Material and methods: The inventory was carried out in accordance with the "Instruction on technical inventory of greenery in the cities and towns of urban type of Ukraine" and guidelines for accounting of greenery in local areas of Ukraine (Guidelines..., 2001; Methodical... 2006).

Results: The general project of modern town buildings of a new part of Uzhhorod was designed in 1923 by team of famous architects led by Professor Adolf Liebscher. Building a neighborhood that demonstrates stylistic variety of the so-called architecture of modernism with its characteristic expediency, economy and conciseness of forms, was carried out in a few stages and by parts. Landscaping of new buildings was also carried out. Green plantings of linear street plantings not only had to decorate the streets, but also emphasized the conciseness and geometry of buildings. Usually, trees of the same species were planted along the streets, under which bushes and low hedges formed geometrically shaped shrubs (quickset, hedge, hedgerow). The range of breeds was small, mostly from non-native species and cultivars. As an innovation in the green construction of Czechoslovakia for the first time in the region as a dominant tree of linear plantings were planted large decorative and beautiful

flowering sakura trees and, much less to diversify the range - *Malus niedzwetzkyana*, and some other apple tree species. These sorts have a compact fairly uniform crown shape, are relatively low, so do not cover the building. Pissard plums, compact globular form of robinia, European species of linden, and other were planted on the streets also, and ornamental flowering exotics such as *Philadelphus coronarius*, *Deutzia scabra*, *Syringa vulgaris*, *Chaenomeles japonica*, *Symphoricarpos albus*, *Forsytsire x vanmedia* were planted from the bushes. One of species (*Ligustrum vulgare*) was used to create curbs throughout the neighborhood, supporting a united concept of linear plantings. In the new parks and gardens, the range of breeds was much higher, however, non-native breeds were also preferred. The newly built district includes a part of the historical garden, founded by the famous naturalist I. Laudon in the 1880's, where rare (in particular, *Ginkgo biloba*) and unique (*Tsuga canadensis*, *Taxodium distichum*) specimens of exotic trees for the region grew (the last one are presented and to nowadays). In the postwar period, partial reconstructions of greenery in the neighborhood were carried out in the 50s and 70s during the Soviet period, as well as, permanently, in the 2000s during the independence of Ukraine. In general, today, although in some places, with significant disruption, the tree and shrub landscaping of the neighborhood corresponds to the general plan of the designers. Today the neighborhood has 12 squares and parks, which concentrate a high variety of species and forms.

Conclusions: According to the performed investigations, 98 species, varieties, and varieties of tree and shrub plants with a total number of 1503 specimens have been counted in the plantations of the Malyi Galagov district. Angiosperms are represented by 22 species (most - 15 species - exotics), angiosperms: 76 tree-shrub species and hybrids (of which 47 tree species and 29 species of ornamental shrubs), most of them (54 species and hybrids) are exotic. Sakura still dominates (more than 300 trees have been counted, almost exclusively in linear plantings of streets), other species are less common. The age gradations of tree species in the district coincide with the historical planting periods: Czechoslovak (70-90 years), Soviet (30-50 years) and modern (5-25 years).

Keywords: green plantations, dendroflora, aboriginal and introduced species, taxonomic analysis, Uzhhorod, Transcarpathia

HEALING URBANIZATION'S FOOTPRINT IN THE NATURAL LANDSCAPE CONCEPT PLAN FOR THE REHABILITATION OF THE SUSENI QUARRY - STUDENT PROJECT –

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Introduction/Goal, objectives: The Giurgeului Depression has been significantly impacted by human intervention, resulting in numerous scars on the landscape. The Suseni quarry area requires a comprehensive rehabilitation plan to restore its natural features. Developing a rehabilitation plan is the first step towards successful landscape restoration, which is critical for achieving positive outcomes.

Material and methods: The initiative to create a rehabilitation plan for the Suseni quarry was instigated by the local council and municipality. The Harghita County Association and Council, in collaboration with the Suseni Mayor's Office, the Sapientia Hungarian University of Transylvania, Department of Horticulture, and the Babeș-Bolyai University, Faculty of Biology and Geology, launched a research scholarship program for students pursuing bachelor's, master's, and doctoral degrees in this field.

Results: The research and landscape rehabilitation plan tender is located in the administrative area of Suseni, along county road number 138, between the Liban settlement and the settlement center, adjacent to a valuable natural environment. The quarry mainly comprises andesite, a dark gray, highly durable volcanic rock suitable for road paving and construction. Over one hundred million tons of stone extracted from this mine were used to construct railway networks and airports across Romania.

Conclusions: Much has already been taken from this landscape, and it is now time to give something back to the area, the local ecosystem, and the landscape. The large scars created as a result of human activities significantly alter the natural landscape features and are detrimental to the visual and ecological relationship systems. Those need urgent rehabilitation.

Keywords: student project, quarry, reclamation, rehabilitation concept, footprints, renaturalization

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