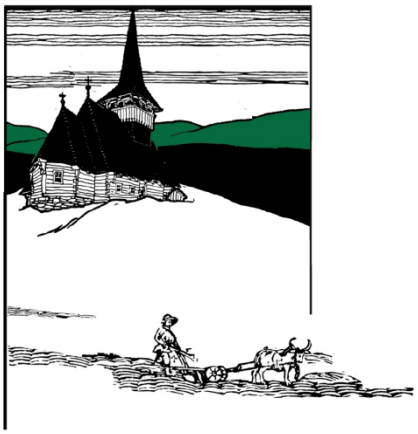
Acta Biologica Marisiensis

Volume 4 | Supplement 1 | 2021

6th Conference on Horticulture and Landscape Architecture in Transylvania



Târgu Mureș, Romania

May 28-29. 2021

Online event

BOOK OF ABSTRACTS

Acta Biologica Marisiensis:
ISSN: 2601 – 6141 (Print)
ISSN: 2668 – 5124 (Online)
Website: www.abmj.ro

Acta Biologica Marisiensis

6th Conference on Horticulture and Landscape Architecture in Transylvania

May 28-29. 2021

Scientific Committee

Dr. Abod Éva, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Bálint János, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Balla Géza, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Balog Adalbert, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Bandi Attila, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Bartha Csaba, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Benedek Klára, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Bíró-Janka Béla, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Căbuz Andrea, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Csiszér Levente, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Domokos Erzsébet, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Fazakas Csaba, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Fekete Albert, Hungarian University of Agriculture and Life Sciences, Institute of Landscape Architecture, Urban Planning and Garden Art
Dr. Ferencz László, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Hegedűs Noémi Melitta, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Henning Imola, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Kentelky Endre, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Kovács Kázmér, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Kohut Erzsébet, Ferenc Rákóczi II. Transcarpathian Hungarian Institute, Department of Biology and Chemistry
Dr. Moldován Csaba, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Nyárádi Imre István, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Orosz Ferenc, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Tanase Corneliu, "George Emil Palade" University of Medicine, Pharmacy, Science, and Technology of Târgu Mureș, Botanical Garden, Discipline of Pharmaceutical Botany
Dr. Ványolós Endre, Sapientia Hungarian University of Transylvania, Department of Horticulture

Organizing Committee

Dr. Domokos Erzsébet, Sapientia Hungarian University of Transylvania, Department of Horticulture (chief organizer)
Dr. Bálint János, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Benedek Klára, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Căbuz Andrea, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Fazakas Noémi, Sapientia Hungarian University of Transylvania, Department of Applied Linguistics Fazakas Miklós, Association of Hungarian Farmers in Romania Mureş Organization
Dr. Fekete Albert, Hungarian University of Agriculture and Life Sciences, Institute of Landscape Architecture, Urban Planning and Garden Art
Dr. Hegedűs Noémi Melitta, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Imre Attila, Sapientia Hungarian University of Transylvania, Department of Applied Linguistics
Dr. Kohut Erzsébet, Ferenc Rákóczi II. Transcarpathian Hungarian Institute, Department of Biology and Chemistry
Molnos Zselyke, Co-founder and head of the Ecopsychology Institute
Dr. Nyárádi Imre István, Sapientia Hungarian University of Transylvania, Department of Horticulture
Dr. Sárosi-Márdirosz Krisztina, Sapientia Hungarian University of Transylvania, Department of Applied Linguistics
Sikó László, Association of Hungarian Farmers in Romania Mureş Organization
Dr. Ványolós Endre, Sapientia Hungarian University of Transylvania, Department of Horticulture
Drd. Molnár Katalin, Sapientia Hungarian University of Transylvania, Department of Horticulture
Iakab Martin, Sapientia Hungarian University of Transylvania, Department of Horticulture
Putnoky Csicsó Barna, Sapientia Hungarian University of Transylvania, Department of Horticulture
Szabó Beáta, Sapientia Hungarian University of Transylvania, Department of Horticulture

Contact

Dr. Domokos Erzsébet
Dr. Hegedűs Noémi Melitta
horticultureandlandscape@ms.sapientia.ro

PLENARY LECTURES

LANDSCAPE - CHALLENGES AND INSTRUMENTS OF OUR WELL-BEING

Krisztina Kincses[1]

[1] Ministry of Agriculture, Hungary
E-mail: krisztina.kincses@am.gov.hu

Landscapes are a reflection of human interaction and decision making and as such help to define us, who we are, where we live, our culture and our heritage as well as our relationship with nature. But landscapes also directly reflect and contribute to our well-being, individually and collectively and the coronavirus pandemic, which began in 2020, has brought this into sharp focus.
It is now generally accepted that access to open space and landscape, especially in the urban environment, as well as time spent outdoors, are extremely important for people's health - physical, mental and social well-being.
Paradoxically, our material welfare is considered by some to be a better indicator of well-being indeed in the context of happiness, security, health, and social relations. However, reliance on this 'standard of living' measure, ignores long-term social and quality of life interests for short-term economic interests.
The Council of Europe considers the landscape holistically, from aesthetic, cultural, environmental aspects as well as from the human rights issues, not simply in relation to the physical reality of landscape, but also its perception and the resulting value-judgement. Understanding the effect of humans' interventions helps to maintain harmonious landscapes rich in habitats, biodiversity, providing sustainable environments that can benefit human activity, while maintaining and developing an essential linked green infrastructure. It is evident that to meet emerging challenges including climate change and Covid-19, there is a need for a revitalised, holistic, cross-sectoral, multidisciplinary approach to landscape and environmental planning.
This paper draws attention to the European Landscape Convention, particularly to the importance of the instruments of landscape protection, management and planning, which represent some of the principal objectives of the Hungarian National Landscape Strategy. It also highlights the role of landscape architects.

Keywords: Landscape strategy, European Landscape Convention

URBAN ECOLOGY AND ECOCITIES, PLANNING FOR SYNERGIES IN A REGIONAL CONTEXT

Nico Tillie[1], Dr. Rob Roggema[2], Frits van Loon[3]

[1] Urban Ecology and Ecocities Lab, Landscape Architecture, Department of Urbanism, Faculty of Architecture and Built Environment, TU Delft
E-mail: n.m.j.d.tillie@tudelft.nl
[2] Cittaideale, Office for Adaptive Design, Spatial Planning and Design Research
[2] Urban Ecology and Ecocities Lab, Landscape Architecture, Department of Urbanism, Faculty of Architecture and Built Environment, TU Delft

Background: Until recently, urban ecology has been predominantly approached from a biological perspective. Alberti (2009) calls for other professions and research angles to enrich the urban ecology domain. In our view urban planning, landscape architectural and architectural design and engineering explorations can contribute substantially to the development of a model that considers cities as urban ecosystems developing towards ecocities using urban ecosystem restoration strategies. How can we use landscape architecture and design to translate the Ecocity principles plus the biodiversity and ecological challenges into (site specific) spatial design, spatial quality and spatial experience?

Material and methods: Research by design on urban metabolism and urban ecology projects with selected stakeholders in design charettes in Rotterdam region.

Results: This research is based on the understanding of natural systems and cyclic processes such as the water, carbon or nitrogen cycle and its relation to local ecosystems and habitats. In the flow analysis, with facts and figures, mapping, drawing sections and so on, a (semi)natural system baseline is defined for a certain site. Flow diagrams can show the relation to spatial systems or relationships with others flows or systems. Often there is a discrepancy between the aimed (semi)natural system base line and the situation at hand. A diagnosis of local challenges and opportunities to intervene in the system is set which form the first steps of an ecosystem restoration strategy. Taking assumptions of possible futures and scenarios into account a spatial vision is made. This is the basis for (restoring) planning and design interventions followed by maintenance and or planting schemes. This leads to interventions to improve the (semi)natural system as well as improved ecosystem services and quality of life.

Conclusions: landscape architecture analysis and design combined with ecological and other overlapping disciplines can form a basis for (urban) ecological restoration strategies to translate the Ecocity principles plus the biodiversity and ecological challenges into (site specific) spatial design, spatial quality and spatial experience, leading to improved ecosystem services.

Keywords: landscape architecture, urban ecology, ecological restoration strategies, urban flows, ecosystem services

CONTEMPORARY CHALLENGES: THE SUSTAINABILITY OF THE CULTURAL LANDSCAPE IN RURAL AREAS. THE MONUMENTS' AMBULANCE ACTIVITY

Bogdan Ilieș[1]

[1] ARHAIC Association, Zalău, Sălaj, The Monuments' Ambulance, Romania
E-mail: bogdan_ilies@yahoo.com

Background: The contemporary rural environment is the place where the two elements that define the Cultural landscape, namely Nature and Man, are in the most obvious intertwining. The challenges of recent years: labor migration, ageing communities, industrialization of agriculture, and urbanization of villages have had negative impact on sustainability in rural areas. From a cultural point of view, the adverse consequences of these transformations are found in the deterioration, sometimes almost irreversible, of the local identity, the disappearance of traditional crafts and, in particular, the accelerated destruction of the built heritage.

Material and methods: The Monuments' Ambulance is a project initiated in 2016 by the MONUMENTUM Association and developed by a series of similar organizations working in the field of heritage, independently, in several regions of Romania. The purpose of this program is to carry out interventions to secure the cultural heritage, with the help of craftsmen and volunteers, in collaboration with local communities, under the strict supervision of heritage conservation specialists, local authorities and authorities with responsibilities in the field. Thus, the Ambulance for Monuments project proposes an efficient way, which takes into account the principles of sustainable development - environmental protection, social development and economic development, to secure important heritage sites in an advanced state of degradation or pre-collapse.

Results: Protecting the built heritage is usually expensive and the acute lack of craftsmen and specialists makes this work even more difficult. For these reasons, in order to help communities in difficulty, the Monuments' Ambulance acted mainly in rural areas.

Conclusions: For the activity carried out in recent years, the Monuments' Ambulance project received international recognition, with the winning of the Education, Training and Awareness section, respectively the Public Prize of the European Heritage Awards/Europa Nostra Awards 2020.

Keywords: The Monuments' Ambulance, Sustainability, Cultural landscape, Heritage, Rural areas

---

SWIRL OVER THE BASIN – GRASS TO FLASK (DIFFERENT PATHS ON COMMON GROUND)

András Halász[1]

[1] Institute of Animal Husbandry, Hungarian University of Agriculture and Life Sciences, Godollo Campus, Hungary
E-mail: halasz.andras@uni-mate.hu

Face the global truth. European food production is expensive.
On the other hand, Europe is the brand of quality. Food safety is priority alongside animal welfare and environmental issues. Finding the balance between feasible farming and sustainability not an easy task and depends from the farmers mindset. Grasslands are multifunctional in term of ecosystem services and forage production. The global demand of meat and milk is increasing but the quality/quantity fight is escalating.
Adaptation is a must. Introducing new machinery or farming technique needs courage and pro activity. Younger generation's ability to make quick – shoot first – decisions is a big advantage. Decide which grass service is Your closest and get to the market. Social media, specialists groups help to build alliances. Buy one animal trailer, run & fill together with Your land neighbour. Brand Your cheese or meat not the live animal.

Grow Your QUALITY MEADOW hay! If no local market than advertise and sell it to Scandinavia or to Middle East. English is essential to get in contact however Google translator or smart phone applications help.
If no point to keep animals on Your grassland than look after different services like carbon sequestration, pollinator pasture or livestock connected cultural base. Traditional building material is also an option.

Establish couple of corner stones: conserved traditional landscape (mosaic hillside, forests with meadows) healthy environment (less chemical, clean water – organic farming) sustainability (feasible activities avoid EU funds) social-emotional decisions

Conclusion: The Market Shark eats the careless. You have to be the first to start something new with grass. Uncertain that agri-function or nature conservation will take over in Europe.

Keywords: pasture, hay, milk, added value, GI products

ORGANIC AGRICULTURE RESEARCH AT ÖMKI

Katalin Allacherné Szépkuthy[1]

[1] Hungarian Research Institute of Organic Agriculture (ÖMKi), Budapest, Hungary
E-mail: katalin.szepkuthy@biokutatas.hu

Background: ÖMKi is working since 2012 in the field of arable crops, horticulture, viticulture, apiculture, focusing on organic production. ÖMKi's On-farm Living Lab is an agroecology-focused participatory experimentation network which includes a variety of field trials and technology tests co-designed and co-implemented with farmers in Hungary.

Material and methods: In frame of the On-farm Living Lab, the research topic is co-defined together with the value chain actors, and the agreed on-farm tests are carried out via interested producers. Summarized results are shared with involved stakeholders, and are published with open access.

Results: Among various results we focus here on two topics. In multiannual experiments the participants of the Living Lab Network have tested 35 tomato heritage cultivars that were only preserved in gene banks. From these cultivars 6 were selected and registered officially as landrace in 2019. These are available as seedlings at one of the discount chains and at small retailers from 2019, thus helping to bring tomato landraces back into the home-gardens as well as to enrich production diversity.
Another Living Lab project was to examine soil management technologies in vineyards with different species-rich living mulch systems. Tests were run by more than 22 farms, in 5 wine regions of Hungary. In 2018, an interrow seed mixture product was finalized, and with the involvement of a private seed company, market distribution of the product could commence.

Conclusion: On-farm Living Labs are suitable vehicles for practice-oriented research and development of organic production systems. The European Union's Horizon research framework programme will actively foster the development of Living Labs in the coming years. It is recommended to develop similar systems also in Transylvania.

Keywords: participatory experimentation network, agroecology, organic farming, tomato landraces, living mulch, seed mixture

---

MAUERPARK BERLIN - MAINTAINING AND PRESERVING LIFE IN UNORGANIZED STRUCTURES OF A PUBLIC PARK

Frank Sleegers[1]

[1] Department of Landscape Architecture & Regional Planning, University of Massachusetts Amherst, USA
E-mail: sleegers@larp.umass.edu

Background: The Mauerpark Berlin is one of the most vibrant contemporary parks in Berlin (GER) and known for being an inclusive place for a diverse urban population. The park was designed by German landscape architect Gustav Lange on the void of the former Death Strip of the Berlin Wall and is protected by copyright. Lange preserved the openness of the urban void as a statement of freedom between political systems and concentrated his design work on carefully placed form-based interventions on the edges of the park.

Material and methods: This presentation provides a formal design analysis at various scales. Sources include revisiting historic and current design plans, site visits over multiple years, personal interviews and collaboration with Lange, and a review of the few, published statements from the designer about his philosophy and the Mauerpark specifically.

Results: Findings are that principal geometric forms and shapes are applied as legible interventions that interfere, interrupt, intersect and overlap with the primary organizational elements of the composition: lines and grids. While there is evidence of formal, geometric execution of Lange's design on the large scale, the moments of variations and exceptions that dissolve the principal geometries are increasing on the small scale. From a close-up perspective geometries and lines are broken up to reveal gaps and thus increase diversity in the design.

Conclusion: The strategy of creating variety and intricacy on the formal level supports the liveliness of Mauerpark. The gaps and spaces in between provide flexibility for spontaneous activities and programing to serve a diverse urban population. The gaps also provide niches for random growth of plants to encounter wilderness and nature in an urban context.
The findings are relevant for understanding and preserving parks in dense urban areas that have to serve multiple demographics and needs while maintaining a comprehensible design framework and language.

Keywords: Design Theory, Park Design, Form in Landscape Architecture, Urban Park, Preservation

THE ROLE OF LANDSCAPE ARCHITECTURE IN THE GREEN ENVIRONMENT OF THE 21ST CENTURY WORKPLACES

Peter I. Balogh[1], Balázs Almási[1], Krisztina Szabó[1], Eszter Karlócainé Bakay[1], Vera Takácsné Zajacz[1], Anita Reith[1], Miklós L. Pap[1]

[1] MATE - Hungarian University of Agriculture and Life Science, Institute of Landscape Architecture, Urban Planning and Garden Art, Budapest
E-mail: Balogh.Peter.Istvan@uni-mate.hu

Background: The idea of a workplace is constantly changing, regardless of the pandemic. Many professions work in completely different ways and in different places than before. This rapid change affected particularly those working on the computer: office buildings are undergoing an unprecedented 'green transformation' and in parallel, many alternative workplaces have been and are being created. Community offices, cafés, public squares, parks – and mostly due to the epidemic, homes. These are all new and old workplaces and landscape architecture has a key role to play in shaping their environment, as 'green thinking' is ubiquitous in the 21st century.

Material and methods: The presentation reflects the simultaneous impact of several factors: ergonomic research has led to the transformation of the narrowly defined workstation itself. The scientific results of environmental psychology have had a major impact on the physical quality of the workplace in the broader sense. Green thinking has transformed the external relationships of office buildings to urban public spaces and its own green spaces. This impact has been particularly significant with the proliferation of various rating systems (LEED, BREEAM, DGNB). Alternative workplaces have become popular precisely because they already offer the environmental quality and experience that office buildings are designed to provide.

Results: The presentation will illustrate, through examples, the changes that have taken place in the development of office buildings and the optimal design of alternative workplaces - seen through the lens of landscape architecture.

Conclusion: The result is a systematisation of the relationship between offices and the internal and external green environment, and their interactions, which can be used in future developments.

Keywords: workplaces, office buildings, landscape architecture, environmental psychology, sustainability

---

"... AND ALL OF A SUDDEN THE EYES SAW"

Ana Horhat[1]

[1] E-mail: anam.horhat@gmail.com

Background: The relationship between man, nature and landscape, from contemplation to perception, has produced various aesthetic categories, from picturesque to romantic, from natural to artificial, with heated debates, some handed down to this day. The industrialization and the more recent globalization have accelerated this changes and made those relationships even more complex. The garden has not managed to escape from the rules of the global market, from fashions and contaminations and became object of mass consumption, losing in the process its uniqueness, enchantment, harmony, its "aura".

Material and methods: The myriad of images, the garden commercialization and the excess of visual stimuli have produced a decrease of landscape expressions. Paradoxically, the practice of modern landscape architecture has also contributed to ecological globalization and unfortunately is still doing the same today. This phenomenon is due not only to the global market or the amateur practice of gardening but also to some large international studios or plant producers who are playing an important role in the creation of global models and in the unification of urban landscapes, offering similar gardens with "global plants".
Given the homologation, the solution must come from an awakening of the senses. The debates regarding the choice of vegetation should go beyond the sphere of pure ecology and fit into a wider context, at the confluence between image, meaning and experience, therefore between aesthetics, philosophy, science, technique and a sensitive level.

Results: The language of naturalness passes from reductive or extremist, ecological, idealistic, nostalgic approaches to new dynamic manifestations, changeable, sensitive, interdisciplinary, trying to put together poetics of garden art, ecology of nature, market economy, floriculture but also all the different garden natures understood as image, life and death, emotion or experience.

Conclusions: All this suggests the need to change and investigate the way of seeing, leaving the sphere of the visible and feeling the invisible. Seeing goes beyond the eye, it means a reflection, a judgment, a choice and therefore a project. And where do we sit with our urban landscape in these debates?

Keywords: ecology, nature, garden, image, sensitive

NATURE CONNECTEDNESS – AN ECOPSYCHOLOGICAL APPROACH

Zselyke Molnos[1]

[1] Ecopsychology Institute, Budapest, Hungary
E-mail: molnos.zselyke@ecopsychology.hu

The fundamental challenges of our time include the understanding and managing the climate crisis and ecological crisis at the global level, and the landscape transforming activities at the local level. All of these are not only technological, economic or demographic issues, but also psychological issues, as environmental problems can be linked to human behavior. Some form of reciprocity in our daily relationship with nature is essential for both our future and our personal and social health. According to the ecopsychological approach, our perceptions of nature may be related to our long-term unsustainable functioning, as we primarily perceive “things” in nature and not living systems or ecological networks. My presentation approaches the issue of attitudes towards nature from the angle of perception of non-human individuals and ecosystems by humans, and also discusses the possibilities of changing this distorting view.

Keywords: nature perception, connectedness to nature, ecopsychology, participative walks

---

HAVING A ROLE OF HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES IN THE CARPATHIAN BASIN

Eszter Balog[1]

[1] Center manager, Carphatian Basin Agricultural and Rural Development Innovation Center (KAVIK), Hungarian University of Agricultural and Life Sciences (MATE), Gödöllő, Hungary
E-mail: Balog.Eszter@uni-mate.hu

Background: The Hungarian University of Agricultural and Life Sciences (MATE) has a network of contacts in the Carpathian Basin, covering five countries (Hungary, Romania, Serbia, Slovakia, Ukraine). MATE's Carphatian Basin Agricultural and Rural Development Innovation Center (KAVIK) aims to create a network system that connects the inhabited by Hungarians regions at the Carpathian Basin level for education, research and development.

Material and methods:
Activity of the department:
• To plan and coordinate the University's outsourced study programmes in beyond the borders territories, based on the principles set out in the national strategies and local needs assessments.
• To organize education in coordination with the academic community involved in outsourced study programmes and the consultative centers where the training takes place.
• Organization and coordination of professional programmes in the Carpathian Basin network.
• Organization of study trips.
• Organizational and coordination tasks related to the Makovecz Programme (mobility in the Carpathian Basin).
• Maintaining contacts, building relationships and developing joint programmes with domestic and foreign organizations, businesses and relevant ministries.
• Search for tendering opportunities for the five-country’s network, develop networking materials at national and EU level.

Results: The Hungarian University of Agricultural and Life Sciences (and it’s predecessors) was a pioneer in the startup of Hungarian-language higher education in Szeklerland thirty years ago. Did that with the aim of promoting the prosperity of the Hungarian population of the Carpathian Basin in their mother tongue, in their homeland. Since then, the university has been steadily building up it's network of contacts beyond the borders, and has developed a model that now covers five countries.

Conclusions:
Development opportunities:
• Communication, marketing: in addition to the activity on social networking sites, more emphasis on updating and developing KAVIK's website.
• Makovecz Programme: opening up to instructor mobility and new partner institutions.
• Application to best practices and search for more tendering opportunities.
• Development of experimental farms.

Keywords: network, relationship system, rural development, homeland, Carpathian Basin

AN ATTEMPT TO REBUILD THE PEASANT WAY OF LIFE IN THE 21ST CENTURY

József Bányász [1] , Anna Bányász, Emerencia Bányász, András Bányász

[1] E-mail: banyasz.jozsef@eloszovet.ro

Background:
The Milk Mine is an attempt to recreate the peasant way of life on the eve of the 21st century. Peasantry as a social stratum is disappearing. Its type of farming created a complete lifestyle and a culture of its own. It integrated organically into nature, sought harmony with it, and farmed sustainably. Using a kind of circular working method – rotational cropping, organic fertilisation, pasture management, etc. – it took only as much from nature as it could feed back. It also handled the „mysticism" of the vertical appropriately: "Man's is work, God's is the blessing". Humility which meant strength and intelligence in the peasant society, was the embodiment of the human virtue that achieved balance from the point of view of mental health. Depression and burnout was not typical in the peasant society. Biodynamic farming today is trying to reproduce this in some form.
AGRICULTURE: The cultural landscape, the built heritage is the product of a peasant way of life, which we cultivate almost exclusively on stage today. However, its creative medium has become "derelict" (Áron Márton). Almost everyone was "educated out" of the farming way of life since the 1940's or even earlier. The noun 'peasant' that once gave poise, has degenerated into a pejorative adjective (In Austria, farmers rank second on the social ladder after doctors). Farming has been replaced with industrial agriculture which treats nature, land and animals not as (work) companions but as capital to be exploited and thus it slowly destroys them. Being a peasant or a farmer today means commitment, an intellectual task. It is the debt of the "educated"! With the knowledge and tools of the 21st century, we must carry on – as much as possible – the organic cultural heritage that we owe everything we are still proud of. It is not enough to farm because of some sort of a peasant romanticism, as the intellectuals, who "start a new life in the countryside" could easily fail. Mainly, but not only, animal husbandry means commitment, consistent work, knowledge, systematic prudent behaviour, openness to cooperation and some voluntary "ascetic" willingness to make sacrifices. And that is the point. Restoring the honour of manual labour that can bring blessings and health.
It is important that in the "family farm" we do not produce raw materials for the food industry, but an end product with the highest possible added value.
For us, this is not only a way of life, it is a "mission statement" and (https://www.youtube.com/watch?v=d4ua29KtV8E) a matured cheese that is made from raw milk (https://www.facebook.com/watch/?v=742521499543996) which can financially sustain a farm with 9 dairy cows.
In addition, the other family members add colour to the excitement of everyday farm life from the point of view of art (https://www.instagram.com/tejbanya/?hl=hu) and education (education for life, therapy). Events, workshops and education are also part of our life, which also strengthens the hope for a future of the countryside (https://eszm.ro/2020/07/06/gyergyoujfalu-elet-jel-ujrakezdes-es-folytatas/#more-40559). In the Milk Mine the cows are our friends, our co-workers. We call them by their names, we try to provide them with living conditions according to their nature. They are free range cows, fed with intermittent grazing. Each of them has a different personality, we treat them accordingly which they value and somehow reciprocate. Not only must the cultural landscape and built heritage be preserved, but it also needs to be inhabited and developed in a modern way, so that future generations may be happy to inhabit and further recreate it. Public discourse, science, politics must recognize that only by living organically with nature can we restore the "fairy garden", or the "paradise" that subverts our pure dreams through the subterranean streams of folk tales.

Gyergyóújfalu, April 19, 2021

Material and methods: Experience, reflections, scholarly literature

Results: A viable option, a working alternative to the mainstream

Conclusions: A wholesome life alternative with high ethical and environmental returns.

Keywords: peasant, organic, culture-creating, living in harmony with the environment, community, providing quality of life, sustainable

ORAL PRESENTATIONS

INFLUENCES OF TRIACONTANOL AND SALT STRESS ON GROWTH AND METABOLISM OF SPINACH

Bernát Tompa[1], László Fodorpataki[1]

[1] Hungarian Department of Biology and Ecology, Babes-Bolyai University, Cluj-Napoca, Romania
E-mail: tompa_bernat@yahoo.com

Background: Natural biostimulants are promising alternatives to cope with yield losses caused by environmental stress. They promote plant growth and improve crop productivity without negative impacts on the environment, and because they act as triggers for plant natural defenses, only small amounts are needed to increase stress tolerance. Triacontanol, a wax constituent of the plant cuticle, is such a biostimulant with still unelucidated action mechanism. Because high salinity is among the most critical direct consequences of global climate change affecting crop production, the main objective of this work is to investigate the influence of salt stress, triacontanol and their combination on growth and metabolic processes of spinach, related to yield and productivity.

Material and methods: The 'Viking' cultivar of spinach (*Spinacia oleracea* L.) was grown under controlled environmental conditions, being watered regularly with Hoagland's nutrient solution. Three weeks old plantlets were treated for 15 days (once in 3 days) with 250 mM NaCl, 1 µM triacontanol and a combination of the two chemicals. Root and shoot length, fresh and dry biomass, leaf gas exchange parameters, induced chlorophyll fluorescence parameters, reduced to oxidized vitamin C ratios, phenolic content of leaves and photosynthetic pigment contents were determined.

Results: Triacontanol stimulated shoot growth and compensated for growth inhibition caused by salt stress. It increased phenolic content of leaves, even under high salinity conditions. The biostimulant did not influence significantly the vitamin C content, but it increased the ratio between reduced and oxidized ascorbate under salt stress. Triacontanol moderated the reduction of stomatal conductivity caused by salt stress and reversed the decreasing effect of salinity on net carbon assimilation rate, as well as on the effective quantum yield of photosynthesis.
Conclusions: Triacontanol stimulates growth of spinach and alleviates several negative metabolic effects of salinity stress, including accumulation of health-promoting substances in leaves.

Keywords: ascorbate, carbon assimilation, photosynthetic efficiency, salt stress, triacontanol

---

EFFECT OF LIGHT-EMITTING DIODES (LEDS) ON SOME PHYSICAL AND BIOACTIVE COMPOUNDS OF 'ICEBERG' LETTUCE (*LACTUCA SATIVA* L.)

Asmaa Sayed Ahmed[1], Arshad Abdulkhalq Yaseen[1,2],Triska Dlshad Bakir[1,3]

[1] Salahaddin University-Erbil, College of Agricultural Engineering Sciences, Department of Horticulture, 44002 Kurdistan Region, Iraq
E-mail: arshad.yaseen@agr.unideb.hu
[2] Institute of Horticultural sciences, Faculty of the Agricultural and Food Sciences and Environmental Management, University of Debrecen, H-4032 Debrecen, Böszörményi Street 138.
[3] Khabat Technical Institute, Department of Horticulture, Erbil Polytechnic University, Erbil, Kurdistan Region, Iraq

Background: Use of light-emitting diodes (LEDs) is a recent concerned regarding application of indoor crop system of the modern plant production. Thus, this research aims to investigate the response of a common outdoor Crisphead lettuce variety 'Iceberg' to different LED lightning in comparison to the GR (control) light condition.

Material and methods: In our research, we evaluated the influence of four monochromic LED lights including 100% White (W) (430 nm and 582 nm), Yellow (Y), (570 nm), Red (R) (660 nm), Blue (B) (460 nm) in comparison to solar lightening condition (GR) as a control. The morphological characteristics and biochemical content of the common outdoor 'Iceberg' lettuce (*Lactuca sativa* L.) grown under the light treatment of 16/8 (day/night), RH of 65% ± 5, and the temperature of 18-20 ℃ for 22 days were measured.

Results: The results show that leaf length, leaf area, and total head weight were significantly greater in case of the plants grown under B LED, while all the other physical parameters were significantly higher in the plants grown under GR condition. Conversely, chlorophyll (Chl), carotenoids (Car), and nitrate content were also influenced by different light treatments. Plants grown under LED light treatment provided significantly higher chlorophyll content compared to the control. However, significantly greater carotenoid content was in the plants grown under GR condition. The highest total chlorophyll content was recorded under B and R LED, whereas the lowest was in the GR condition. The lowest nitrate content in the blade and petiole was recorded in the plants grown under Y LED, while the highest nitrate content was recorded in the GR.

Conclusions: Based on our result, it is possible to grow and improve some quality parameters of common outdoor 'Iceberg' lettuce under LED where the solar light is limited or unavailable. However, plants performed better under GR light conditions than monochromic LEDs.

Keywords: LED light, morphological parameters, bioactive contents, common outdoor 'iceberg' lettuce (*Lactuca sativa* L.), nitrate content

SUSTAINABLE WATERFRONT LANDSCAPE PARADIGM BASED ON TRADITIONAL PHILOSOPHICAL PERSPECTIVE - CASE STUDY OF YANGZE RIVER BASIN. CHINA

Ning DongGe[1] , Albert Fekete[1], Yang Yang[1], Ernest Amoako-Atta[2]

[1] Department of Garden Art, Faculty of Landscape Architecture and Urbanism, Szent István University, Budapest/Hungary
E-mail: ningdongge@qq.com
[2] Department of Landscape Planning and Regional Development Szent István University

Background: The dialectical relationship between matter and consciousness determines that different natural and human environments have different paradigms for mankind to understand and transform the world.
Nowadays, China has experienced the transformation from agricultural society to industrial society and post- industrial society under the guidance of western modern civilization values. We are experiencing a series of environmental problems faced by western society, especially urban diseases and other conflicts between human and environment in the process of urbanization.

Material and methods: literature review and historical review
Looking back on the traditional agriculture period in China (before 1860), there were also large-scale cities and settlements. However, under the guidance of traditional philosophy, the ancient ancestors possessed sustainable strategies for the construction of settlements, and formed a set of paradigms regarding settlement location, planning and layout.
Especially the waterfront settlements, under the comprehensive influence of traditional Chinese philosophy, Confucianism, Buddhism, and Taoism, have formed the ecological construction concept of the unity of nature and man, the nature of Taoism, and the unity of material and self. This is specifically manifested in the landscape harmony, ecological harmony, and the spiritual harmony of the place realized by the Waterfront heritage.

Results: This study will take six traditional settlements in the upper, middle and lower reaches of the Yangtze River Basin as examples to analyze how traditional philosophy affects the construction of waterfront landscape, and explore the application value of ancient Chinese ecological philosophy to today.

Conclusions: sustainable Landscape design model

Keywords: heritage, settlement, landscape, water management, ecological

LANDSCAPE CHARACTER AND SETTLEMENT IDENTITY

Ádám Weiszer[1], Albert Fekete[1]

[1] Hungarian University of Agriculture and Life Sciences Institute of Landscape Architecture, Urban Planning and Garden Art Budapest, Hungary
E-mail: weiszeradam@gmail.com

Background: The best-known public space design manuals are setting goals for big metropolises, tailored to the global needs, but their demands are usually also reflected in similar manuals for smaller cities or rural settlements, ignoring scale differences.

Material and methods: The current paper presents settlement-forming on the examples of European settlements and case studies, and examples are presented for how to preserve the characteristics of traditional public spaces through small settlements located in Kalotaszeg, in the Balaton Uplands and in the agglomeration of Budapest.
The elements of 17 different public space manuals (urban ecology, transportation, detail design, local identity) were categorized, consequently the following conclusions were determined:
- Through which elements the traditional public space character can be described.
- What are those elements of a public space design manual in which the enforcement of the global effects are unavoidable or necessary, and what are those elements by which the local identity can be preserved.

Results: Among the examined settlements in the north side of Lake Balaton and Kalotaszeg we found examples where the unified material and architectural language associated with the landscape character is an integral part of the settlement. Among examined settlements in the metropolitan area of Budapest, this only occurs sporadically.
In the course of the research based on the 17 public space design manuals we selected, it could be identified that which are those elements that will appear in European settlements regardless of their location (influence of globalization) and which are those ones through which the preservation of local identity can be a realistic goal.

Conclusions: Ecological sustainability and the resilience of settlements doesn't just depend on the quality of the green space elements and the complexity of their system, but also on the enforcement of the local character appears through the public space design elements.

Keywords: design manual, landscape character, globalization, local identity, traditional character, public space

RESULTS OF SOWING TRIALS WITH COMMERCIALLY AVAILABLE AND SELF-ASSEMBLED WILDFLOWER AND HERBAL-WILDFLOWER SEED MIXTURES

Diána Páble[1], Julianna Tasi[2]

[1] Szent István Egyetem, Növénytudományi Doktori Iskola, 2103 Gödöllő, Páter Károly u. 1
E-mail: pable.diana@gmail.com
[2] Szent István Egyetem, Mezőgazdaság- és Környezettudományi Kar, Állattenyésztés-Tudományi Intézet, 2103 Gödöllő, Páter Károly u. 1.

Background: In our research, we carried out sowing experiments with three types of commercially available and three types of self-assembled seed mixtures with spring and autumn sowing times. Almost the whole self-assembled mixtures were by self-collection. The trials area is located in Csákvár, Fejér County, Hungary. The trials began at 2014 and the last sowing was at 2016. We compared the results of the hatching rate of the sown species and also the study of the settled species.

Material and methods: Before sowing trials, we carried out some preliminary tests (analysis of soil samples, indicative germination test of seed mixtures, monitoring precipitation). To evaluate the success of sowing, we performed coenological studies (using the Balázs quadratic method), rooting and mowing tests. We considered it very important to evaluate the coverage rate of sown plant species but we also paid attention to the appearance of allergenic plants and the non-sown plant species. The seed mixtures were sown in the spring and in the autumn. We did not apply irrigation because we want to apply extensive maintenance.

Results: The two foreign commercially available seed mixtures contained a large number of plant species in contrast to the domestic commercially available and the self-assembled mixtures. Based on experience, we used only a few plant species. There was also a significant difference in the use of grasses and in the sowing time.

Conclusions: In the study of the whole trials, there was a significant difference between the coverage of autumn and spring sowings, the rate of species and the weeding abilities. Autumn sowing proved to be more effective therefore more comparisons were made for that sowing. A higher rate of coverage was achieved there and the diversity was also higher, but allergenic weeds were not observed on the plots.

Keywords: wildflower, seed mixtures, sowing trials

ANALYSIS OF ENERGY MANAGEMENT AND POSSIBILITIES FOR ITS DEVELOPMENT IN ECOVILLAGES WITH TOOLS OF LANDSCAPE ARCHITECTURE THROUGH THE EXAMPLE OF VISNYESZÉPLAK

Zita Szabó[1], Viola Prohászka[1], Ágnes Sallay[1]

[1] Department of Landscape Planning and Regional Development, Institute of Landscape Architecture, Urban Planning and Horticulture, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary
E-mail: szabo.zita28@gmail.com

Background: Nowadays, it is a priority to increase the efficiency in energy management to reduce greenhouse gases emission and increase the share of renewable energy sources in the energy mix. The current research examines the system and development opportunities of energy household of an ecovillage, as these communities are economically, socially and ecologically sustainable, so the study of their energy household is especially justified. The goal of this community is sustainability, so possible technological and efficiency barriers can be more easily determined.

Material and methods: Our sample area is the Visnyeszéplak ecovillage in Somogy county, which was established in the early 1990s. The economy of the sample area has been based on ecological principles for decades, thus providing valuable information from a practical point of view. In our research, on the one hand, we are looking for the answer to how the energy management of an ecovillage can be characterized, can it be developed in terms of sustainability, what kind of barriers hinder development? What other general practices can we use that make energy production and consumption more efficient in everyday life?

Results: The characteristics of energy management were examined through interviews, literature and map databases. The literature review gives a picture of the sustainability of energy management and the applicability of the principles of the circular economy. Through the interviews, we analyze the energy balance of the community based on the cultural system. To define the analysis with the tools, technologies, and their application that illuminate their cognitive norms that are characteristic of organic farming-based communities. The spatial structure of energy management is presented through the territorial analysis of the settlement.

Conclusions: As a result, we formulated development proposals that could make the community's energy management systems more efficient. Besides, we have formulated generally applicable recommendations to increase the efficiency of energy management.

Keywords: energy transition, ecological agriculture, rural development, renewable energy, circular economy

INVESTIGATION OF RELATIONS BETWEEN HUMUS CONTENT AND DISTURBANCE IN URBAN SOIL

Gábor Sándor[1], György Szabó[2]

[1] Doctoral School of Earth Sciences, University of Debrecen, Debrecen, Hungary
E-mail: sandorgabor87@gmail.com
[2] Department of Landscape Protection and Environmental Geography, University of Debrecen, Debrecen, Hungary

Background:
The humus content is working as good marker of human influence by the alteration of its vertical distribution in the urban soils. Amount of organic materials can be increased in topsoil of green spaces in cities by different inputs. There is significant difference between the covered soil profile's humus content and uncovered soil profile's humus content. On the basis of natural profiles, humus content coincides with the regular tendency characteristic of original genetic soils opposite of the irregular distribution of content in profiles with technogenic layer on surface. The vertical distribution of humus content can be represented by the ratio SS/TS of subsoil humus content (SS) over topsoil humus conent (TS). SS/TS values lower than 1demonstrates typical natural distribution with the main humus concentration in topsoil, whereas values close or higher than 1 refers to considerable role of subsoil humus. The objective of the present research was to investigate the amount and the vertical distribution of organic matter in order to measure the ratio of anthropogenic effects.

Material and methods: Samples from 22 soil profiles were collected in Debrecen. The depth of the certain profiles varied from 1 to 2 m. The organic material content was identified by the Tyurin method. The datas have been analyzed according to different land use types (forest, urban green spaces/park, courtyard, cemetery, traffic zone/roadside).

Results: Values of SS/TS index varied from 0 to 1.6. The ratio of SS/TS was higher in green-spaces and traffic zones than in the other land use types. The soils of city centre proved to be under strong anthropogenic effect, because alternating layers of humus-rich and humus-poor soil layers had been found towards the deeper levels.

Conclusions: The anthropogenic effect was identified with SS/TS index. The high index can show areas, where the human impact was stronger. Zones of Debrecen were separated by the intensity of anthropogenic effect.

Keywords: urban soil, humus content, human impact, disturbance, technogenic layer

---

CLIMATE PROTECTION IN THE PRACTICE OF LANDSCAPE ARCHITECTURE: AN ATTEMPT TO CLARIFY SOME KEY TERMS

Patrícia Szabó[1], Máté Sárospataki[1]

[1] Department of Garden Art and Landscape Design, Institute of Landscape Architecture, Urban Planning and Garden Art, Budapest, Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungary
E-mail: szabo.ptr.cia@gmail.com

Background: Climate change is a pressing issue in nearly all disciplines and industries dealing with the built environment. Settlements have to cope with the negative effects of climate change specific for their geographical location. Green spaces and public parks are a part of the built environment that have a key role in reducing the effects of climate change, given they were designed, built and are managed in order to fulfil this role. Landscape architecture is the profession that deals with the design of green spaces, therefore the climate awareness of landscape architects is also crucial. Our goal is to promote the design of green spaces and public parks so that they can significantly contribute to the adaptation of the built environment to climate change.

Material and methods: As a first step, a closer look has been taken at the main literature in connection to climate change available on the international (European) and national levels. Based on a structured analysis, an attempt was made to extract the key terms of these documents and to clarify their relation to the practice of landscape design.

Results: A list has been compiled of the most frequently used terms related to climate change, with a view on their applicability in landscape architecture

Conclusions: Although the language used to describe climate related phenomena is broad, translation of the terms into design practice is not always straightforward. In order to efficiently transfer the existing knowledge about climate change into the practice of landscape architecture, a professional consensus is needed on the use of terminology. A clear use of the terminology of climate change among landscape architects would enable us to form a common awareness of the issue. Such an awareness could lead to developing design principles of green spaces that meet the requirements of a changing climate.

Keywords: climate change, landscape design, public parks, technical terms, climate adaptation, climate awareness

APPEARANCE AND REALITY. THE AFTERLIFE OF SAXON BUILT HERITAGE IN ROMANIA

Csenge Fülöp[1]

[1] Department of Public Building Design, Faculty of Architecture, Budapest University of Technology and Economics, Budapest, Hungary
E-mail: fulopcsenge@edu.bme.hu

Background: The study examines the ever-changing character of cultural landscapes, with a focus on the relationship between the Saxon region, its local residents and external heritage protection organizations. The special status of the region comes from the Saxon villages and fortified churches listed as UNESCO World Heritage sites. However, as a large part of the Saxon population emigrated in the second half of the 20th century, the villages were reinhabited by Romanians, Romas and Hungarians. These communities are transforming the existing buildings according to their identity and way of life, often resulting in interventions of questionable quality. At the same time, several internationally funded projects are aiming to protect the built heritage and to safeguard and promote traditional Saxon values. In line with the expectations of outsiders and tourists, these village quarters show an idealized picture of the Saxon village, one of the harmonious, self-sustaining coexistence of man and nature, based on agricultural and livestock farming. It is an attempt to reconstruct and preserve the Saxon cultural landscape which, by definition, no longer exists in this form.

Materials and methods: The argumentation is based on qualitative research – it is a current and subjective cross-section of the architectural imprints of the changing cultural landscape, analyzing interventions of contemporary architecture as an indicator of interactions between current residents of the region, the existing environment and external interests. Investigations are based on field observations, case studies and theoretical research.

Results: The highlighted case studies of architectural interventions from this region are showing ways of sustainable (re)usage of the built and the natural environment, however, they are only unique examples of this kind.

Conclusions: The cultural landscape of the Saxon region is in a conflicting and fragmented condition, and with a past-oriented attitude, it is moving towards a museum-like, frozen state of some of the settlements, consequencing in alterations in land usage too.

Keywords: cultural landscape, sustainability, museumification, Saxon heritage, rural

---

THE LANDSCAPE EVOLUTION OF TRANSYLVANIAN MEDIEVAL ABBEYS

Nicholas Cantoni[1]

[1] IOSUD PhD Studies in Architecture, Faculty of Architecture and Urbanism, UTCN The Technical University of Cluj-Napoca, Cluj Napoca, Romania
E-mail: nickcantoni@yahoo.com

Background: The purpose of this study is to explain the way in which the natural landscape was transformed by implementing the architectural program of Transylvanian abbeys between the 18th and 15th centuries, as well as the ways by which today the ruins and the former domains of the monasteries can be restored and revitalized in a sustainable way.

Material and methods: The research methods of the study put into the foreground: the archive sources, the descriptions from historical chronicles, the architectural and landscape studies that talk about how medieval abbeys worked in general and those of Transylvania in particular, by comparing various suggestive examples in this territory (the abbeys of: Cârța, Igris, Acâș, Rodna etc) and some analogies with other examples from Western Europe.

Results: The results earlier of studies have shown that on Transylvanian territory the medieval monastic orders established here (Dominicans, Benedictines, Cistercians, etc.) changed the topography in order to adapt it in a new topology that met their basic social, spiritual, and economical needs. The monks consolidated the swamp lands, diverted the river courses, built irrigation channels for the agricultural lands and constructions that both altered the image and these inhabited areas, and ensured a proper functioning of the monastery as physical organism (the constructed landscape) and as institutional part of the Catholic Church.

Conclusion: Today, due to the disappearance of these monastic communities from the Transylvanian area and to the appearance of new ones (the village communities that have developed around these assemblies), there is an increasing need for sustainable recovery in terms of the conservation for these valuable sites. These can be developed and enhanced by rediscovering the operating mechanisms of the former assemblies and by their architectural and landscape revitalization.

Keywords: natural landscape, consolidation, sustainability, land, abbey, the monastery domain, transformations, constructions.

THE URBAN REGULATION LANDSCAPE IN TRANSYLVANIA AT THE END OF THE 19TH CENTURY AND BEGINNING OF THE 20TH CENTURY

Klaus Birthler[1]

[1] IOSUD Studii doctorale în arhitectură, Facultatea de Arhitectură și Urbanism, UTCN Universitatea Tehnică Cluj-Napoca, Romania
E-mail: klausbirthler@gmail.com

Background: This paper analyzes the attitude of the urban society of Transylvania, at the end of the 19 and early 20 century, toward the built and the future built environment. The interest for the subject is generated by the observation of differences of contemporary built environment compared to past times as a result of the culture of the society. The questions that this paper answers are: how much has contributed urban planning; regulation has contributed and contributes to urban landscapes; how public administration has changed and what has changed in the attitude of the society that makes up the urban landscape.

Materials and methods: The materials as primary resources are the urban planning regulations of the cities of Brașov, Mediaș, Bistrița and Gheorgheni between the end of the 19 century and the beginning of the 20 century. The regulations for Brasov and Medias are written in German gothic fonts, the originals were found at the Transylvanian Archives in Gundelsheim, Germany. The semantic analysis of the text of the regulations makes a significant contribution to understanding the attitude of society.

Results: The historical regulations were primarily aimed to assure the aesthetic aspect of the built environment as public interest as well as defending the rights of neighbours by the building permit.
Building policies for urbanization existed in Transylvania at least since the end of the 18th century.

Conclusions: Non-exhaustive but effective regulations well as simple public administration, were the main aspects that contributed to urban development in Transylvania cities, which are perceived today as harmonious. The law and conditions for drawing up a building permit, both in the past (end of 19th century) and today are regulated centrally, but there is a relatively high dose of local autonomy in the management of the built environment.

Keywords: historic urban regulation, Transylvania, urban landscape, society, built environment

---

WATER MANAGEMENT STRATEGIES FOR THE MUREȘ RIVER AND POCLOȘ STREAM, IN ORDER TO CREAT A GREEN-BLUE CORRIDOR IN TÂRGU MUREȘ MUNICIPALITY

Tăslăvan Marius Róbert[1]

[1] landscape architect, Absis Landscape Studio
E-mail: marius_robert93@yahoo.com

Background: Regarding the relief, the municipality of Târgu-Mureş (Municipiul Târgu Mureș) has an advantage that gives it uniqueness: only a few kilometers towards the four cardinal directions you can find plain, hill or mountain areas. The city is located on a topographically non-homogeneous surface. The Mureş River crosses and partially borders the urban area of the city for an approximate 9.1 km length. The town is crossed by 5 streams with their tributaries (Sărat, Pocloş, Budiului, Mureşeni and Cocoş streams). The artificial channel of the Turbine (Turbină), which is 1.6 km long, completes the city's hydrographic network. The most important tributary of the Mureş River from the administrative territory of the municipality is the Pocloş stream (pârâul Pocloș). The aim of the project is to find a solution through which we can create a sustainable and ecologically integrable blue-green corridor along the three watercourses of the city of Târgu Mureș, especially in the case of the Pocloș stream.

Materials and methods: The first significant regulation of the Pocloș stream took place during the mayorship of György Bernády in the first decades of the last century. Then the meandering Pocloș stream was somewhat regulated. Following the floods of the 1970s, the regulation of the Mureş river and Pocloș stream was discussed again. Subsequently, a number of studies have been published proposing water-regulating and reservoir basins around Livezeni and Corunca, including the Vațman and Sașvar streams. Plans and strategies developed over the past decades show that the watercourses that appear in the city's pattern are underused. It would be possible to create blue-green corridors, and the green lanes along the rivers would also adequately connect the parks and green areas adjacent to the waters. The constant flow of the Pocloș stream has not been resolved to date, nor has the case of uncontrolled waters flowing into watercourses.

Results: The chosen strategy consists in developing a green alignment along the course of the Pocloş stream, which would include the set-up of a cycle track. The arrangement of a protected wetland in the backwater of the Mureş river, the development of a recreational area in the Mureş loop, the construction of small artificial lakes on the valley of the streams, with non-permanent character, from the built-up area.

Conclusions: The aim is to reduce the effects of air pollution on the environment and the health of the population, caused by exhaust emissions from vehicles. Find a solution through which we can create a sustainable and ecologically integrable blue-green corridor along the three watercourses of the city of Târgu Mureș, especially in the case of the Pocloș stream.

Keywords: Târgu Mureș, Watercourses, blue and green corridors, green infrastructure, connecting green spaces

THE ROLE OF LINEAR PUBLIC SPACES IN THE DEVELOPMENT OF GREEN INFRASTRUCTURE - DEVELOPMENT STRATEGY OF GREEN INFRASTRUCTURE BY ENHANCING THE LINEAR PUBLIC SPACES IN THE MUNICIPALITY OF TARGU MURES

Szabó Beáta Csilla[1]

[1] Sapientia EMTE, „Ion Mincu" Doctoral School
E-mail: szabobeatacsilla@gmail.com

Background: The importance of green spaces is growing, both globally and in the EU, and nationally. In addition to the fact that green infrastructure has a beneficial impact on quality of life, it represents an important potential for urban development, bringing significant benefits. The global trend to develop green cities offers an opportunity to rethink economic and social development directions, and to change the way urban development is approached. Creating green infrastructures is an important tool for balanced urban development.
The aim of the research is to identify the optimal solution for creating the green infrastructure for the municipality of Târgu Mureș (Romania), by connecting large green spaces in urban and peri-urban areas with the help of linear green spaces in a way that contributes to increasing biodiversity, reducing pollution and bring important environmental, economic and social benefits.

Materials and methods: The proposed strategy is based on research of literature and documents published by the European Union on green infrastructure, a series of multi-criteria analysis of the existing situation, consultation of the community and of specialists in the field of ecology and urban planning in Targu Mures.
The analysis of linear public spaces aimed to identify public spaces that can be transformed into green infrastructure components. The materials used for the analysis were Google Earth Pro, Google Street View and QGIS applications. The main criteria of the analysis were vegetation cover and quality.

Results: On the basis of the data collected, a map of linear public spaces was drawn up, which underpins the proposed interventions formulated in a green infrastructure development policy, aimed at enhancing linear public spaces. With the help of the information collected during the literature survey, some of the most important environmental ecosystem services offered by the development of green infrastructure were quantified.

Conclusions: The proposed strategy is only one stage in the development of the green infrastructure of the Municipality of Targu Mures. It is also necessary to develop a strategy targeting specific green spaces and to link the green infrastructure strategy with a strategy targeting tourism, thus maximising the environmental, economic and socio-cultural benefits of green infrastructure.

Keywords: green infrastructure, urban planning, sustainable development, linear green spaces, ecosystem services

---

LAND ART - BORDER BETWEEN DREAM AND REVERIE

Irina Panțiru[1], Sonia Bors-Oprișa[2]

[1] Master degree, Department of Landscape Architecture, Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine, Cluj-Napoca, Romania
E-mail: pantiruirina96@yahoo.com
[2] Faculty of Horticulture, University of Agronomic Sciences and Veterinary Medicine, Cluj-Napoca, Romania

Background: Through the studies and researches carried out in this paper, we have tried to emphasize the general characteristics of the land art movement, the human-nature relationship and how land art projects can change the perception about the urban landscape; the link that is created between art, landscape architecture and this concept.

Material and methods: A site analysis, based on a series of photos, and a visual survey, was conducted in the USAMV Cluj-Napoca campus to highlight the best area for the projects implementation: an experimental forest. The land art structure, that symbolizes a gate, was constructed using natural materials collected from the forest, and the whole process was completed in 15 days.
The aim of the study was to integrate a land art structure in an urban landscape, and to assess the visual impact and atmosphere of the place in relation to the perception of the visitors.

Results: Following the centralization of questionnaires distributed to visitors, it was observed that most of the respondents have little knowledge of this concept,and few have ever seen such structures implemented on site. However, most of those who visited the place were pleasantly surprised by the project, confirming that landscape modeling and the integration of land art structures in nature offer a balanced atmosphere in a natural environment.

Conclusions: The land art movement isn't well known, and there are few structures of this type in Romania, known to the general public. However, people are open to spend time in nature and accept the idea of integrating structures made out of natural materials, integrated into an urban landscape. Following the study, it can be said that no clear boundary can be drawn between art, land art and landscaping; together they are part of a whole, the connection between these domains being an obvious and indestructible one.

Keywords: land art, landscape architecture, structure, forest, natural materials

MUSIC AND SOUNDS IN LANDSCAPE ARCHITECTURE

Lívia Vámosi[1]

[1] MSc student of Hungarian University of Agriculture and Life Sciences, Institution of Landscape Architecture, Urban Planning and Garden Art, Budapest, Hungary
E-mail: vamosi.liviablanka@gmail.com

Background: In this work the opportunities in the renewal of the Csajkovszkij park taking place in the 10th district of Budapest, in Kőbánya were explored. Starting off with the name and the current programme of the park highlighted by busts of romantic musicians, the open space concept integrated the musical theme. For the validation of this idea, the analysis of our work provides an overview of the relevant literature on the connection of music or sounds and landscape architecture.

Material and methods: This part of our work covers the topics of environmental psychological aspects of sounds in urban sites, principles and methods of soundscape design and assembles the possibilities in the visual representation of the music theme in open-space design. Our analysis was supplemented by a collection of 42 examples illustrated with pictures from Hungary and from abroad as well.

Results: Since this aspect of landscape architecture is not so well represented in the vernacular scientific literature, our goal was also to offer a Hungarian overview on this topic by translating and synthesizing the English sources. The literature research is touching the issues of sound preferences in open-space design, sounds role in place identity, and the application of soundscape design principles in landscaping, pavement and planting design or in choosing facilities and street furniture. In addition, it highlights the several opportunities of using water features and provides many examples of artistic installations, land art or interactive equipments connected to sounds and music.

Conclusions: Getting acquainted with the many opportunities and benefits, it became clear that paying attention to conscious soundscape design can add a relevant, rich layer to any open-space concept. Moreover, the sounds and music in our environment have effects on the perceptions of a place on so many levels that they could help efficiently to create more liveable places in the urban environment.

Keywords: soundscape design, literature overview, sound preferences, musical theme in landscape architecture, diplomawork

---

STUDY OF BLADE REEL LAWN MOWER

Zsombori Dániel[1], Pásztor Judit[2]

[1] National Salt Company S.A., Praid, Romania
E-mail: danielzsombori@outlook.com
[2] Department of Mechanical Engineering, Faculty of Technical and Human Sciences, Târgu Mureş, Sapientia Hungarian University of Transylvania, Cluj-Napoca, Romania

Background: In this paper we present a stand for the study of a lawn mower with blade reel. The aim of the paper is to draw attention to the lawn mower with blade reel and the importance of sharpening the cutting edges. We will present the advantages of this lawn mower and we will study the possibilities of determining the cutting forces, as well as the effect of sharpening the cutting edges on the cutting force.

Materials and methods: The lawn mower with blade reel cuts the plant by shearing, so the cut grass is healthier, has a smoother, greener surface and does not turn yellow after mowing. From a nature protection point of view, the lawn mowers can be characterized by the factor of the space of simultaneous action, this being the space in which the blades of lawn mower have an effect on the living world at the moment. This factor depends on the length, width and height of the lawn mower where the tarpaulin, cutters or vortex affects the life of the creatures. The higher this factor, the greater the danger the lawn mower can pose to affected lives. The calculated simultaneous action space factor of the lawn mower with a cylindrical blade reel is 0.0025 m^3/m.
In this study the shear force is determined from the propulsion motor of blade reel torque. For this we measured the current consumption of the motor. The torque was determined from the measured current consumption. We determined the cutting force for both sharp and damaged cutters. The results are as expected, the proportion of the cutting force of the damaged cutter compared to the sharp cutter is 28 ± 6%.

Results: The calculated simultaneous action space factor of the lawn mower with a cylindrical blade reel is the lowest compared to the lawn mowers in use.
The energy consumption of damaged cutters is 28% higher than the energy consumption of sharp cutters.

Conclusions: It is recommended to perform operational tests and to compare the mowed surface of the grass with the work of other lawn mowers.

Keywords: lawn mower, cylindrical blade reel, advantage, space of simultaneous action, energy consumption

EVOLUTION OF QUALITY PARAMETERS OF DIFFERENT LETTUCE (*LACTUCA SATIVA* L.) VARIETIES UNDER UNHEATED PLASTIC TUNNEL

Ágota Kovácsné Madar[1], Mária Takács-Hájos[1]

[1] University of Debrecen, Faculty of Agricultural and Food Sciences and Environmental Management, Institute of Horticultural Science, Hungary
E-mail: madar.agota@agr.unideb.hu

Background: Among the leafy vegetables, the lettuce is the most important species. Plastic tunnel can asure a positive effect on the yield and quality of vegetables. The relative chlorophyll content (SPAD value) of the plants can be monitored in order to follow the condition of the plants. During the springtime (low light intensity), the possibility of nitrate accumulation should be considered, which may greatly depend on the type of lettuce. This is the main reason to choose proper variety for given growing method.

Material and methods: The experiment was conducted at the University of Debrecen, Farm and Regional Research Institute Botanical and Exhibition Garden under unheated plastic tunnel (in spring of 2019 and 2020), on limestone chernozem soil. Transplants were planted out on 25 x 25 cm space. We measured the yield, plant condition (SPAD, NDVI), dry matter and nitrate content, as well as physical parameters of different lettuce types (heading type - King of May, Great Lakes659, non-heading type - Lollo Rossa, Lollo Bionda, Romaine lettuce).

Results: There is a strong correlation (r=0,719) between the head weight and stem length of the evaluated lettuce types. The highest head weight was detected by Great Lakes659 (373.97 g/plant) and Romaine lettuce (266.79 g/plant). Higher nitrate content (565.0 mg kg-1) was measured for lettuce types with intense green colour (Romaine lettuce), while lower values (425.50 mg kg-1) were measured for those with light green leaves (Lollo Bionda). The highest SPAD value (42.87) was measured for Romaine lettuce. Among the varieties, the highest dry matter content was also measured for Romaine lettuce (9.52%) and for Great Lakes659 (8.52%).

Conclusions: According to our results for lettuce production under unheated plastic tunnel the Great Lakes659 is succeeded with higher yield and dry matter content and lower nitrate accumulation. Among the non-heading types Lollo Bionda was preferable for this growing method.

Keywords: lettuce, spring, plastic tunnel, yield, nitrate, SPAD, NDVI

ASSESSMENT OF 1-TRIACONTANOL TREATMENT OF SWEETCORN (*ZEA MAYS* L. CONVAR. *SACCHARATA*) AIMING ITS SALT TOLERANCE IMPROVEMENT ON THE BASE OF A POT EXPERIMENT

Lucia Sinka[1], Mária Takács-Hájos[1], Györgyi Kovács[2], Géza Tuba[2], Arzu Rivera-García[2], József Zsembeli[2]

[1] University of Debrecen Faculty of Agricultural and Food Sciences and Environmental Management, Department of Horticulture
E-mail: sinkalucia@agr.unideb.hu
[2] Hungarian University of Agriculture and Life Sciences, Research Institute of Karcag

Background: Hungary can provide premium quality sweetcorn products due to its favourable climatic and soil conditions, and high level of the agrotechnology applied. Irrigation is practically essential for sweetcorn production as it has high water demand. There are certain areas in Hungary, which pedologically are suitable for sweet corn production, but have saline subsurface waters involving the risk of secondary salinization in case of irrigation. Since the demand for Hungarian sweetcorn products is indisputable and increasing consumption is expected in Europe, the extension of the sweetcorn production area onto the areas with less favourable agroecological conditions is recommended in a longer term.

Material and methods: In our research, salt stress of sweetcorn was induced by irrigation with saline water in a pot experiment. For this pot experiment, two sweetcorn hybrids (Tyson and Sweetstar) were selected on the base of the results of a preliminary experiment as they showed higher salt tolerance. 1-Triacontanol is known as having positive effect on the physiological and biochemical processes of plants grown under salty environment, therefore, we studied the possibility of the decrease of the negative effects of salt stress by applying this compound in various concentrations (3, 6, and 9 µM).
Some morphological parameters (plant height, raw biomass, root biomass), three parameters characterizing the photosynthetic activity of the plants (SPAD, NDVI, chlorophyll content), and proline content were determined in order to quantify the effect of 1-Triacontanol treatment on salt tolerance.

Results: According to the examined parameters, it could be conclude that Sweetstar hybrid had better salt tolerance than Tyson regarding all the studied parameters.

Conclusions: 3 µM dose of 1-Triacontanol treatment improved all the studied parameters of Sweetstar. In the case of Tyson, higher doses of the 1-Triacontanol treatments were more efficient.

Keywords: sweetcorn, salt stress, 1-Triacontanol, salt tolerance

JAPANESE GARDENS IN THE GERMAN SPEAKING SPACE

Maria, Bostenaru Dan[1]

[1] Department for Research, "Ion Mincu" University of Architecture and Urbanism, Bucharest, Romania
E-mail: maria.bostenaru-dan@alumni.uni-karlsruhe.de

Background: This paper is part of a larger research presenting Japanese gardens in Europe. Already an overview of the elements has been published, along with the European overview and an own design, and a paper on Japanese gardens in Romania, including an ontology for the research, has been submitted for publication. This paper gives an overview on the gardens in Germany along with an analysis of the plans and the design of an own plan.

Material and methods: The first research method was field research. Site visits and photographical investigation has been done. Specifically for this research, using the overview of the elements and the ontology developed in previous research, a space synthax analysis of the plans was done. The gardens in Vienna, Munich, Würzburg, Hamburg, and Karlsruhe were visited, and compared also to the Chinese gardens in Mannheim and Munich.

Results: The visited gardens were included on the story map on Japanese gardens in Europe, which is available under https://arcg.is/0vfXXK, completing previous research. Efforts were done to identify the landscape architects of the gardens. The typology of the gardens was investigated, in the German speaking space national and international garden exhibitions playing a role as important as for example botanical gardens in Romania.
On the other hand, from the analysis of the elements on the plans, according to ontology, a related garden plan was designed for Heidelberg. It is a garden with lake.

Conclusions: Japanese gardens are ambassadors in Europe and well suited for that temporary museum under the sky which are the garden exhibitions as they are for botanical and zoological gardens as living museums. Better knowing their elements through photographic survey, analysis of plans and systematization of the elements identified, for example through an ontology, can help design new gardens for the city.

Keywords: garden exhibition, garden design, far East, lessons learned, field survey

---

AN OVERVIEW OF URBAN PARK EVOLUTION IN ZHENGZHOU, CHINA

Yang Yang[1], Albert Fekete[1], Ruizhen He[2], DongGe Ning[1], Guifang Wang[1], Manshu Liu[1]

[1] Institute of Landscape Architecture, Urban Planning and Garden Art. Hungarian University of Agriculture and Life Sciences, Budapest, Hungary
E-mail: Yang.Yang@hallgato.uni-szie.hu
[2] Department of Landscape Architecture, College of Landscape Architecture and Art, Henan Agricultural University, Zhengzhou, China

Background: As critical green space and social space in cities, urban parks significantly improve the urban living environment and promote urban sustainability. Research on the development process of urban parks can be meaningful for cities to deal with the current problems and future directions faced by urban parks. This study aims to examine how urban parks evolved through time and how to optimize the development of urban parks in Zhengzhou, China.

Material and methods: We adopted the qualitative research method of empirical analysis to review Zhengzhou's urban park evolution from the perspectives of implementation approach, spatial layout, as well as function and service.

Results: After analyzing and summarizing relevant data, results reveal four progressive phases since the emergence of urban parks in Zhengzhou – the emergence phase (before 1978), the growth phase (1978-1996), the acceleration phase (1997-2012), and the promotion phase (after 2012) – based on city status and development opportunities. Then we investigate the evolution trend of urban parks according to the characteristics of implementation approach, spatial layout, and function and service in each phase.

Conclusions: The discussion suggests research and practice prospects learned from the advanced experience of domestic and foreign cities combined with the current development stage of Zhengzhou's urban parks, which is a basis for reasonable urban park policy, planning, and design. The findings may also provide some implications for formulating park development strategies in similar cities.

Keywords: Zhengzhou, Urban parks, Development phases, Evolution trend, Implementation approaches, Spatial layout, Function and service

THE EFFECTS OF LANDSCAPE PLANNING ON URBAN LANDSCAPES: A CASE STUDY OF BUDAPEST URBAN GREEN SPACES

Camila Andressa Pereira Rosa[1], Bárbara Mylena Delgado da Silva[1], Gabriel Silva Dantas[2]

[1] Doctoral School of Landscape Architecture and Landscape Ecology, Hungarian University of Agricultural and Life Sciences (MATE), Budapest, Hungary
E-mail: camilarosa.capr@gmail.com
[2] Department of Urban Planning, Faculty of Landscape Architecture and Urbanism, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary

Background: Urban landscapes can be described as a sub-division or type of landscape, which has been changing rapidly due to the ever-growing urbanization and advancements in technology. As a result, an imbalanced human-environment coexistence is becoming more evident, thus considering the city itself a landscape. Many are the elements composing the urban landscape. For this research, the study of surfaces and vegetation elements will be prioritized, focusing on urban green spaces (UGS). This paper addresses the relevance of landscape planning in urban landscapes, and how new projects are responding to the increasing challenge of making cities greener and healthier.

Material and methods: The study focuses on landscape architecture projects executed in Budapest, Hungary. Based on relevant literature review, field assessment, satellite imagery analysis, historical evaluation and empirical research of selected UGS in the city, it aims to collect data from the case studies in order to better understand what have been their impacts on the urban landscape.

Results: By analyzing and comparing the selected sites in Budapest and its surroundings, it can be observed that by restoring or creating new UGS based on landscape planning strategies, there can be an increase of social, economic, and environmental values.

Conclusions: This preliminary research indicates that urban landscapes, in general, accommodate abounding improvement possibilities. Furthermore, having more quantity and quality UGS can help combat urban ill and improve life quality (Wolch, Byrne & Newell, 2014), besides promoting healthier and more resilient ecosystems.

Keywords: Urban landscapes, urban green spaces, landscape planning, urban health, cityscapes, Budapest

---

THE MICROCLIME THICK EFFECTS OF HOSPITAL GARDENS

Vera Takácsné Zajacz[1], Flóra Szkordilisz[2]

[1] Institute of Landscape Architecture, Urban Planning and Garden Art, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary
E-mail: Takacsne.Zajacz.Vera@uni-mate.hu
[2] Hungarian Urban Knowledge Centre, Budapest, Hungary

Background: The increasing urbanization of the past decades resulted severe effects and changes in the quality of the urban environment, degrading human well-being and also resulted health issues and increased mortality due to heat stress, air pollution, etc.
In order to plan and build livable cities, the environment of urban people must be improved. The urban environment is primarily determined by the appropriate microclimate and the proportion of biologically active areas.

Material and methods: The examination of several gardens of different types of hospitals in Budapest was made using numeric micro-climate simulation tools.

Results: This research demonstrates, the effectiveness of each landscape planning tool through a concrete example, and demonstrate the type and extent in affecting microclimate. The measured tools improve human comfort and contribute to the creation of healthy environment in the city.

Conclusions: The results of our studies are supported by a number of researches and works carried out in the past. Our results could help designers to make a preliminary forecast of the impact that the intervention could have on the micro- climatic conditions of the design site. The forecasts and simulations that we make, could help a cost-effective planning taking in account the micro-climatic conditions.

Keywords: urban microclimate, hospital gardens, ecosystem services of urban green infrastructure

READING SYMBOLS IN JAPANESE GARDENS

Peter Gyori[1], Albert Fekete[2]

[1] Doctoral School of Landscape Architecture and Landscape Ecology, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary
E-mail: petergyori@gmail.com
[2] Department of Garden Art and Landscape Techniques, Faculty of Landscape Architecture and Urbanism, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary

Background: There is a growing interest in Japanese culture, including horticulture. We were able to read the first time about the design and rules of Japanese gardens in detail in the works of the British architect Josiah Conder at the turn of the 19-20th century. Information on the subject is available through a number of channels and is becoming increasingly accessible. During our research, we managed to find and organize nearly five hundred English-language publications (books and journal articles) dealing with the history and art of Japanese gardens. Most of the publications contain descriptions and presentations of the formal elements, without exploring the religious messages and philosophies that influence horticulture. Because of this, the intellectual content is more important besides theJapanese garden's rich palette of artistic images and forms, that are thus pushed into the background. The aim of the research is to interpret and present the religious symbols and references found in Japanese gardens, to categorize their appearance by taking into account their unique characteristics, their role in the garden, which contributes to a deeper apprehending and understanding of the form-shaping approach.

Material and methods: By presenting the religious aspects of the elements in the monastery and tea gardens involved in the research, their garden historical aspects and everyday functions also become visible.

Results: The monastic gardens presented by this study are closely linked to the practices of the religious community that maintains the monastery. The tea gardens connection to religious aspects, on the other hand, is not so visible, yet there is a strong reference to Buddhism, or Shinto. These aspects can be found in the individual elements and also in the whole garden. The elements do not serve a purely aesthetic purpose, as with their spatial appearance, they constantly are refering to the teachings of a given religion, aspects of its practice for those who are able to read it.

Conclusions: In the absence of pre-training and prior knowledge, the garden image can only reveal the visible form for us, thus the message from which the form has arisen, is lost. The visitors must have prior knowledge about the aspects that create the form, so that not merely the visible, but that the content and the message can also be perceived. Otherwise, the garden's space can be presented purely as an exhibited object, with the help of an exhibition guide. Through the examples presented in the research, we can see that the people living in the monastery may be able to transform the forms that cannot be decoded for others, into a living space both religiously and practically.

Keywords: garden art, japanese garden, buddhism, forms, symbols, sacrality

---

A CASE STUDY ON THE POTENTIAL OF PUBLIC INVOLVEMENT IN GREEN SPACE DEVELOPMENT, REFLECTING TO ARNSTEIN'S LADDER OF CITIZEN PARTICIPATION

Andrea Keresztes-Sipos[1], Albert Fekete[1], Péter I. Balogh[1]

[1] Department of Garden Art and Garden Design, Institute of Landscape Architecture, Urban Planning and Garden Art, Hungarian University of Agriculture and Life Sciences (MATE)
E-mail: keresztessiposandrea@gmail.com

Background: Green space development is a complex planning and implementation process which, without proper communication and cooperation, often leads to unexpected conflicts and obstacles to implementation. Social involvement and its various instruments can make a significant contribution to the success of development. However, community involvement is always difficult because it requires a lot of preparation, and even then there are many complaints. Nevertheless, experience shows that there are social and physical benefits of working with the community, the landscape architect being a key player. The development of relationships and trust between the actors, the clear and understandable presentation of technical processes, and the needs and suggestions of the residents who follow the specific development as local guides, all help to make the project a success.
In this article, a specific form of public involvement, which is increasingly used in green space development, the community planning and its possibilities, processes and tools are presented through a case study.

Material and methods: I describe the whole process of the case study project and the tools of public involvement from the initial idea to the completion of the construction. I draw on materials from interviews, internet and municipal data collection (e.g. satisfaction surveys) and review the literature on public involvement and its levels.

Results: As a synthesis of the development project, I will present the project phases, their associated tools and actors in a complex table comparing them with Arnstein's Ladder showing the level of involvement.

Conclusions: The result of the research can be seen as a synthesis table for the project itself, but the correlations that emerge from it (e.g. What level of involvement is achieved in a community planning process? Which actors should be involved in which project phases?) have both theoretical and practical use.

Keywords: landscape architecture, green infrastructure, community planning tool, project phases, levels of involvement

IN ACCORDANCE WITH THE LANDSCAPE UNDERSTANDING THE PLACE

Anna Benkő[1]

[1] Pagony Garden and Landscape Architecture Studio, Budapest, Hungary
E-mail: benkoanna.la@gmail.com

Background: In the planning process of an open space, knowledge of the place provides the base for further steps of design and helps the place to fulfill its role. The aim of this work is to encourage the reinterpretation and to highlight the importance of analysis.

Materials and methods: Studies and works on design theory and personal, on-site experiences form the framework of this study. The Place is determined by its geological location – from which its natural endowment arises – and also determined by the era – how the society formed by the landscape projects its own reflections back to the Place. These reflections can be the architectural environment, the typical use, events of the past, traditions and it can carry the direction of future development in the form of the emerging needs in society. In the course of a responsible design process we attempt to make a connection between the values of past and future generations.

Results: Cognition of a Place commences in a superior perspective and narrows to microword-scale, along the personal impressions of the observer. A part of the understanding is to search and recognize on-site impressions such as compositions, rhythms, patterns, materials, motifs, atmospheres, and traditions that could serve later as design tools to make connections with the existing base by continuing, emphasizing, enhancing, repeating or making contrast with them.
Due to these conscious or instinctive links, places formed this way are self-identical. They could fulfill their role in certain natural and social contexts. Besides that they are well-functioning, they cover the needs of open-space-users, and follow the fundamental aesthetic principles, they are also in union with their surroundings and past. They are recognizable even from their details, and arouse associations in the observer.

Conclusions: When these links have an – unnoticed or detected – impact on the user, then accordance comes about.

Keywords: analysis, impression, understanding, interpretation, planning theory

---

THE IMPACT OF TRADITIONS ON THE GARDEN DESIGN: PERSIAN GARDEN AS A CASE STUDY

Abuhayya Mahmoud[1]

[1] Dept. of Garden Art and Landscape Techniques, Faculty of Landscape Architecture, Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungary
E-mail: Mahmooed@gmail.com

Background: The aim of this work was to investigate the effects of traditions on the garden design and their elements.

Material and methods: In this work a qualitative research methodology, a descriptive-analytical approach, and a case study method was used. The books were used to define the meaning of tradition and what is considered a tradition for any people. By investigating the Persian garden as a case study, the researcher will explore the main traditions of the people of Persia, and then find the meaning of the traditions that may be reflected in the garden. A Persian garden was analyzed using maps, garden layout, and photos to find links between the design process and tradition.

Results: Evidences that people's traditions influenced the garden design as appeared in the case study of Persian garden.

Conclusions: People's traditions can influence the design process of gardens and the element used in them, as well as the way they are combined.

Keywords: Garden History, Garden design, Garden Elements, Traditions, Persian Gardens.

POSTERS

MEADOW PHYTOCENOSES ON THE TERRITORY OF THE CARPATHIAN BIOSPHERE RESERVE, VEGETATION CHANGES UNDER THE INFLUENCE OF TRADITIONAL MANAGEMENT

Mykola Voloshchuk[1]

[1] Ph.D., researcher, head of Botanical Laboratory Carpathian Biosphere Reserve, Ukrain
E-mail: voloschuk.mi@gmail.com

Background: As a result of a centuries-old traditional management in the Ukrainian Carpathians, on the large areas were formed meadow phytocenoses, which led to a change of vegetation, and namely to decrease of forest cover.
Studies were done at the meadows located on the lands with permanent traditional management and, for a control, under the conditions of cessation of anthropogenic influence on the territory of the Carpathian Biosphere Reserve.

Materials and methods: Phytocoenotic studies were performed according to generally accepted methods. On the trial plots in different ecological conditions were studied the stages of vegetation digression, the dynamics of succession processes in meadow phytocenoses, the state of natural regeneration of forests, the distribution and condition of rare meadow plants and plant communities.

Results: Under study were lowland floodplain meadow-swamp complexes - association Junco-Molinietum caeruleae Preising 1951, and mountain meadows in the forest belt – associations Agrostio-Festucetum rubrae Csuros et Rosmerita 1960, Deschampsio-Festucetum rubrae Sapegin 1986, Anthoxantho odorati-Agrostietum tenuis Sillinger 1933.
After the cessation of economic activity, for 20 years of observations there was noted an intensive spread of woody and shrubby plant species. These successional changes lead to the displacement of populations of rare meadow plant species: *Arnica montana* L., *Centaurea carpatica* Porc., *Gymnadenia conopsea* (L.) R.Br*, Trollius europaeus* L.*, Platanthera bifolia* (L.) Rich., *Narcissus angustifolius* Curt., *Dactylorhiza sambucina* (L.) Soo, *Dactylorhiza majalis* (Rchb.) P.F.Hunt et Summerhayes, *Iris sibirica* L.
In meadow phytocenoses, where some types of traditional management are performed (annual haymaking, moderate grazing, fertilizers, clearing of undergrowth of tree and shrub species), the described associations do not undergo significant changes, populations of rare meadow species are in stable condition.

Conclusions: Support of traditional types of management is an important environmental measure aimed at conservation of the unique meadow phytocenoses, which are the places of growth of a significant number of rare plant species. In the meadows of the Carpathian Biosphere Reserve, it is necessary to maintain such a way of traditional management, in which these meadow phytocenoses were formed.

Keywords: meadow phytocenoses, traditional management, associations, successions, Carpathian Biosphere Reserve.

ASSESSMENT OF THE AGRICULTURAL LANDSCAPE AS PLANNING TOOL

Necsulescu (Popa) Andreea[1]

[1] Department of Urban Design and Landscape Planning, Faculty of Urban Planning, University of Architecture and Urbanism Ion Mincu, Bucharest, Romania
E-mail: apopa.uauim@gmail.com

Background: The paper presents the results of several studies concerning the agricultural landscape assessment for various Romanian municipalities and communes, made in order to substantiate urban development plans. The study outlines main methodological steps for the agricultural landscape assessment and emphasizes the importance of its constitutive elements that should be further preserved or can indicate landscape dynamics and transformation.

Materials and methods: The study, compares different landscape assessment conclusions for several cities in Romania and outlines that the common landscape resource is generated by different elements (build and natural/ productive), not only the heritage/ cultural landscape. Also, one of the conclusions of this survey is that productive landscape is one of the main development resources that can substantiate development decisions at urban level, but despite that, it is the most transformed element due to urban development pressures. In accordance with present development trends, the study outlines the main features that can characterize an agricultural landscape and the main transformations that affected Romanian landscapes. Those features can be object of the urban development plans in terms of agricultural landscape preservation and valuation.

Results: In accordance with present development trends, the study outlines the main features that can characterize an agricultural landscape and the main transformations that affected Romanian landscapes. Those features can be object of the urban development plans in terms of agricultural landscape preservation and valuation.

Conclusions: A very important aspect of the agricultural landscape at territorial level is its economic value – being in the same time society's functional environment, a cultural, historical and economical context and further development resource – spatially expressed at territorial level. The paper wants to outline the main development principles that should be included in urban development policies in order to preserve the main agricultural landscape features and functions, especially nearby big cities.

Keywords: agricultural landscape; productive landscape; economic landscape; assessment; constitutive elements; preservation

THE RELATIONSHIP BETWEEN THE VITALITY AND AGE OF EVERGREENS IN THE COLLECTION GARDEN OF THE JOHN VON NEUMANN UNIVERSITY IN KECSKEMÉT

Tímea Kiss[1], Károly Ecseri[1],

[1] Department of Horticulture, Faculty of Horticulture and Rural Development, John von Neumann University, Kecskemét, Hungary
E-mail: kiss.timea@kvk.uni-neumann.hu

Background: In our research, we aimed to compare the bonitation value and the state of growth of the evergreen taxa found in the nearly 50-year-old collection garden of the John von Neumann University with the data found in the literature.

Material and methods: During the survey, Radó's bonitation values were used to characterize the health status of the plants. Furthermore, their age was also estimated by determining the trunk diameter. The obtained values were compared with the data of the relevant source works.

Results: The results of our survey show that the values for the state of development approached the data in the literature for those taxa at which the environmental conditions are optimal and have good vitality.

Conclusions: More than 50% of the evergreen taxa found in the collection garden lagged behind the results of previous surveys. The reason for this may be that the number of plants per unit area is high, thus the individual environmental factors (light, nutrients) are scarce for individuals.

Keywords: evergreen taxa, bonitation value, age of tree, sustainability, health status, health of tree

---

FLOWERING DYNAMICS OF *CYANUS SEGETUM* IN LIGHT OF ENVIRONMENTAL PARAMETERS

Károly Ecseri[1], Péter Honfi[2]

[1] Department of Horticulture, Faculty of Horticulture and Rural development, John von Neumann University, Kecskemét, Hungary
E-mail: ecseri.karoly@kvk.uni-neumann.hu
[2] Institute of Landscape Architecture, Urban Planning and Ornamental Horticulture, Hungarian University of Agriculture and Life Sciences

Background: In our research we investigated the sustainability of *Cyanus segetum* in an archaeophyton seed mixture and the effect of temperature and precipitation on the generative stage of this species.

Material and methods: We studied the phenological stages of cornflower as a part of an archaeophyte seed mixture by bonitation in an open field microparcel experiment. The number of inflorescences was measured over 8 vegetation periods and compared with two environmental parameters (amount of heat and amount of precipitation).

Results: The species bloomed between the second decade of June and the second decade of July every year. The most intense ornamental value and the longest period of decoration were experienced in the year of sowing. Close fit was observed in the regression analysis between the flowering dynamics and the heat sums.

Conclusions: In light of our results, it can be concluded, that *Cyanus segetum* is permanently present in this artificial synusium and plays a dominant role in these associations.

Keywords: cornflower, heat sum, ornamental value, archaeophyton, wildflower

SUSTAINABLE COLLECTION GARDEN IN THE GREAT PLAIN - AN AGE ESTIMATION OF THE JOHN VON NEUMANN UNIVERSITY DENDROLOGICAL COLLECTION

Károly Ecseri[1], Tímea Kiss[1]

[1] Department of Horticulture, Faculty of Horticulture and Rural development, John von Neumann University, Kecskemét, Hungary
E-mail: ecseri.karoly@kvk.uni-neumann.hu

Background: In our research, we surveyed the trees of the collection garden of the Faculty of Horticulture and Rural Development in Kecskemét. The aim of the study was to determine the sustainability of the stock, and in the light of the data we tried to draw conclusions about longer-term application possibilities of each taxon in the Great Plain.

Material and methods: As the original planting documentation is also available, we also identified the surveyed specimens. In addition, we were able to determine the age using two methods: the time of planting and the trunk diameter. We also compare these two methods in our work.

Results: Of the 461 individuals surveyed, 171 were identified on the 40-year-old landscape design sheets. 51 % of the originally planted trees can also be found in the area in 2020. Based on trunk diameters, 50% of the plants are 30-year-old or younger, while the range of 41-49 years contains 17 specimens.

Conclusions: Based on our results, it can be stated that the age estimation based on the trunk diameter is inaccurate in several cases, as the trunk thickness of trees is strongly influenced by biotic and abiotic environmental factors. At the same time, the plant selection of our ancestors and their professional maintenance activities are praised by the fact that half of the trees planted in the 1970s can still be observed and serve to broaden the plant knowledge of horticultural engineering students.

Keywords: trunk diameter, green area, age of trees, stress tolerance, arboretum

---

ASSESSMENT OF VISUAL QUALITIES AND IMPACTS IN LANDSCAPE BY PERCEPTION ATTRIBUTES AND PREFERENCE

Cai Xuecheng[1]

[1] Department of Landscape Protection and Restoration, Faculty of Landscape Architecture and Urbanism,Hungarian University of Agriculture and Life Sciences
E-mail: chercaicai@gmail.com

Background: The changes and development of the landscape will directly or indirectly affect the aesthetic value and visual amenity of the landscape. The aim of this study was to assess the landscape quality and visual impacts by involving the judgment of different participants.

Material and methods: This study used the quantitative research method to evaluate the visual quality and visual impacts in a waterfront landscape, mainly through objective statistical analysis of the survey data and feedback of participants.

Results: Participants' preferences are diverse and interesting, but some factors determine their judgment and rating. In general, the living environment of the participant (urban and rural area), the extent (visual zone, vegetation cover, accessibility), and the state of landscape scenic (the qualities of facilities and land use) will affect the visual evaluation results.

Conclusions: Evaluation of public perception and preference help us to better understanding the attitudes and concerns from the receptors from different interest groups. It also provided a beneficial reference to decision-makers and future improvements.

Keywords: landscape evaluation, landscape visual quality, visual impact assessment, public participation, multivariate analysis

COMPARISON OF INNER CONTENT OF SOME PROMISING TOMATO VARIETY

Nour Al-Hadidi[1], Júlia Pálóczy-Bakonyiné[2], Zoltán Pap[3], Noemi Kappel[1], Katalin Fekete[1]

[1] Department of Vegetable and Mushroom Growing, Hungarian University of Agriculture and Life Science, Budapest, Hungary
E-mail: noorhadidi_1992@hotmail.com
[2] Horticultural engineer, BSc senior student of Hungarian University of Agriculture and Life Science, Department of Vegetable and Mushroom Growing, Budapest ,Hungary
[3] Control Union Hungaria Kft, Budapest, Hungary

Background: The importance of small berry weight type tomato is remarkable nowadays. However, yield can be lower than normal tomato yield, the taste of berries represents higher quality. Many people look for and request it in marketplaces.

Material and methods: In this study four special tomato varieties were compared in terms of berry physical parameters and instrumental attributes at the Hungarian University of Agriculture and Life Science. Special varieties meant some new commercial cherry tomatoes in the description of higher sugar content with two shape types (plum, and normal global shape berries). Besides total soluble solids and acid content measured parameters are water-soluble antioxidant capacity (FRAP), total polyphenolic content, and lycopene-content.

Results: Cultivation techniques have a fundamental influence on the antioxidant capacity of tomatoes, but the variety has an effect of higher sugar content and higher total soluble dry material content. From the previous studies, tomatoes usually have 4-6 Brix total water soluble dry material content, but in this study, all tomatoes included higher Brix values, and acid content was also higher. Antioxidant assays should be used parallel to overcome the selectiveness of certain methods. A positive correlation between FRAP and lycopene content was confirmed by instrumental analytical studies.

Conclusions: It can be observed that, high quality type tomatoes usually higher in sugar, but dependent on varieties, the dry material content can be different. The antioxidant capacity of berries is really similar, but the correlation between FRAP and lycopene content is noticeable.

Keywords: Tomato variety, Yield, Berries, Sugar content, Antioxidant capacity, Total polyphenolic content, Lycopene content, Dry material content

---

EVALUATION OF COMMON NUTRIENT DEFICIENCIES IN PRIMROSE (*PRIMULA ACAULIS*)

Martin Iakab[1], Dorottya Szabó[1], Artúr Botond Csorba[2], Katalin Molnár[1], János Bálint[1]

[1] Department of Horticulture, Faculty of Technical and Human Sciences, Târgu Mureş, Sapientia Hungarian University of Transylvania, Cluj-Napoca, Romania
[2] Doctoral School in Biology and Sport Biology, University of Pécs, Faculty of Sciences, Hungary
E-mail: balintjanos@ms.sapientia.ro

Background: Nowadays the outdoor and greenhouse ornamental plant production is a very important horticultural sector. The cultivation of ornamental plants is determined by weather factors, cultivation technology, resistance to pests, and the effectiveness of plant protection. For successful cultivation, we have to know the properties of the growing medium, the nutrient requirements of the plant, the amount and proportion of nutrients. The optimal vegetative development and growth of plants, flower differentiation, flowering intensity and durability are significantly influenced by the nutrients supply of the plant. Under appropriate nutrient conditions, the plant will be healthy, resilient and durable.

Material and methods: During the study, Primrose deficiency symptoms were examined under controlled greenhouse conditions. Seedlings were grown in perlite, irrigated with complete and deficient nutrient solutions to provoke symptoms of nutrient deficiency. One of the macro- and micro-nutrients was missing from the deficient nutrient solutions. However, we also examined the effect of different pH and sodium toxicity of the growing medium on plant development.

Results: Plants irrigated with clean water and with nitrogen deficient nutrient solution showed the earliest developmental disturbance. These plants appeared visibly weaker than the control in both vegetative and generative terms. However, in plants irrigated with potassium deficient nutrient solution, chlorotic symptoms appeared early on the old leaves and flowering was also delayed. Over time, the plants were completely destroyed. During cultivation, some microelements deficiency symptoms were less pronounced, one possible explanation for this being that the rooting medium was not removed when the seedlings were put into the perlite, and this may have contained small amounts of microelements.

Conclusions: The roots in the perlite developed well, and the moisture was kept well by the growing medium, so this method can be excellent for the long-term study of deficiency symptoms. In accordance with our objectives, it was possible to take appropriate pictures of the deficiency symptoms. The experimental protocol is suitable for monitoring the deficiency symptoms of additional plants, keeping in mind that it is worth removing the rooting medium at planting.

Keywords: Primrose, *Primula acaulis*, nutrient deficiencies, nutrient disorders, sodium toxicity

EFFECTS OF ACCELERATED AGING AND PRIMING WITH ASCORBIC ACID, L-CYSTEIN AND TRIACONTANOL ON GERMINATION OF RAPESEED (*BRASSICA NAPUS* L.)

Molnár Katalin[1], Bíró-Janka Béla[1], Nyárádi Imre-István[1], Bálint János[1], Fodorpataki László[2], Bartha Csaba[1], Marcel-Matei Duda[3]

[1] Department of Horticulture, Faculty of Technical and Human Sciences, Târgu Mureş, Sapientia Hungarian University of Transylvania, Cluj-Napoca, Romania
E-mail: molnarkati@ms.sapientia.ro
[2] Hungarian Department of Biology and Ecology, Babes-Bolyai University, RO-400084 Cluj-Napoca, Romania
[3] Faculty of of Agriculture, University of Agriculture and Veterinary Medicine, Cluj-Napoca, Romania

Background: The present study was conducted to invigorate the deteriorated rapeseed (*Brassica napus* L.) seeds (under artificially accelerated aging by exposure to 41ºC and 90% RH for 72 h) by seed priming with ascorbic acid (10 mM), L-cysteine (10 mM) and triacontanol (1 µM) in two rapeseed hybrids (Hybrirock and Factor, both provided by KWS).

Material and methods: The seeds were dried at 35 ºC for 6 hours in an air-dryer, in order to reduce seed moisture to 10-14%. Subsequently, the seeds were incubated for 72 h in an aging chamber at 41ºC and a relative air humidity of 90%. Aged seeds were soaked for 1 h at 24 ºC in solutions of ascorbic acid (10 mM), L-cysteine (10 mM) or triacontanol (1 µM). Control seeds were treated with tap water. Primed seeds were adjusted to the initial seed moisture by air-drying at 35 ºC for 6 hours.
The samples were randomly selected to examine the effects of accelerated aging on seed quality. Germination was carried out in Linhard vessels under laboratory conditions (20°C, 75% relative humidity, 16 h photoperiod). Four replicates were set for every experimental variant, each with 30 seeds.

Results: Germination tests were performed to examine seeds quality. The results demonstrated that priming significantly improved the quality of seeds of both hybrid rapeseeds. Results concerning biomass production indicate that the average weight gain in the examined hybrids is the lowest in the control, while the highest increase in weight was registered when seeds of the "Hybrirock" hybrid were pretreated with triacontanol. The results also revealed that that use of ascorbic acid, L- cysteine for priming also enhanced seed germination and seedling growth.

Conclusions: The results may be used to rank seed lots by vigor, and decisions can be made regarding the storability or planting potential of each seed lot.

Keywords: seed priming, seed enhancements, germination, seed ageing, rapeseed, ascorbic acid, triacontanol, L-cystein

---

SUSTAINABLE AND PRESERVATIONAL HISTORICAL GARDEN MANAGEMENT

Ildikó Réka Báthoryné Nagy[1], Krisztina Bálint[1]

[1] Faculty of Landscape Architecture, Budapest, Hungarian University of Agriculture and Life Sciences
E-mail: b.krisztina1900@gmail.com

Background: The purpose of this paper is to examine the sustainable and preservative management of historical gardens, and to explore specific preservative and sustainable landscape management methods. The investigated methods focus on green spaces with practical solutions based on ecological and economical approaches.

Material and methods: The research is essentially based on literature, which has been synthesized to define a methodology for field studies It relies on case studies of historical gardens affected by restoration projects, where maintenance tasks have increased significantly following the restoration. Based on the experiences of the restoration works, the most important maintenance tasks in these gardens can be prioritised. Thereby, the focus of the research is on the management of the spatial structure, that is technological alternatives for the maintenance of woods and grassland. These were analysed by the management zones, which could be defined mainly by historical structure, among other aspects.

Results: The results of the research on the one hand are the development of the methodology and its structure. On the other hand, the partial results of the study based on this methodology are highlighting the aspects of grassland management.

Conclusions: The conclusions that can be drawn at this stage of the research clearly indicate that the subject is worthy of further investigation. The results obtained so far demonstrate the effectiveness of sustainable management technologies, which will provide opportunities for scientifically based, practical applications in the future.

Keywords: historical garden, sustainability, management, maintenance, preservation

THE EFFECT OF DIFFERENT SUBSTRATE ON THE MORPHOLOGICAL CHARACTERISTICS OF HUNGARIAN *TAGETES PATULA* CULTIVARS

Máté Ördögh[1]

[1] Department of Floriculture and Dendrology, Institute of Landscape Architecture, Urban Planning and Garden Art, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary
E-mail: ordogh.mate@uni-mate.hu

Background: *Tagetes patula* cultivars are annuals with several flower colors and aromatic, glandulous leaves. Hungarian cultivars (bred by Zoltán Kováts) produce bright, durable flowers in large quantities and tolerate unfavorable conditions. The aim of this trial was to find the optimal substrate for germination and growing of 'Robuszta Kénsárga', 'Vénusz' and 'Tigris' cultivars.

Material and methods: At the beginning of May, seeds (120 piece per cultivar) were sown into plug trays filled with sand, peat and 50-50% mixture of them. Each groups contained 40 seeds according to substrates.
At the end of May, germinated specimens were replanted into plastic pots measuring 10 cm over (with the same substrates). Until planting out to open field, young plants were grown in polytunnel without heating, artificial lighting, fertilization. Germination and survival ratio, plant height, root length, flower number and diameter were measured.

Results: Almost all seeds (except few individuals) germinated successfully without reference to the substrate or cultivar. The highest surviving was around 80% in the case of 50-50% peat + sand, and the lowest (50%) when plants grown in pure sand. The latter substrate resulted in the longest roots (especially in the groups of 'Tigris') and all cultivars (particularly Vénusz') reached the lowest height with the use of this soil. On the other hand, peat effected the shortest roots, tallest specimens, most flowers of every cultivar. In case of flower number, there were significant differences between 'Tigris' (with average 58-70 flowers) and the other two types (23-39 flowers), irrespectively of the substrates. 'Vénusz' developed the smallest flower heads (maximum 3.5 cm) in every case; the other cultivars produced at least 4 cm inflorescences.

Conclusions: Overall, the lowest surviving, growing and flowering values experienced with the use of sand and the best results on peat. As an adequate and cheaper option, a mixture of them also suitable.

Keywords: *Tagetes*, cultivars, sowing, flowering, substrate

THE REALM OF THE BOXWOOD HEDGE – THE BAROQUE MONASTERY GARDEN IN JASOV

Melinda Nagy[1], Pavol Balázs[1]

[1] Department of Biology, Faculty of Education, J. Selye University, Komárno, Slovakia
E-mail: nagym@ujs.sk

Background: The Monastery of Premontre in Jasov, Slovakia was a significant ecclesiastical centre of the historical Abaúj-Torna county. The monastery building was rebuilt by the provost Andrej Sauberer in Baroque style around 1760, and then the Baroque monastery garden was created. This garden has undergone relatively few alterations, retained its original style, and some species then considered exotic can still be found today.

Material and methods: The monastery garden is encircled by tall hornbeam trees that form a long row of trees surrounding the geometric French-style parterres. The back of the park is enclosed by a winter garden with a sundial on the façade. The gardener took advantage of the symmetry of the dynamic forms typical of Baroque-style horticultural works, manifested in the breaking of individual lines, rounding corners, the plastic shaping of the terrain, and planting flowers ornaments, and the division of space into smaller units. The exploitation of lights and shadows makes the interior of the garden even more varied.

Results: The monastery gardens, including those of Jasov, were part of the lives of those living there. Cultivated crops and ornamentals have changed rapidly, depending on the needs and fashion, and material resources. However, the woody plants planted due to their aesthetic value – the dendroflora – determine the look of the garden for several decades or even centuries. Therefore, the presentation is limited to describing the species of dendroflora, their history, and the current state of specific species.

Conclusions: In addition to native species (littleleaf linden, English yew), common park trees (Oriental arborvitae and boxwood), Jasov also has exotic species (tuliptree and maidenhair tree). Today, boxwood, which is the base of Baroque gardens, has been biologically threatened. The box tree moth (*Cydalima perspectalis* Walker 1859) appeared in Europe from Asia. Without effective intervention, damage can override the physiognomy of the garden.

Keywords: Baroque style, historical garden, monastery garden, Jasov, Slovakia

CHROMOSOME STUDIES ON SUBPOPULATIONS OF *DIANTHUS ARENARIUS* L. *SENSU LATO*, FROM FENYŐFŐ NATURE RESERVE

Zsófia Kovács[1], Jelena Mlinarec[2], Mária Höhn[1]

[1] Hungarian University of Agriculture and Life Sciences, Institute of Agronomy, Department of Botany, Budapest, Hungary
E-mail: zsofia.kovacs42@gmail.com
[2] University of Zagreb, Faculty of Science (PMF), Department of Division of Molecular Biology, Zagreb, Croatia

Background: The pine forest of “Fenyőfői Ősfenyves” Nature Reserve is the only known habitat of the sand carnation (*Dianthus arenarius*) in Hungary. The species area extends along the Nordic Sea, thus Hungarian relict populations are highly isolated. According to cytological studies by Baksay dating from 1970 the Hungarian specimens from Fenyőfő similar to the Nordic ones are tetraploids (2n=60). A close relative of *D. arenarius* is *D. serotinus* which is endemic species of the sand area of the Pannonian basin. This species is hexaploid (2n=90). Sympatric occurrence of the two species have been reported formerly from the Fenyőfő area. Based on morphological trait variation the two species are hardly distinguishable therefore ploidy level need to be determined in order to map *D. arenarius* subpopulations. Performing a cytological study our aim was mapping the current distribution of the *Dianthus* cytotypes in the Fenyőfő pine forest area and to confirm the presence of the tetraploid specimens.

Material and methods: Seeds were collected from four subpopulations from Fenyőfő and for reference data Nordic population from Latvia was also included in the analysis. Cytotypes of 42 individuals from Fenyőfő and 20 individuals from Latvia were determined. Chromosome numbers in root tip cells in mitotic metaphase were counted using ice-cold pretreatment and classical squash method.

Results: Our results revealed that all investigated individuals from Fenyőfő subpopulations are exclusively hexaploids, compared to the Latvian population, where all individuals are proved to be tetraploids.

Conclusions: Polyploidization in the genus *Dianthus* is a common phenomenon, and provides increased genomic flexibility and ecological adaptation. Our study indicates possible rapid polyploidization or introgression in the subpopulations of Fenyőfő, but the drivers of the changes need further investigations.

Keywords: chromosome count, *Dianthus*, endangered plant, ploidy level, sand carnation

Acknowledgement: This research was supported by the ÚNKP-20-3-II. New National Excellence Program of the Ministry for Innovation and Technology from the source of the National Research, Development and Innovation Fund.

INDEX OF AUTHORS

Y

W

„George Emil Palade" University of Medicine, Pharmacy,
Science and Technology of Târgu Mureş
38 Gheorghe Marinescu Street, Târgu Mureş, 540139, ROMANIA
Telephone: +40-265-21 55 51; fax:+40-265-21 04 07

abmjournal@umfst.ro
www.abmj.ro