

11th Student Conference on Conservation Science, Balatonvilágos 2026

*SCCS Europe - Connecting Eastern and Western Europe
in conservation biology*

*Balatonvilágos (Lake Balaton), Hungary
01 – 05 September 2026*

ABSTRACTS



*Eds: B. Zsinka, G. Süle, A. Báldi
HUN-REN Centre for Ecological Research
<https://sccs.ecolres.hu/>*

Background of the Conference

The Student Conference on Conservation Science series started in Cambridge and have expanded with Brisbane, Beijing, Bangalore and New York.

SCCS is the largest international conference in conservation science, where students and early career scientists are welcomed and have the chance to present their research, learn from each other and meet with experts of the field who can offer them guidance in their future careers.

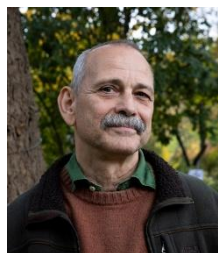
In 2015, Hungary joined this inspiring event and organizes a conference, especially for young scientists from all around Europe to build a network among the presented parts of the continent.

Keynote Speakers at the SCCS Europe 2026



Raphaël Arlettaz is the head of the Division of Conservation Biology at the University of Bern. He works primarily on societally relevant biodiversity conservation and restoration issues, adopting a problem-solving approach. His main research focus is on the population biology of rare and endangered animal species (insects and vertebrates – amphibians, birds, bats, carnivores

and ungulates) of temperate, Mediterranean and Alpine biomes and on community ecology (plants and animals) of agro-ecosystems and Alpine ecosystems (grasslands, vineyards, fruit tree plantations, forests, treeline habitats and floodplain rivers). All his research projects aim to bridge the still wide chasm that exists between science and practice, with the overarching objective to render conservation action more efficient in the real world.

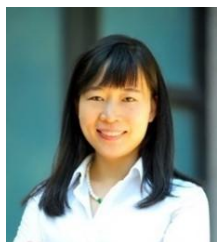


Tibor Standovár is an associate professor and department head at the Department of Plant Systematics, Ecology and Theoretical Biology, Institute of Biology, Loránd Eötvös University in Budapest. His major research interest is in biodiversity conservation in forests. He has led and participated in several projects

on studying tree stand and vegetation dynamics of untouched forest reserves, patterns, causes and consequences of large-scale ice and wind disturbances in managed forests and on the effects of tree stand structures on the occurrence of forest-dwelling species (herbs, birds, xylophagous beetles). In the past two decades his interest has turned into more applied topics in collaboration with national parks and forestry companies including the development of monitoring schemes to assess forest naturalness.



Tamara Mitrofanenko is working as an expert in the field of regional sustainable development as part of the team of the United Nations Environment Programme, Office in Vienna, Secretariat of the Carpathian Convention and at the University of Natural Resources and life Sciences, Vienna (BOKU), Institute of Landscape Development, Recreation and Conservation Planning (ILEN). Her work has been largely focused on Central and Eastern Europe, and the Caucasus countries. Her PhD Thesis was focused on “Integrating approaches from the Intergenerational field into protected area management and regional development governance”. Since learning about the importance of transdisciplinary approaches for sustainable regional development, she has devoted her efforts to integration of transdisciplinary approaches into academic systems and policy processes as well as science-policy-practice interface in the context of sustainable regional development, as well as Education for Sustainable Development.



Huan Li is a senior research fellow at the HUN-REN Balaton Limnological Research Institute (BLKI) in Tihany, Hungary, where she leads research in satellite remote sensing and environmental informatics applied to aquatic systems. Her work uses Earth observation satellites and machine learning to monitor water bodies across a wide range of scales — from reconstructing four

decades of phytoplankton dynamics in Lake Balaton using Landsat imagery to retrieving sea ice thickness in Antarctica and tracking water storage changes across major river basins worldwide. A particular focus of her research is recovering long-term ecological records from historical satellite archives, revealing environmental change at timescales and spatial extents that field surveys alone cannot reach. Alongside her research, Li Huan develops open, interactive monitoring tools using Google Earth Engine,

making satellite-derived water quality data freely accessible to scientists, water managers, and the broader public.



Agnieszka Wypych is an associate professor in climatology at Jagiellonian University in Krakow and works also in the Institute of Meteorology and Water Management - National Research Institute which serves as National Weather Service in Poland. Her main research fields cover climatology, hydroclimatology and GIS in environmental sciences while the current research interests are mostly weather extremes as well as climate change and variability and its impact on the environment and the society. She is currently a head of Human-Environmental Systems Research Centre at Jagiellonian University and also a chair of the Commission on Climatology International Geographical Union.

Plenary Talks at the SCCS Europe 2026

From Ecology to Conservation and Restoration Biology: Another Gap to Bridge?

Raphaël Arlettaz

The scientific production, notably the publication of peer-review articles, has been increasing dramatically over time in all scientific domains, including conservation biology and restoration ecology. At the same time, biodiversity erosion continues unabated, with a few exceptions. I will present some outstanding case studies from the research carried out by my lab which have led to tangible benefits for flora and fauna in real contexts. Thereby, I'd like to demonstrate that research that is from the onset conceived and designed not only following scientific golden standards but also with a clear recognition of the needs of the end-users – with a real intention to make results translated into conservation, restoration and management recommendations in practice – can make a difference for biodiversity.

Approaches to Assess Forest Naturalness

Tibor Standovár

Forests have been identified as playing a vital role in preserving Europe's biodiversity. It is hypothesised that natural forests represent the primary reservoirs of original biodiversity. Nevertheless, a harmonised European methodology aimed at estimating forest naturalness is still absent. This presentation provides a concise overview of the notion of forest naturalness and the primary methodologies employed for its evaluation. To provide concrete examples, three distinct projects that aim to assess forest naturalness in Hungary at varying spatial scales will be introduced. The talk will also address the strengths and weaknesses of the various approaches.

Water from Above: How Satellites Are Changing the Way We Monitor Aquatic Ecosystems — and What Lake Balaton Can Tell Us

Li Huan

Earth observation satellites offer something no field campaign can: the ability to monitor lakes, rivers, and wetlands continuously, across decades, at planetary scale. In this talk, I will introduce the principles behind satellite-based water quality monitoring — what sensors measure, how machine learning translates raw reflectance data into ecologically meaningful information, and what the approach can and cannot tell us about aquatic ecosystems.

I will draw on case studies from across the conservation community showing how satellite data is already being used to address real conservation challenges — tracking deforestation and habitat loss, mapping wetlands for migratory bird assessments, monitoring coral reef bleaching, and detecting illegal fishing activity. These examples show how tools originally developed for Earth science are increasingly finding their way into biodiversity conservation practice.

I will then bring the story home to Lake Balaton, on whose shores we are meeting. Using four decades of Landsat imagery combined with machine learning, we have reconstructed the long-term history of phytoplankton dynamics in the lake, revealing patterns of eutrophication and recovery with direct relevance to conservation and water management.

Linking Biodiversity, Pastoralism, and Cultural Heritage: Carpathian Convention the International Year of Rangelands and Pastoralists 2026

Tamara Mitrofanenko

Pastoralism is a traditional practice that shapes landscapes while supporting biodiversity, rural livelihoods, and the transmission of cultural heritage across generations. In the Carpathians, it has long played a central role in maintaining mountain landscapes, biodiversity, and rural

communities, while sustaining diverse habitats, traditional knowledge, local livestock breeds, and cultural identities. Despite its continued importance, pastoralism—particularly mobile pastoralism—faces growing challenges arising from rural depopulation, land fragmentation, changing land-use patterns, and restrictions on pastoral mobility. Addressing these challenges requires, among other approaches, finding a balance between extensive grazing practices and nature conservation objectives. In this context, the Carpathian Convention Secretariat is implementing the project "Linking biodiversity, pastoralism, and cultural heritage through education for sustainable development (ESD) in the Carpathian Region" to better understand the relationship between biodiversity conservation and pastoralism and to address the challenges faced by pastoralist communities within the broader framework of biodiversity and sustainable development governance.

The Carpathians in a Warmer World: Climate Change and Its Environmental Consequences

Agnieszka Wypych

The Carpathians are already experiencing significant climatic changes, including rising air temperatures, shorter and less reliable snow seasons, shifts in precipitation patterns, more frequent droughts and an increasing occurrence of extreme weather events. Owing to their complex topography and strong elevational gradients, these changes are not uniform across the mountain range and may produce highly variable local effects.

The presentation will provide an overview of observed and projected climate change in the Carpathians and examine its consequences for the mountain environment. Particular attention is given to changes in snow cover, water availability, river flow, soil moisture and the frequency of disturbances such as floods, windthrow, wildfire and insect outbreaks. Examples from forests, mountain grasslands, wetlands and freshwater

ecosystems illustrate how climatic processes influence habitat conditions, ecosystem functioning and species distributions.

The presentation will also consider how climate impacts interact with land-use change, forest management, river regulation and habitat fragmentation. These interactions may either increase ecosystem vulnerability or strengthen resilience. In line with the Science for the Carpathians Research Agenda 2022–2030, the talk will highlight the need for improved climate monitoring, regional projections, long-term ecological observations and adaptation measures that support natural processes, ecological connectivity and water retention. Understanding these linked climatic and environmental changes is essential for developing effective conservation strategies for the Carpathian region.

Workshops at the SCCS Europe 2026

Is Your Research Relevant for Practice?

Raphaël Arlettaz

I would like to propose an innovative workshop which necessitates an active participation of several conference attendees selected for talks or posters by the conference organisers. On the base of the abstract booklet and of an on-the-spot assessment of the talks and posters delivered during the conference, the idea would be to pick up some presentations, ask the students to join the workshop (and possibly summarise again their main findings with just a few slides) and jointly discuss the case studies in plenum. We will, first, assess where the paper positions itself along a gradient spanning from basic / applied ecology, on the one end, towards conservation biology / restoration ecology, on the other. The underlying assumption is that the latter research is more amenable to delivering practical guidelines for biodiversity preservation and recovery, although management solutions might not be framed concretely enough for proper takeover. Second, we shall try to collectively appraise the various research outcomes presented from the viewpoint of all potential end-users and see whether they deliver the information needed for proper implementation. To assist with workshop preparation, all participants in the conference will be asked, already when registering online, whether they would be ready to contribute to the workshop with their own research (serving as illustrative cases). This means they should be ready to face collective but constructive criticism. The objective is definitely to try to ameliorate research approaches in conservation biology and restoration ecology to enhance the chances of actual implementation of mitigation measures for biodiversity in the real world.

Monitoring of the Conservation Status of Forests

Tibor Standovár

The monitoring of the conservation status of forest habitats of community interest is a task that falls to all EU member states. Nevertheless, the methodologies employed in the production of country reports are not universally compatible, which can give rise to significant methodological challenges when conducting European-scale assessments and trend analyses. In this workshop, students are invited to present and discuss the monitoring methods employed in their respective countries. The objective of this initiative is twofold: firstly, to identify and address the challenges associated with interpreting the data; and secondly, to explore strategies for the effective utilisation of monitoring data to enhance the conservation status of forests.

Monitoring Ecosystems from Space: An AI-Assisted Introduction to Google Earth Engine

Li Huan

Google Earth Engine (GEE) gives researchers free access to decades of global satellite imagery and the computational power to analyse it at scale — but using it requires programming in JavaScript. This workshop explores a practical and increasingly popular shortcut: using AI tools such as ChatGPT to write, run, and debug GEE code, making satellite analysis accessible even to those without a programming background. After a short introduction to what satellite remote sensing can offer conservation science, participants will work in groups of 5–6 on a hands-on task of their choice: mapping wetland or lake extent changes, tracking vegetation loss or recovery, or monitoring water quality from space. Each group will use ChatGPT (or other AI platforms) to generate GEE code, run the analysis, and interpret the results. The session closes with a short group presentation and a discussion of what the satellite results actually tell us — and what they do not. Can one image represent a trend? What

ecological processes might explain the patterns we see? And what additional data would be needed before these results could inform a real conservation decision?

No prior programming or remote sensing experience is required. Participants will need a laptop, a Google account, and a registered GEE account (free registration at earthengine.google.com; approval typically takes 1 day–1 week — participants will be asked to register before the conference).

Carpathian Day: Developing Communication and Policy Recommendations for Linking Biodiversity and Sustainable Regional Development

Tamara Mitrofanenko, Julian Skórski

In celebration of Carpathian Day 2026, with its theme "Carpathian Pastoralism: Where Nature and Culture Meet", aligned with the International Year of Rangelands and Pastoralists (IYRP2026), the workshop will explore approaches to strengthen science-policy-practice interface and awareness raising for sustainable regional development. Following a brief introduction, in the framework of the Carpathian Convention's cross-sectoral work on Education for Sustainable Development (ESD), participants will work in groups to tackle a real-world challenge: balancing biodiversity conservation with traditional pastoral livelihoods - via science communication and policy recommendations. Each group will draw on participants' expertise and the provided background information to actively co-create actionable policy recommendations and awareness-raising materials designed for different target groups, including local community actors and governmental officials.

Speaking Science to Power: Communicating Science for Impact and Transformative Change

Eva Slavova, Pensoft Publishers

Communicating science clearly to decision-makers is an essential skill for early-career researchers (ECRs). Science-informed decisions serve everyone's interest.

This interactive workshop draws on the Horizon Europe project TRANSPATH and its open-access Action Guide, combined with hands-on expertise from the project's communication partner. Participants will explore storytelling, message framing, and audience adaptation, along with formats like policy briefs, media interviews, social media, and visual content, building the skills to turn research into messages that drive real-world impact.

Awards SCCS Europe 2026

Best Talk Awards

- Giulia De Luca: *"Evaluating the Effect of Soil Tillage Intensity and Land-Cover Change on Arbuscular Mycorrhizal Fungi"*
- Małgorzata Śliż: *"Urban Lawn Management for Insect Conservation: Effects of Different Mowing Regimes on Orthoptera and Bee Communities"*
- Sarolta Szilágyi: *"Comparison of the Effects of Continuous Cover Forestry and Rotation Forestry Management on Understorey Vegetation in Hungarian Native Forests"*
- Sandra Abele: *"Factors Influencing the Occurrence of the Red-backed Shrike (*Lanius collurio*) in Energy Wood Piles in the Vidzeme Region, Latvia"*
- Bálint Pacsai: *"Lessons of Patience – from a Geophyte"*

Best Poster Awards

- Virág Németh: *„Flower resources, urban cover, and nesting material drive the use of bee hotels in Budapest”*
- Attila Bíró: *„Transition from rotation to continuous cover forestry promotes structural and compositional diversity in European beech and oak-dominated forests”*
- Emília Illés: *"IUCN Green Status assessment of the endemic blind mole rat species of the Pannonian Basin"*

The awards comprised of a free publication opportunity in Nature Conservation Journal from Pensoft and book prizes from Pensoft and the HUN-REN Centre for Ecological Research.



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Bernadett Zsinka – Lendület Ecosystem Services Research Group, HUN-REN Centre for Ecological Research

Brigitta Palotás - Lendület Ecosystem Services Research Group, HUN-REN Centre for Ecological Research

Talks and Posters

of the

11th SCCS Europe

Balatonvilágos, Hungary

01 – 05 September

2026

Talks

Breeding Under Pressure: How do Anthropogenic and Environmental Stress Impact Shorebird Reproductive Traits?

Agnese Cecchin¹, András Liker^{2,3}, Tamás Székely^{1,4,5}

1 HUN-REN-DE Reproductive Strategies Research Group, Department of Evolutionary Zoology and Human Biology, University of Debrecen, Hungary

2 HUN-REN-PE Evolutionary Ecology Research Group, University of Pannonia, Veszprém, Hungary

3 Behavioral Ecology Research Group, Center for Natural Sciences, University of Pannonia, Veszprém, Hungary

4 Milner Centre for Evolution, Department of Life Sciences, University of Bath, United Kingdom

5 Department of Ethology, Eötvös Loránd University, Budapest, Hungary

Shorebirds occupy some of the world's most delicate and threatened landscapes, such as wetlands and grasslands, increasingly reshaped by human activity and extreme climatic fluctuations. Still, how these underlying pressures alter their fundamental breeding traits remains poorly understood across species and populations. In this study, we aimed to investigate whether environmental variation (e.g. ambient temperature, precipitation, latitude, seasonal and annual variations), as well as anthropogenic disturbance and phylogeny influence life history traits, behaviour and traits related to the species' ecology, focusing on egg size, clutch size, incubation period, and reproductive output. We targeted multiple shorebird species spanning over multiple populations across the world, using field data collected over the years by numerous collaborators, to assess the impacts of climate, geography, and human footprint in shaping reproductive trait variation, and to reveal whether populations under greater anthropogenic pressure show increased changes over their breeding strategies. Understanding the adaptation dynamics of these

delicate species can help us highlight strength and weaknesses to address for species conservation in our rapidly changing world.

Habitat Suitability and Hotspots of Breeding Waterbirds in Central Asia Using Ecological Niche Modelling

Ahmed Awad^{1*}, Saltanat Saduakas¹, Grant C. McDonald², Ákos Bede-Fazekas^{3,4 §}, Tamás Székely^{1,5 §}

1 HUN-REN-DE Reproductive Strategies Research Group, Department of Evolutionary Zoology and Human Biology, University of Debrecen, Debrecen, Hungary

2 Department of Zoology, University of Veterinary Medicine Budapest, Budapest, Hungary

3 HUN-REN Centre for Ecological Research, Institute of Ecology and Botany, Vácrátót, Hungary

4 ELTE Eötvös Loránd University, Institute of Geography and Earth Sciences, Department of Environmental and Landscape Geography, Budapest, Hungary

5 Milner Centre for Evolution, Department of Life Sciences, University of Bath, Bath, United Kingdom

**Corresponding author: ahmedawad@mailbox.unideb.hu*

§These two authors contributed equally to this work as co-last authors.

Global declines in waterbird populations highlight the need to identify and protect suitable breeding habitats. Central Asia supports high waterbird diversity, yet breeding habitat suitability across this vast region remains poorly understood. We modeled the breeding habitat suitability of 21 waterbird species using Maximum Entropy (MaxEnt) models based on occurrence records and environmental predictors describing climate, topography, vegetation, proximity to water bodies, and human disturbance. Kernel density estimation was used to identify breeding hotspots. Suitable habitats varied among species, covering 2–8.5% (6,534–27,804 km²) of Central Asia. Habitat suitability was heterogeneous, with the most suitable areas concentrated in the southwest. Predicted suitability was positively associated with historical population estimates from Wetlands International ($r = 0.43$, $p < 0.05$, $n = 19$ species). Hotspot analyses revealed clustered distributions in southeastern and

southwestern Central Asia. Core-use areas, represented by the 10% utilization distribution, ranged from 1,369 to 56,363 km² among species. These findings identify priority conservation areas and support species-specific conservation and long-term monitoring programs for waterbirds in Central Asia.

Lessons of Patience – from a Geophyte

Bálint Pacsai, Vivien Lábadi, Judit Bódis

Institute for Wildlife Management and Nature Conservation, Hungarian University of Agriculture and Life Sciences, Keszthely, Hungary

A large number of plant species are known to be able to enter a state of prolonged dormancy as a means of conserving energy or a way of survival during unfavorable conditions.

In our study we were monitoring two populations of a dormancy-prone species, *Fritillaria meleagris* between 2017 to 2025 in Hungary. We followed the life of the plants at an individual level in order to understand the underlying mechanisms of population-level trends.

In most years, nearly half of the *F. meleagris* populations were dormant at both sites, and longer dormancies were also frequent. Some plants emerged from dormancy after at least eight years. Both juvenile and adult plants went into dormancy in high rates, but juvenile plants became dormant only for shorter periods. Disturbances (prolonged inundation during vegetation period) caused quick changes in dormancy trends which might be a way of response of the species to such challenges. To assess mortalities (to study population-level trends), we analysed convergences of dormancy trends for each year and site separately, although this could only be done at least four years after the census.

Uncovering the life cycles of species with such long dormancy periods and understanding their demographic dynamics is only possible through long-term studies.

Behavioural and Attitudinal Determinants of Chemical Insecticide Use Among Farmers and Home Gardeners: Implications for Pollinator Conservation

Brigitta Juhász, Zoltán Tóth

Department of Zoology, Plant Protection Institute, HUN-REN Centre for Agricultural Research, Martonvásár, Hungary

Pesticide use is recognised as a major driver of pollinator decline, yet little is known about the behavioural factors that influence insecticide-use decisions among plant growers. Understanding these drivers is essential for developing effective pollinator-conservation strategies and reducing pesticide exposure. We surveyed Hungarian farmers and home gardeners to investigate factors associated with insecticide use, identify behavioural profiles related to purchasing decisions, examine predictors of insecticide-use patterns, and characterise insecticide-user networks. A total of 170 farmers and 502 home gardeners participated in the survey. Chemical insecticide use was common among farmers, whereas 54.4% of home gardeners reported no use of the investigated insecticides. Latent class analysis identified two distinct farmer groups. “Cautious buyers” (38%) placed high importance on pollinator safety, product usability, consultant recommendations, and application timing, whereas “conventional buyers” (62%) generally placed lower importance on these factors. Our findings indicate that pollinator-friendly behaviour is associated not only with environmental attitudes but also with distinct decision-making strategies.

Socioeconomic Determinants of Tolerance Towards Coyotes in Monterrey, Mexico and the Role of Media in the Perceptions of People

Charlotte Needham, Mariela Morales

Anglia Ruskin University, Cambridge, United Kingdom

In this presentation we will explore the socioeconomic and socioecological complexities associated with wildlife management in the modern day. In recent years, technological advancements have resulted in the era of humans, more commonly known as the Anthropocene. The main signposts of the Anthropocene today are urban expansion, rural abandonment, environmental degradation and socio-economic divide. It is important to consider these factors when we look at human-wildlife interactions and how they are shaped.

The presence of carnivores like coyotes in Monterrey, Mexico, can be subject to controversy due to people's perceptions of these animals. With an increasing number of encounters, we research people's perceptions in Monterrey of coyotes, the socioeconomic background of the city and how social media presents the encounters between humans and coyotes. The objective of this study is to elaborate on how more accurate science communication programs can be implemented through social media.

Local Perceptions of Human-Brown Bear Coexistence in Covasna County

Gergő Varga¹, László Kónya², Mihály Zoltán³, Tibor Hartel²

1 Doctoral School of Integrative Biology, Faculty of Biology and Geology, Babeş-Bolyai University, Cluj-Napoca, Romania

2 Faculty of Environmental Science and Engineering, Babeş-Bolyai University, Cluj-Napoca, Romania

3 Department of Sociology, Faculty of Sociology and Social Work, Babeş-Bolyai University, Cluj-Napoca, Romania

Many studies have examined perceptions and attitudes toward large carnivores to assess human-wildlife conflict and conservation strategies. This study focuses on an Eastern European rural landscape characterized by high brown bear density and frequent everyday human-bear encounters. It explores how local residents interpret, experience, and respond to bear presence within their own social-ecological context and aims to identify recurring patterns across everyday encounters, landscape use, local narratives, ecological perceptions, tourism, institutional responses, and future expectations. The analysis is based on 32 semi-structured interviews. The results show that bear presence has become part of everyday local life. Respondents described changes in feelings of safety and nature use, including the reduced use of forests for traditional activities. Their attitudes were ambivalent: fear and insecurity coexisted with respect, curiosity, cultural attachment, and recognition of bears as part of nature. Participants proposed a combination of regulation, population management, education, prevention, habitat protection, and local cooperation, while their expectations for the future remained largely uncertain. Within the limitations of the sample, the thematic analysis offers insight into how local communities experience the practical, cultural, and institutional challenges of living alongside brown bears. Despite these

conditions, many residents remain open to coexistence and express nuanced views rather than taking a categorically negative stance.

Evaluating the Effect of Soil Tillage Intensity and Land-Cover Change on Arbuscular Mycorrhizal Fungi

Giulia De Luca¹, Péter Batáry¹, János Balogh²

1 Institute of Ecology and Botany, HUN-REN Centre for Ecological Research, Vácrátót, Hungary

2 Institute of Agronomy, Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungary

Arbuscular mycorrhiza (AM) is a widespread plant-fungal symbiosis that provides key ecosystem services, such as improved soil structure, enhanced plant stress tolerance and nutrient retention. Agricultural intensification with serious soil disturbance and conversion of natural habitats to arable land limit AM establishment and functioning. However, reported effects are inconsistent and likely moderated by factors, such as vegetation, soil type, and climate. Here, we conduct a systematic review to enable two separate meta-analyses quantifying the effects of soil tillage intensity and land-cover conversion on AM fungi (AMF). Interventions contrast reduced or no tillage versus conventional tillage, and conversion of natural habitats to arable land; outcomes are root colonization rate, AMF species richness and spore density, capturing indicators of function, diversity, and abundance. The systematic review on soil tillage intensity yielded more than 100 publications after full text filtering, while the review on land-cover conversion is in progress. Upon completion, we will extract data to compute log response ratios as effect sizes, and fit meta-analytic models including the above-mentioned moderators. Our synthesis will clarify context-dependent AMF responses and guide management.

Sex-specific Physiological Costs of Reproduction in the Collared Flycatcher: Correlative and Experimental Evidence

Gyula Szabó^{1,2,3}, Gergely Hegyi^{1,4}, Gergely Nagy^{1,5}, János Török^{1,4}, Miklós Laczi^{1,4}

1 Behavioural Ecology Group, Department of Systematic Zoology and Ecology, ELTE Eötvös Loránd University, Budapest, Hungary

2 Doctoral School of Biology, ELTE Eötvös Loránd University, Budapest, Hungary

3 Lendület Ecosystem Services Research Group, Institute of Ecology and Botany, HUN-REN Centre for Ecological Research, Vácrátót, Hungary

4 HUN-REN-ELTE-MTM Integrative Ecology Research Group, Budapest, Hungary

5 Evolutionary Ecology Research Group, Institute of Ecology and Botany, HUN-REN Centre for Ecological Research, Vácrátót, Hungary

Life-history theory predicts a trade-off between current reproductive effort and self-maintenance, yet the physiological mechanisms mediating this trade-off remain poorly understood. We experimentally manipulated brood size by reducing and enlarging broods in a wild collared flycatcher (*Ficedula albicollis*) population and examined how parental haematocrit, an indicator of oxygen-carrying capacity and energetic demand, responded to altered brood size. Haematocrit responded in a sex-specific manner: males rearing enlarged broods had significantly higher haematocrit than females. These experimental results do not align with correlative findings from the same population, where lower male haematocrit during nestling rearing was associated with larger broods, while in females there was no such relationship. The two analyses address two distinct biological phenomena: one examines natural among-individual variation, the other a plastic physiological response to an experimental manipulation. This implies that the relationships observed on the basis of natural variation do not necessarily reflect the same physiological mechanisms as those elicited

by an experimentally induced change. These findings also indicate that the physiological effects of parental effort are sex-specific.

Scale-Dependent Patterns of Plant Diversity in Hungarian Forest-Grassland Mosaics

Indri Puspitasari¹, László Erdős^{2,3,4}

1 University of Szeged, Doctoral School of Environmental Sciences, Szeged, Hungary

2 University of Debrecen, Department of Ecology, Debrecen, Hungary

3 HUN-REN-DE Functional and Restoration Ecology Research Group, Debrecen, Hungary

4 Lendület Seed Ecology Research Group, Institute of Ecology and Botany, HUN-REN Centre for Ecological Research, Vácrátót, Hungary

Understanding how habitat type and spatial scale jointly shape plant diversity is essential for revealing biodiversity patterns and guiding conservation in forest-steppe ecosystems. We studied eight habitat types across nine sites in the Kiskunság Sand Ridge, Central Hungary. Plant diversity was quantified using species richness, Shannon diversity, Simpson diversity, and Pielou's evenness at plot, site, and regional scales. Habitat edges consistently supported the highest species richness and maintained high Shannon and Simpson diversity across all spatial scales, suggesting that edge effects extend beyond the plot scale to broader spatial levels. Forest interiors and grasslands showed scale-dependent patterns: forests had higher species richness than grasslands at the regional scale, similar richness at the site scale, and lower richness at the plot scale. Open grasslands exhibited high evenness at all scales, resulting in relatively high Shannon and Simpson diversity despite low richness. These findings highlight habitat edges as multi-scale biodiversity hotspots and demonstrate strong scale dependence in diversity patterns. Using multiple diversity metrics provided complementary insights into community structure relevant for ecological research and conservation planning.

Effects of Mowing and Management Heterogeneity on Grassland Arthropod Communities

Lili Korsoveczky^{1,2}, Márton Szabó^{1,2}, Nikolett Gallé-Szpisjak¹, Attila Torma³, Tomáš Hamřík⁴, Fulton Kitt¹, Róbert Gallé^{1,5}

1 MTA – HUN-REN “Lendület” Landscape and Conservation Ecology, Institute of Ecology and Botany, MTA–HUN-REN Centre for Ecological Research, Vácrátót, Hungary

2 Biology Doctoral School, Hungarian University of Agricultural and Life Sciences, Gödöllő, Hungary

3 Department of Ecology, University of Szeged, Szeged, Hungary

4 Department of Forest Ecology, Faculty of Forestry and Wood Technology, Mendel University in Brno, Brno, Czech Republic

5 MTA-SZTE ‘Lendület’ Applied Ecology Research Group, Szeged, Hungary

Grassland management, particularly mowing, strongly influences arthropod communities, but the importance of management heterogeneity remains unclear. We investigated the effects of mowing and homogeneous versus heterogeneous management on the species richness and abundance of Orthoptera, true bugs, spiders, and carabid beetles in Hungarian grasslands. Arthropods were sampled by sweep netting and pitfall trapping across three regions, and data were analysed using generalized linear mixed-effects models. Refuge areas supported significantly higher richness and abundance of vegetation-associated taxa, especially true bugs, vegetation-dwelling spiders, and carabid beetles. In contrast, ground-dwelling spiders were more diverse and abundant in mown areas, while Orthoptera showed no significant responses. Overall, mowing had a stronger effect than management heterogeneity, whose direct and interactive effects were generally weak. Our results highlight the importance of retaining unmown refuge strips within managed grasslands to support arthropod biodiversity.

Nomadic Traditions and Sustainable Tourism: Pastoralism as a Tool for High-Mountain Conservation in Kyrgyzstan

Magdalena Pustoszkin

University of the National Education Commission, Krakow, Poland

High-mountain ecosystems are increasingly threatened by global climate change and uncontrolled tourism development. This study evaluates traditional nomadic culture and sustainable tourism as drivers for environmental protection in Kyrgyzstan, where 93% of the territory is mountainous. The primary geographical focus is placed on the regions surrounding lakes Son-Kul and Issyk-Kul, where qualitative field observations were conducted in 2025. Through this approach, an investigation is made into how traditional land-use practices interact with broader environmental sustainability goals. The results indicate that Kyrgyz nomadic heritage - characterized by seasonal transhumance, equestrian tourism, and temporary yurt settlements - represents a low-impact ecological model that does not permanently alter the landscape. By integrating local pastoral communities into the ecotourism sector, these practices generate sustainable income while actively preventing the degradation of fragile mountain ecosystems. Ultimately, this research demonstrates that preserving indigenous nomadic pastoralism serves as an effective, community-based strategy for biodiversity preservation, offering a valuable comparative framework for sustainable high-mountain management globally.

Urban Lawn Management for Insect Conservation: Effects of Different Mowing Regimes on Orthoptera and Bee Communities

Małgorzata Śliż^{1,2}, Zuzanna Migas¹, Karol Wałach³, Hubert Brol³, Joanna Kajzer-Bonk³

1 Behavioural Ecology Team, Institute of Environmental Sciences, Faculty of Biology, Jagiellonian University, Kraków, Poland

2 Doctoral School of Exact and Natural Sciences, Jagiellonian University, Kraków, Poland

3 Department of Invertebrate Evolution, Institute of Zoology and Biomedical Research, Faculty of Biology, Jagiellonian University, Kraków, Poland

Climate change, urbanisation, and biodiversity loss are among the most pressing challenges for conservation science. Cities are often perceived as biodiversity-poor environments. However, urban greenery can support insect conservation when managed properly. We tested the effect of different lawn mowing regimes on two insect groups. We focused on Orthoptera and bees which are closely associated with grasslands and play key roles in ecosystems as primary herbivores and pollinators, respectively.

The study was conducted at the 3rd Campus of the Jagiellonian University in Kraków, Poland, in a large-scale field experiment with over 60 plots under different mowing regimes. Orthoptera were surveyed monthly from June to August 2025, and bees from June to September 2025. In each plot, we recorded abundance and taxon richness.

We recorded over 3000 Orthoptera individuals from 14 species and more than 2000 bees representing about 40 unique taxa. Less frequently mown plots supported higher insect abundance and richness. Several Orthoptera species occurred only in rarely mown plots, while bee data suggest that reduced mowing benefits urban pollinator communities.

Our results indicate that less frequent and mosaic mowing is worth considering as a simple practice for urban insect conservation.

Can Regenerative Farming Mitigate Habitat Fragmentation? A Predatory Arthropod Perspective

Márton Zoltán Szabó^{1,2}, Lili Korsoveczky^{1,2}, Nikolett Gallé-Szpisjak¹, Róbert Gallé¹

1 'Lendület' Landscape and Conservation Ecology, Institute of Ecology and Botany, MTA–HUN-REN Centre for Ecological Research, Vácrátót, Hungary

2 Doctoral School of Biological Sciences, Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungary

Intensive agriculture is a major driver of habitat fragmentation, while concerns over soil health are accelerating regenerative practices. Many farmers have adopted no-tillage management in recent decades. This practice improves soil moisture, soil biota, and nutrient content, and may benefit epigeic fauna via increased plant litter and undisturbed soil, increasing habitat permeability for insect groups threatened by biodiversity loss. Carabids are an important group providing ecosystem services, including biological pest control.

Our research asked whether:

(I) carabid abundance, richness, and assemblage composition differ between no-till and conventionally managed fields;

(II) this effect is influenced by within-field location (edge vs. center).

We sampled 6 no-till and 6 conventional fields in South-Eastern Hungary, with edge and center plots per field. Sampling used pitfall traps over 6 weeks in early spring. Analyses included GLMs and PERMANOVA.

Results showed no treatment effect on abundance or richness. Richness was higher at field edges, but there was no treatment × location interaction. Assemblage composition differed between treatments,

indicating species-specific responses to no-till. Overall, we found no strong evidence that no-tillage benefits carabid assemblages.

Automated Law Enforcement and Property-Based Accountability for Ecocide: a Case Study of Forest Ecosystem Degradation

Nikita Kardash

State University of Trade and Economics, Kyiv, Ukraine

*UNDP-GEF Small Grant Programme Youth Advisory Group, expert Partnership Network
“Education for Sustainable Development in Ukraine”*

Modern conflicts pose an existential threat to biodiversity. A stark example is the mined forested corridor from Kyiv's Novobilychi to the Chornobyl Exclusion Zone. Crucially, the transboundary spread of air, water, and soil pollution from such devastated areas poses a cascading threat to the Carpathian region, underscoring the urgent relevance of the Carpathian Convention.

Current international law relies on slow diplomacy, failing to provide timely compensation. This paper proposes a transition to automated legal enforcement and property-based accountability for state aggressors committing ecocide.

Verifiable destruction data (e.g., satellite mapping) must automatically trigger sanctions, freezing the aggressor's sovereign assets for direct reallocation to environmental rehabilitation and demining funds.

Investigated in cooperation with the State Scientific Institution “Institute of Ecological Renovation and Development of Ukraine”, this framework integrates conservation metrics with automated legal instruments. It eliminates delays, guaranteeing immediate financial resources to safely restore affected transboundary biomes.

Factors Influencing the Occurrence of the Red-backed Shrike (*Lanius collurio*) in Energy Wood Piles in the Vidzeme Region, Latvia

Sandra Abele^{1,2}, Māra Kitenberga³, Inga Straupe²

1 Swedish University of Agricultural Sciences, Uppsala, Sweden

2 Latvia University of Life Sciences and Technologies, Jelgava, Latvia

3 Latvian State Forest Research Institute Silava, Salaspils, Latvia

In the current geopolitical situation, demand for energy wood has increased significantly, leading to a rise in the preparation of energy wood piles.

At the same time, it has been observed that one of the nesting sites of the red-backed shrike (*Lanius collurio*), listed in Annex I of the EU Birds Directive and Annex II of the Bern Convention, is an energy wood pile. To date, studies on the presence of red-backed shrikes and other birds in energy wood piles have not been conducted in Latvia or across Europe.

The aim of the study is to assess the occurrence of the red-backed shrike and its influencing factors in energy wood piles during the nesting season in the Vidzeme region, Latvia.

The study examined a total of 627 energy wood piles in the Vidzeme region that were accessible at the time of the survey and at the beginning of the red-backed shrike's nesting season, at the end of June.

The occurrence of the red-backed shrike in energy wood piles in the Vidzeme region is 13.7% (86 piles) and is influenced by the size of the forest opening, the height of the wood pile, and the presence of young spruce stands.

Comparison of the Effects of Continuous Cover Forestry and Rotation Forestry Management on Understorey Vegetation in Hungarian Native Forests

Sarolta Szilágyi¹, Csenge Veronika Horváth¹, János Bölöni¹, Attila Bíró¹, Gergő Sudár², Péter Ódor^{1,2}

1 HUN-REN Centre for Ecological Research, Institute of Ecology and Botany, Vácrátót, Hungary

2 University of Sopron, Sopron, Hungary

In Hungary, Rotation forestry (RF) covers about 90% of forest area where it creates homogeneous, even-aged stands. Continuous cover forestry (CCF) maintains permanent forest cover, promotes structurally diverse, multi-aged stands, however it covers less than 5%. To analyse how these management approaches affect the forest understorey, we surveyed the herb layer of 320 plots across 8 RF-CCF site-pairs.

RF stands had higher species richness, understory cover, and canopy openness. Forest-associated, disturbance-sensitive species were relatively more abundant in CCF, while non-forest and non-native species were more frequent in RF. Woody regeneration below 50 cm height was more abundant in CCF. While the species composition showed partial overlap in ordination analysis, the difference between the two management types was significant.

One of the greatest challenges of modern forest management is the need to balance timber production with the preservation of the protective functions of forests. In sites where management was shifted from RF to CCF approx. 20 years ago, differences in the understory vegetation of the two management regimes can already emerge. Here, CCF effectively contributes to the forest character of the understory composition, a trend expected to intensify over time.

Decoupling of Travel Time from Distance Increases Protected Area Exposure to Human Access

Shuting Chen, Felix Eigenbrod, Yurui Li, Craig Hutton, Robert Holland

University of Southampton, Southampton, United Kingdom

Urban and infrastructure expansion are bringing protected areas (PAs) closer to human-dominated landscapes. Yet, most assessments of PA accessibility rely on spatial distance rather than travel time, potentially underestimating PA exposure to functional access. Here, for the first time, we measure changes in travel time and spatial distance between PAs and their nearest human-dominated landscapes at 30-m resolution for 2009, 2015, and 2020 in China. We find that travel time between PAs and urban or human settlements has converged to similar values among PA locations, types, and geographical constraints. We quantify a systematic weakening of distance constraints over time, particularly in initially remote areas, indicating pronounced decoupling between temporal accessibility and spatial separation. This decoupling of temporal accessibility from spatial proximity is primarily (80% on average) driven by transport improvement rather than urban land-use expansion. Our findings have important global implications, given that the Chinese road-building boom of recent decades is now increasingly being mirrored in other countries. We highlight that the accelerating temporal accessibility represents an emerging but easily overlooked threat to PAs, requiring timely adaptive management.

Morphometric and Demographic Analysis of Seedlings and Juvenile Plants: It Really does Matter Whether Data Are Collected Ex-Situ or In-Situ

Vivien Lábadi, Bálint Pacsai, Judit Bódis

Institute for Wildlife Management and Nature Conservation, Hungarian University of Agriculture and Life Sciences, Keszthely, Hungary

An understanding of their biology is essential for the successful conservation management of endangered plant species. For perennial species, the germination rate and survival of young plants are of key importance. To determine these factors, ex-situ studies are often conducted, but these cannot replicate all the environmental factors present in the original habitat. Our aim was to compare the characteristics of *Gladiolus palustris* plants growing under in-situ and ex-situ conditions.

In 2023, we sowed seeds collected from forest and meadow habitats under ex-situ and in-situ conditions. These were monitored twice a year for the following three years.

The germination rate of seeds under ex-situ conditions was significantly higher than under in-situ conditions. Over the next two years, the survival rate of young individuals was higher in ex-situ populations than in in-situ populations; however, overwintering seeds were more prevalent in-situ. For three-year-old plants grown ex-situ, there was a positive correlation between height and leaf width ($R^2 = 0.73\text{--}0.81$). In in-situ populations, this correlation was weak.

These results highlight that ex-situ and in-situ populations differ in several characteristics. These differences became increasingly significant as the years progressed.

Riding the Current: Timber Rafting as a Living Resource for Sustainable Regional Development

Vlăduț-George Lucan, Alexandru Bănică

Centre for European Studies, "Alexandru Ioan Cuza" University of Iași, Iași, Romania

Timber rafting along the Bistrița Valley is more than a historical craft, it is a living testimony to centuries of intimate human-river dialogue, where communities learned to read the water and move with the rhythms of a mountain ecosystem. This research treats this Intangible Cultural Heritage as a strategic territorial resource capable of driving sustainable regional development; By exploring the deep human-nature relationships embedded in the timber rafting tradition, the study aims to identify how traditional ecological knowledge can inform contemporary Nature-Based Solutions and inspire new models of community resilience. Situated in one of Romania's most culturally rich yet economically left-behind regions, the research proposes integrated pathways that place culture, memory, and nature at the heart of territorial revitalization. The project also engages with UNESCO safeguarding frameworks, arguing that heritage protection and regional development need not be separate agendas. When communities are empowered to reactivate their own cultural memory, tradition becomes innovation. This research is ultimately a case for the Carpathian Mountains and for all the places where the future can be built from what has always been there.

Spatial Analysis of Hungarian NATURA 2000 Sites' Threats and Pressures

Zsombor Székely¹, Eszter Tanács², Ágnes Gulyás¹

1 University of Szeged, Szeged, Hungary

2 Institute of Ecology and Botany, HUN-REN Centre for Ecological Research, Vácrátót, Hungary

Nowadays, there are many threats to our environment. To protect the native habitat types and species, the EU established the network of the Natura 2000 sites, which are well monitored and documented. In my study, I make a spatial analysis based on the Hungarian Natura 2000 sites' management plans. Using the information from the plans I apply maps (QGIS) and networks (Gephi) to define the most relevant threats, and the links between habitat types and threats. I study the co-occurrence of threats and habitat types, as well as spatial patterns. The plans reflect the notions of local conservation experts on the importance of the different types of threats. According to my results, currently the most dominant threats are the spread of invasive species and climate change. However, there are many local patterns as well. The results can be used to decide what kind of activities should be changed in the future and how.

Posters

Transition from Rotation to Continuous Cover Forestry Promotes Structural and Compositional Diversity in European Beech and Oak-Dominated Forests

Attila Bíró¹, János Bölöni¹, Csenge Veronika Horváth¹, Bence Kovács¹, Csaba Németh¹, Sarolta Szilágyi^{1,2}, Péter Ódor^{1,3}

1 Forest Ecology Research Group, Institute of Ecology and Botany, HUN-REN Centre for Ecological Research, Vácrátót, Hungary

2 Faculty of Science, ELTE, Budapest, Hungary

3 Institute of Environmental Protection and Nature Conservation, Forestry Faculty, University of Sopron, Sopron, Hungary

Continuous cover forestry (CCF) has been an emerging alternative to rotation forestry (RF) in temperate forests to maintain biodiversity and continuous ecosystem service provision despite elevated economic demands. To investigate the efficiency of CCF management history in Hungary, we collected stand structural and compositional data via stratified sampling of 320 nested plots from 16 sites, representing eight pairs of adjacent CCF and RF sites along a species dominance gradient, from dry mesic turkey oak-sessile oak to European beech forests. CCF stands exhibited significantly higher fine-scale structural complexity, deadwood accumulation and abundance of forest specialist and disturbance-tolerant herbaceous species. In oak dominated forests, the introduction of CCF management manifested in significantly higher admixture species diversity. Contrastingly, competition by European hornbeam, landscape-level structural heterogeneity and beta diversity were tend to be higher in RF sites. Our findings suggest that CCF management should be widely integrated into the Hungarian forestry landscape to improve forest naturalness and habitat provision capacity. This research was funded by Interreg VI-A Hungary-Slovakia Programme (HUSK/2302/1.2/168).

IUCN Green Status Assessment of the Endemic Blind Mole Rat Species of the Pannonian Basin

Emília Illés, Attila Németh

Department of Nature Conservation, Zoology and Game Management, University of Debrecen, Debrecen, Hungary

The endemic blind mole rat species of the Pannonian Basin (*Nannospalax hungaricus*, *N. montanosyrmiensis*, *N. syriensis*) are highly endangered European mammals, despite decades of conservation. This study provides the first comprehensive status assessment using the IUCN Green Status methodology, evaluating conservation impacts via counterfactual scenarios. Literature, museum catalogues, and national park databases were used to map distributions over time, dividing ranges into spatial units categorised as absent, present, viable, or functional. Threats and actions were classified via IUCN schemes, and ecological roles were summarised through species interactions.

All three species showed low recovery scores. Nevertheless, the Srem blind mole rat, *N. syriensis*, is most critical, with a 3% recovery score and high conservation dependence, risking extinction within 10 years without action.

Long-term survival requires halting habitat loss, legally protecting remaining habitats, and executing conservation translocation programs. The latter turned out to be key measures for improving species conservation status.

Biased Regional Representation Among IPBES Authors

Éva Macskásy, András Báldi, Bernadett Zsinka, Brigitta Palotás

*Lendület Ecosystem Services Research Group, Institute of Ecology and Botany, HUN-REN
Centre for Ecological Research, Vácrátót, Hungary*

Equity across gender, disciplinary background, and geographic regions is among the core operating principles of international bodies, including the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Diverse and geographically balanced expert participation is essential to ensure the legitimacy, credibility, and global relevance of scientific assessments, while also strengthening capacities across regions. Here, we assessed whether authorship in IPBES assessments reflects balanced regional representation and whether any temporal trends are evident across successive assessments. We further examined the representation of European countries in particular. To this end, we compiled author affiliations by country for the 1st and 2nd Global Assessments. Regional representation was evaluated using the five UN regions as a reference framework, where an equal distribution would correspond to 20% per region. Within this framework, the two European-related regions represent opposite extremes. The WEOG region (Western Europe and Others Group: Western Europe, Australia, Canada, New Zealand, and the United States) is overrepresented in both assessments, although its share declined from the 1st to the 2nd Global Assessment (from 52% to 40% among Coordinating Lead Authors, and from 35% to 29% among Lead Authors). In contrast, countries of the Eastern European States (EES) group (largely corresponding to the former socialist Eastern Bloc and Turkey) remain markedly underrepresented, accounting for only 3% and 10% of Coordinating Lead Authors, and 14% and 13% of Lead Authors in the 1st and 2nd Global Assessments, respectively. Within Europe, the

composition of represented countries also shifted over time: the United Kingdom and Germany contributed the largest number of authors to the 1st Global Assessment, whereas the United Kingdom and Turkey were the leading contributors to the 2nd Assessment. An even more striking indicator of this imbalance is that, among the more than 800 observer organisations attending the 2026 IPBES plenary, none originated from the EES region, suggesting that underrepresentation extends beyond assessment authorship to broader participation in science–policy processes. To advance more equitable representation across UN regions in IPBES, targeted capacity-building efforts in biodiversity science–policy should be strengthened in Eastern European states, including the so-called "new" EU Member States, alongside measures that reduce barriers to participation in both assessment processes and IPBES governance.

Deep Learning-Based Body Length Estimation in Soil Arthropods: a Scalable Tool for High-Throughput Trait-Based Ecology

László Sipőcz^{1,2}, Gergő B. Békési³, András Ittész^{4,5}, Miklós Dombos¹

1 Institute for Soil Sciences, Centre for Agricultural Research, HUN-REN, Budapest, Hungary

2 Doctoral School of Landscape Architecture and Landscape Ecology, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary

3 Department of Automation and Applied Informatics, Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics, Budapest, Hungary

4 Institute of Mathematics and Basic Science, Department of Applied Statistics, Hungarian University of Agriculture and Life Sciences, Budapest, Hungary

5 Department of International Economics, Faculty of International Business, Budapest University of Economics and Business, Budapest, Hungary

Soil-dwelling microarthropods' body length is a fundamental functional trait, serving as a proxy for biomass and energy fluxes. However, data acquisition for biodiversity conservation is constrained by manual labour and posture-dependent errors in contour-based image processing. These errors propagate non-linearly, causing a 2.5- to 3.5-fold underestimation of population biomass in food web models.

To address this, we validated a Deep Learning (DL)-based regression model for automated length quantification. In laboratory tests across two different stereomicroscopes, the model showed high cross-platform generalizability ($R^2 = 0.94$, $MAE = 0.059$ mm; and $R^2 = 0.96$, $MAE = 0.054$ mm) under unseen optical conditions. For field communities from an automated extraction system ($N = 1,807$ individuals, 16 taxonomic groups), the framework achieved an overall R^2 of 0.98 and a global MAE of 0.039 mm. The DL model significantly outperformed conventional contour-based methods, maintaining high geometric precision across morphologically complex taxa without post hoc calibration. These results provide an

accurate, scalable computer vision workflow for high-throughput trait-based ecology and conservation monitoring.

Drivers of range change in European waterbirds and implications for wetland conservation

Ledi Selgjekaj¹, Zsolt Végvári², Tamás Székely³

1 Department of Evolutionary Zoology and Human Biology, University of Debrecen, Debrecen, Hungary

2 Institute of Aquatic Ecology, HUN-REN Centre for Ecological Research, Budapest, Hungary

3 Department of Life Sciences, University of Bath, Bath, United Kingdom

European breeding waterbirds are changing their ranges, with some species expanding and others declining. These patterns reflect changes in wetland ecosystems under global environmental change. This study examines how ecological factors such as climate, land use, and protected areas coverage influence waterbird range dynamics across Europe. We then test how species biological traits affect these responses across 70 waterbird species. Using data from the European Breeding Bird Atlases (EBBA1 and EBBA2) and spatial and phylogenetic analyses, we identify the main drivers of range change and highlight regions where conservation action is most needed.

Preliminary findings on the impact and spread of a relatively new amphibian virus on agile frog (*Rana dalmatina*)

Nikolett Ujhegyi^{1,2}, Emese Balogh^{1,3}, Andrea Kásler¹, Zsanett Mikó¹, Edina Nemesházi⁴, Márk Szederkényi¹, Judit Baumann¹, Tibor Papp⁵, Veronika Bókony¹

1 Department of Evolutionary Ecology, Plant Protection Institute, HUN-REN Centre for Agricultural Research, Budapest, Hungary

2 Department of Wildlife Biology and Management, Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungary

3 Department of Zoology, University of Veterinary Medicine Budapest, Budapest, Hungary

4 Konrad Lorenz Institute of Ethology, University of Veterinary Medicine Vienna, Vienna, Hungary

5 HUN-REN Veterinary Medical Research Institute, Budapest, Hungary

Infectious diseases are major drivers for the ongoing sixth mass extinction. Amphibians are particularly vulnerable, with around 40% of species being threatened, and diseases play a key role in their decline. While ranaviruses and chytrid fungi are well studied, much less is known about other viral pathogens, such as the alloherpesvirus species *Batravirus ranidallo3* (or commonly named: *ranid herpesvirus 3 - RaHV3*). First reported in Europe in 2017, RaHV3 causes gray, vesicular skin lesions in certain species of frogs.

Since 2023, we have been investigating the effects of RaHV3 in a population of agile frogs (*Rana dalmatina*) near Budapest. Among more than 2,500 capture events, 44% showed skin lesions ranging from a few blisters to extensive lesions. Males were affected more frequently, and although severe lesions were not associated with lower body weight, they were linked to reduced reproductive success. When comparing the severity of signs in 54 frogs with viral load, it was found that higher viral load was

generally associated with more severe lesions, although many infected individuals showed no visible signs. Our results suggest that standardized visual scoring and photographic documentation can support wildlife disease monitoring and help assess the spread and long-term impacts of RaHV3 in native amphibian populations.

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Use and Conservation of the Ethnomedicinal Flora of the Dry Forests of Tumbes, Peru

Vicky Almendra Correa Seminario¹, Adrià Descals², Manuel Charcape³, José Mostacero⁴, Josep Peñuelas²

1 University of Barcelona, Barcelona, Spain

2 Centro de Investigación Ecológica y Aplicaciones Forestales (CREAF), Bellaterra, Barcelona, Spain

3 Departamento Académico de Ciencias Biológicas, Universidad Nacional de Piura, Piura, Peru

4 Departamento Académico de Ciencias Biológicas, Universidad Nacional de Trujillo, Trujillo, Peru

Seasonally dry tropical forests (SDTF) are ecosystems of high biodiversity, yet they remain underexplored in terms of their floristic composition and ethnomedicinal potential. Despite their ecological and sociocultural relevance, knowledge gaps persist regarding the species inhabiting these regions and their traditional therapeutic uses. This study presents the first comprehensive ethnobotanical analysis of medicinal plants in the SDTF of the Tumbes region, Peru, documenting 480 species and identifying previously unrecorded uses. Among the species with the highest use value index (UVI) are *Annona muricata*, *Passiflora edulis*, *Bursera graveolens*, *Cordia lutea*, *Neltuma piurensis*, and *Phyllanthus niruri*, highlighting their importance to local communities. However, the biodiversity in this region faces critical threats such as deforestation, agricultural expansion, and the impacts of climate change. According to IUCN criteria, 48.1% of the recorded medicinal species are classified as at risk, with 8% listed as endangered. These results emphasize the urgent need to design holistic conservation strategies that protect both biological diversity and traditional knowledge, essential elements for the sustainability of these ecosystems and their valuable pharmacological resources.

Flower Resources, Urban Cover, and Nesting Material Drive the Use of Bee Hotels in Budapest

Virág Németh^{1,2}, Kitti Butter³, Gabriella Süle², Viktor Szigeti²

1 Department of Zoology, Hungarian University of Agriculture and Life Sciences, Gödöllő, Hungary

2 Lendület Ecosystem Services Research Group, HUN-REN Centre for Ecological Research, Vácrátót, Hungary

3 Moholy-Nagy University of Art and Design, Budapest, Hungary

Urban areas can serve as valuable habitats for pollinators. Recently, many initiatives by scientists, designers, and citizens aimed to create additional nesting habitats for pollinators. However, how local and landscape factors can affect these interventions is still not fully understood. In 2024, twelve bee hotels were monitored in Budapest. Pollinator activity was measured through repeated five-minute observations of insects visiting the bee hotels, while nest occupation was assessed based on the proportion of occupied holes. Local flower abundance significantly increased both insect abundance and morphospecies richness, whereas direct sunlight, vegetation height, and green cover had no significant effect. Urban cover negatively affected bee activity at the local 100 m scale, but not at the 1000 m scale. Nest occupation also varied with material and hole size. Smaller wooden holes and larger bamboo holes were more frequently occupied. These findings suggest that bee hotels are most effective when combined with nearby floral resources and placed in less heavily built-up local surroundings. The Pollino project provides useful guidance for pollinator-friendly urban design and highlights the importance of integrating nesting resources with high-quality foraging habitats in cities.

Structural Dynamics and Typological Transitions of Urban Food System Resilience in China: Coupling the Ball-And-Cup Model with Adaptive Cycle Theory

Zhou Xia^{1,2}, Xiaoxing Qi¹, Liming Liu³

1 School of Government, Sun Yat-sen University, Guangzhou, China

2 University of Leeds, Leeds, United Kingdom

3 College of Land Science and Technology, China Agricultural University, Peking, China

Food system resilience is dynamic and path-dependent, yet most assessments remain static. This study integrates the ball-and-cup model with adaptive cycle theory to examine the spatiotemporal dynamics and transitions of urban food system resilience in China. An indicator system is developed across four subsystems—production, processing, distribution, and consumption—and three dimensions: adaptive, resistance, and transformative capacities. Using panel data for 336 prefecture-level cities from 2004 to 2024, we apply self-organizing maps and K-means clustering. Results show steady improvement in overall resilience, alongside persistent structural imbalance. Resistance capacity dominates, while adaptive capacity remains the key constraint, forming a “high-resistance, low-adaptability” regime. Subsystem trajectories follow a “consumption-led, production-stagnant, and processing-lagging” pattern, and the “East > Central > West” gradient reflects core–periphery dependence. Six adaptive-cycle typologies reveal nonlinear evolution and lock-in. Alignment with food-security zones has strengthened, but differentiation within balanced zones suggests mismatches. Resilience enhancement requires phase-specific governance, capacity building, intervention, and cross-regional coordination.



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