

3rd Student Conference on Conservation Science, Tihany 2017

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

*Tihany (Lake Balaton), Hungary
29 August - 2 September, 2017*

ABSTRACTS



*Eds: N. Vili, A. Báldi, A. Kovács-Hostyánszki, K. Mázsa
MTA Centre for Ecological Research
<http://sccs.okologia.mta.hu/>*

Background of the conference

The Student Conference on Conservation Science series started in Cambridge and has 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 began to organize the SCCS conference in Tihany, especially for young scientists from all around Europe to build a network among the presented parts of the continent.

Plenary speakers at the SCCS Tihany 2017

Prof. Teja Tscharntke



Teja Tscharntke is a professor of Agroecology at the University of Göttingen, Germany. His research focuses on biodiversity patterns and associated ecosystem functioning at different spatial and temporal scales and in managed and natural systems. Field studies are based in tropical and temperate regions, comparing food webs and multitrophic interactions, but he is also interested in multidisciplinary studies linking socioeconomic with ecological approaches. In the Agroecology Group, many people are working on a number of collaborative projects – often aiming at potential tradeoffs between viable land-use systems and biodiversity conservation in human-dominated, fragmented landscapes.

Dr. Péter Szabó



Péter Szabó (born 1972 in Hungary) is Deputy Head of the Department of Vegetation Ecology at the Institute of Botany of the Czech Academy of Sciences. Currently he is also Vice-President of the European Society for Environmental History. He is an environmental historian/historical ecologist. By training a medievalist, in his early days he studied the history of woodland management in the Carpathian Basin in the Middle Ages. After a post-doc at the Archaeological Institute of ELTE University in Budapest, he moved to Brno in the Czech Republic. Between 2012 and 2016 he was the principal investigator of the ONGWOOD European Research Council project. This interdisciplinary project combined archaeological, historical, palaeoecological and vegetation ecological data to understand long-term woodland dynamics for a larger region in high resolution focusing especially on the role of humans. His own work mostly focuses on forest history, especially on traditional management forms (coppicing, pollarding and the like), and he actively promotes the reintroduction of these techniques into forestry and nature conservation. He has also published on the history of historical ecology and on the theory and practice of interdisciplinary research.

Prof. Andrew Balmford



Andrew Balmford is Professor of Conservation Science in the Department of Zoology, University of Cambridge, where his main research interests are exploring how conservation might best be reconciled with land-demanding activities such as farming, quantifying the costs and benefits of effective conservation, understanding why nature is being lost, and examining what works in conservation. To have most impact he focuses his research in developing countries and collaborates closely with conservation practitioners and with colleagues in other disciplines, including economics and psychology. He helped to establish the Cambridge Conservation Forum, the

Cambridge Conservation Initiative and the Student Conference on Conservation Science. He is a Fellow of the Royal Society and a Trustee of the Royal Society for the Protection of Birds, Europe's largest conservation charity. His 2012 book *Wild Hope* highlights success stories in conservation and argues that cautious optimism is essential in tackling environmental challenges. <http://www.zoo.cam.ac.uk/directory/andrew-balmford>

Dr. György Pataki



György Pataki (PhD in management and organisation science, MA in economics) is currently associate professor at the Department of Decision Sciences, Institute of Business Economics, Corvinus Business School, Corvinus University of Budapest, Hungary. He is also director of research at Corvinus Business School. He is a senior research fellow at the Environmental Social Science Research Group (ESSRG), an independent research and development company. György acts a board member of the European Society for Ecological Economics and served for four years as member of the Multidisciplinary Expert Panel (MEP) of IPBES. His research previously focused on ethics and economics and business ethics, later on sustainability challenges to business firms, then he has been involved in interdisciplinary research projects with natural scientists on biodiversity and ecosystem services. Currently, he is engaged in research addressing different aspects of science-society interactions through cooperative and participatory research and responsible research and innovation (RRI) initiatives. He has always been an activist scientist of a long engagement with the Hungarian green movement.

Awards SCCS 2017 Tihany

Best Talk Award went to **Thomas Timberlake**, for the oral presentation entitled: Mind the Gap: The importance of flowering phenology in pollinator restoration

Best Poster Award went to **Raquel Arias Font** for the poster presentation entitled: Understanding carbon dynamics after peatland restoration

Cambridge University Press offered books up to a value of GBP 75 for both the BEST TALK and the BEST POSTER presentation. For both of them, Fauna & Flora International offered two 2-year memberships of Fauna & Flora International with online subscription to the journal Oryx.

The journal Community Ecology offered the **COMMUNITY ECOLOGY AWARD** for the presentation mostly relevant to multi-species problems. The winner was **Snezana Popov**, her presentation - Landscape impacts on two phytophagus genera of hoverflies - was invited to submit to the journal.

Conference sponsors



Society for Conservation Biology

A global community of conservation professionals

Europe Section



CAMBRIDGE UNIVERSITY PRESS

Conference Organizers

András Báldi - Head of the committee, Director of the Centre for Ecological Research

Anikó Kovács-Hostyánszki - Lendület Ecosystem Services Research Group, Centre for Ecological Research, Hungarian Academy of Sciences

Katalin Mázsa - Centre for Ecological Research, Hungarian Academy of Sciences

Barbara Mihók - Centre for Ecological Research, Hungarian Academy of Sciences, Society for Conservation Biology

Brigitta Palotás - Centre for Ecological Research, Hungarian Academy of Sciences

Nóra Tugyi - Centre for Ecological Research, Hungarian Academy of Sciences, Balaton Limnological Institute

Nóra Vili - University of Veterinary Medicine, Budapest

Talks and posters
of the
3rd SCCS Hungary

Tihany, Hungary
29 August - 2 September, 2017



Participants of the 3rd SCCS, 2017

Talks

Using historical maps in order to detect habitat change on the Great Plain (Hungary), between the 19th and 21th century.

Nikoletta Darányi

daranyin@yahoo.com

Past landscape and habitat has been a question, yet historical maps has not been surveyed in detail before. Habsburg Military Maps holds land use information, yet they need to be enriched (e.g.by historical maps) in order to reveal the habttitat types. I survey old historical maps and analyze the difference between the habitat information on those historical maps and the Second Habsburg Military Survey. I am currently working on the result, thus I cannot state any outcomes yet. Habitat restorations and sustainable management plans for remaining natural habitats needs a target which is usually the natural habitat on the given patch. Validated habitat informaton of those patches can be gathered from historical maps.

The effects of arbuscular mycorrhiza and earthworms on plant growth, phytochemical production and pollination of marjoram (*Origanum majorana* L.)

Gergely Boros, Krisztina Bereczki, Rita Engel, Krisztina Szabó, András Báldi

boros.gergo@okologia.mta.hu

MTA Centre for Ecological Research

Symbiotic associations with arbuscular mycorrhiza fungi (AMF) and soil fauna promote plant health, soil fertility and through enhanced nutrient uptake they can significantly increase the plant biomass. The importance of mycorrhiza fungi on the quantity and quality of plant material of some medicinal plants is known but to understand links between below and above ground processes is a key research area. Belowground organisms can influence floral characteristics that are important mediators of pollinator attraction, and through this can also provide significant ecological and agricultural influences. We connected

decomposition, secondary metabolite production and pollination in a mesocosm experiment to understand the influence of AMF and earthworms' activity on the below- and aboveground growth, secondary metabolite (polyphenol) production and pollination of marjoram. This herb species is economically relevant, so a complex study of supporting biotic processes in its rhizosphere would be beneficial for drug cultivation. We had five treatments with sixteen replications in each treatment: 1) sterile soil, 2) soil with AMF inoculates Inoq Top 3) soil with AMF inoculates Symbivit, 4) earthworm, and 5) AMF inoculates Inoq Top and earthworm. Plant biomass, polyphenols and the number of earthworms were measured at the end of the experiment. During the flowering we recorded the number of pollinator insects as well as the flower visitation rate by pollinators. Our preliminary results show that both biomass and polyphenol content increased due the presence of AMF and earthworms. The flower visitation rate was smaller than the control if only AMF or earthworms were added, but visitation rate was higher if AMF and earthworms were present. These results indicate an interesting plant respond to different soil organisms, how can below ground organisms influence above ground ecosystem functions. Keywords: mesocosm, ecosystem services, polyphenol, aromatic, herb

Semi-natural elements support diverse pollinator communities in sweet cherry orchards in moderately intensified landscapes

Maxime Eeraerts, Guy Smagghe, Ivan Meeus

maxime.eeraerts@ugent.be

Ghent University, Department of Crop Protection, Lab of Agrozoology, Coupure links 653, 9000 Ghent, Belgium

In a previous study we have found that pollinator diversity contributes significantly to the agricultural production of sweet cherries. The landscape context around the orchards is a crucial factor to manage pollinator diversity and optimise pollination of the crop. Both semi-natural elements as well as intensive agriculture influence pollinator diversity and sweet cherry fruit set. In this study, we focus on agro-environments in which landscape management and integration of wild pollinator services are feasible and with a representative landscape context in terms of the amount of intensive agriculture. Based on landscape analyses around potential sweet cherry orchards we selected study orchards with representative amounts of intensive fruit cultivation in the

surrounding landscape within 1000 m (eventual gradient: 16% - 22%). In addition to this criterion, we aimed to have a gradient of semi-natural elements around the orchards within 1000 m (eventual gradient: 3.9% - 27.5%). During full cherry bloom all flower-visiting insects were sampled in the study orchards for 1 day. During this sampling day we also sampled pollinating insects within the orchard with 3 sets of pan traps. Positive relations were found between pollinator diversity and wild bee abundance within the orchards and the amount of semi-natural elements around the orchards – for both the flower-visiting and pan trap diversity. Honeybee abundance was unaffected by the surrounding landscape. We also found that wild pollinators important to sweet cherry pollination were present. Increasing the amount of semi-natural elements may be an important management strategy to assure diverse pollinator communities in fruit orchards in moderately intensified landscapes.

Structure and dynamics of aquatic food webs: a large-scale comparative study

Anett Endrédi

anett.endredi@gmail.com

MTA Centre for Ecological Research, Danube Research Institute

It is important to quantify the relative importance of species within ecosystems. A possible approach is network perspective: a lot of structural/dynamical network indices can be used to this. But it can be difficult to choose the adequate ones. We calculated the most popular structural network indices to all functional groups of 93 aquatic food webs and statistically compared their correlation with Libralato's KS index (as the best proxy for network dynamics) to rank their predictive power. Results (1) show different centrality ranks for different network indices, calculated for the same set of aquatic food webs and (2) quantify the similarities and differences of particular indices. Our results can help to match adequate tools to particular ecological/conservational problems (eg. finding keystone species or functional groups) and thus contribute to a more efficient systems-based conservation framework.

Assessment of habitat restoration for preserving *Phengaris (Maculinea) teleius* butterfly

Cristina González Sevilleja

cristina.sevilleja@gmail.com

Dutch Butterfly Conservation, the Netherlands; Czech University of Life Science Prague, Czech Republic

Restoration projects give us decisive knowledge about relations in nature. The aim of LIFE+ Project “Blues in the Marshes” is to restore the habitat of the threatened butterfly species: the scarce large blue, *Phengaris (Maculinea) teleius*. Due to the complex ecological relations of this butterfly, its unique host plant, *Sanguisorba officinalis*, and the ant, *Mymica scabrinodis*, which breeds the larvae, the restoration project is challenging. Soil excavated land and sod translocations were done to extend and restore a remain wetland in the South of the Netherlands. Data from three continued years are analyzed to determine the effects of these restoration managements in the wetland vegetation and ant population. Several signals of recuperation are observed from the data, vegetation is going toward vegetation composition in wetlands and ant population is slowly spreading from the sod translocations, which gives hope for the recovery of scarce large blue populations.

Predicting breeding localities of Collared Flycatcher *Ficedula albicollis* in near-natural forests

Johanna Hartmann, Miklós Bán, Zoltán Barta

hart.hanni@gmail.com

Department of Evolutionary Zoology and Human Biology, University of Debrecen

Understanding the habitat selection of vulnerable species is crucial in their protection. As a secondary cavity-nester, Collared Flycatcher is a typical species of old-grown, natural and near-natural forest sites. In this study our aim was to determine the characteristics of forest stands that affect the breeding site selection of the Collared Flycatcher on a fine spatial scale. We carried out a detailed survey of forest plots and built a statistical model that predicts the Collared Flycatchers' occurrence. The study site consisted of two 1x1 km plots in strictly protected forest areas in the Gerecse Mts. We located the territories of

the species with territory-mapping technique three times in 2016. Using a 100x100 m grid we conducted forest state assessment at 200, 500 m² plots. More than 200 variables were recorded which refer to tree species and diameter-classes composition, quality and types of dead wood, properties of the canopy and shrub layer, presence of microhabitats and herbs. Based on the results of the plot survey we used linear interpolation to estimate the values of recorded variables for the flycatchers' territory and for random points. We compared the values for these two point sets by linear models, one variable at a time and we also built a random forest (RF) model and performed variable selection to identify those variables which contribute most to the differences between territories and random points. The RF was not able to identify useful variables while we found many differences between territories and random points by the previous variable analyses. Hence, we would like to improve our methods and build a model that predicts the occurrences reliably in order to provide useful information to conservation biology and forest management.

Animal diversity and conservation issues in the Rasik Beel Wetland Complex (West Bengal, India)

Prithwiraj Jha¹ * and Debashis Das²

1 Raiganj Surendranath Mahavidyalaya, Department of Zoology, Raiganj 733 134, West Bengal, India

2 Tufanganj Mahavidyalaya, Department of Zoology, Tufanganj, West Bengal, India

* Corresponding Author: e-mail: jhakingshuk@gmail.com

The present study was undertaken to document the faunal diversity in Rasik beel, a natural wetland complex of about 178 ha, located in Tufanganj subdivision (latitude: 26°25' N; longitude: 89°44' E) of Cooch Behar district in West Bengal, India. Conventional method through observation and photography of bird species and other major fauna was used during the survey period (January'2006 to December'2009). In the field, digging, night watching, locating by the use of bait etc. was applied to record the other major faunal species. Ichthyofauna was collected and preserved in 4% formaldehyde solution. Identification of the vertebrate and invertebrate fauna was carried out following standard literature. A total of 165 species of avifauna were recorded. Five

amphibian, seven reptilian, 13 mammalian, three annelid, 49 fish, 24 arthropod (including 15 species of butterflies) and three molluscans were recorded from the wetland complex. Phytoplankton and zooplankton were represented by 9 and 6 species, respectively. Since Rasik beel had emerged as a popular tourist spot, tourism and other human interference were affecting the natural habitat. It appeared that Rasik beel was being exploited for earning revenue only and proper conservation efforts were needed. Awareness programme among the local people and tourists were necessary for the maintenance of ecosystem balance and to preserve the biodiversity. The water body should be guarded by earth embankment to prevent agricultural pollution that came from fertilizer, insecticides and fungicides. Complete restriction of fishing and grazing inside the wetland complex was also necessary. Trespassing, motor driving inside the complex and sound pollution should be avoided. Acknowledgement: The authors are grateful to the Department of Forests, Govt. of West Bengal for financial aid and field support.

Restoring vegetation cover or richness? Seed introduction methods matters

Anna Kövendi-Jakó¹, Anikó Csecserits², Melinda Halassy², Karl Hülber³, Thomas Wrbka³, Katalin Török²

kovendi.jako.anna@gmail.com

1 Eötvös Loránd University, Department of Plant Taxonomy, Ecology and Theoretical Biology, Budapest, Hungary.

2 Centre for Ecological Research, Institute of Ecology and Botany, HAS, Vácrátót, Hungary.

3 University of Vienna, Department of Botany and Biodiversity Research, Division of Conservation Biology, Vegetation Ecology and Landscape Ecology, Wien, Austria

There is an increasing need for restoring semi-natural grasslands, which are among the most threatened habitats due to abandonment of traditional extensive management and the parallel intensification of agricultural production. Within this study three seed introduction methods were applied to restore ten hectares of open and closed Pannonic sand steppes in N-E Hungary at Nyíregyháza. The following questions guided our research: (1) Do commercial seeds perform better in producing rapid green cover than the other seed

introduction methods applied? ; (2) Is seeding of the dominant grass species sufficient to start the development of target grassland in terms of vegetation cover and species richness? ; (3) Is hay transfer an appropriate alternative of seeding? Species cover and species richness was recorded at five randomly placed 2 x 2 m coenological quadrates for each treatment. We compare vegetation development three years after seed introduction to primary and secondary grassland reference (both open and closed) sites. In terms of species cover sowing of commercial species produced the highest vegetation cover and both direct seeding methods resulted in similar composition to primary closed references. Seeding of the dominant grass species started the development of target grassland, but further management is needed to increase species diversity. Hay transfer resulted in the highest species richness and the most similar composition to closed reference sites based on species richness. We conclude that the combination of seed sowing and hay transfer could be the best solution to recreate Pannonic sand steppes on severely disturb areas. The vegetation was studied by 2 x 2 m coenological quadrates and species list was made during field survey. Our data were analysed by multivariate methods and linear models. The application of commercial seeds resulted the highest cover, in contrast, the highest species richness was detected for hay transfer. The vegetation developed along a gradient from open reference sites to closed reference sites. The combining of sowing seeds and hay transfer is the best solution to recreate dry grasslands. Our study is sufficiently novel to be interesting to other practitioners or researchers.

Environmental stress on physiological state and sexual signals of male European green lizards

Boglárka Mészáros

mbogi90@caesar.elte.hu

Eötvös Loránd University, Budapest

The aim of our study was to experimentally investigate how ecologically relevant environmental factors which are changing rapidly due to the effects of global climate change, affect signal intensity and key physiological traits parallel. We exposed 40 adult male European green lizards to food and basking time treatments in a factorial design. We measured colour, oxidative stress, haematocrit, immunocompetence and blood parasite intensity before and after

treatments. High basking time resulted in elevated immunocompetence coupled with increased oxidative stress. High food treatment increased nuptial colour brightness, but also increased oxidative stress and decreased immunocompetence. The demonstrated effects of ambient temperature and available food point to the physiological variables possibly involved in translating environmental constraints to both survival and reproductive success.

The presence of a glyphosate-based herbicide can enhance survival of agile frog (*Rana dalmatina*) tadpoles when facing lethal predators

Zsanett Mikó

miko.zsanett@agrar.mta.hu

Centre for Agricultural Research

The presence of a glyphosate-based herbicide can enhance survival of agile frog (*Rana dalmatina*) tadpoles when facing lethal predators. Glyphosate-based herbicides are used en masse around the world. Previous studies showed that they can alter morphology and behaviour of anuran larvae, but potential effects of these phenotypic changes on survival have remained unknown. We reared agile frog tadpoles in outdoor mesocosms exposed or unexposed to the herbicide and in the presence or absence of a caged dragonfly larva as a predator. Three weeks after start we moved tadpoles into boxes containing a free-ranging predator. In clean water tadpoles exposed to the herbicide during development had elevated survival in the presence of a free-ranging predator. In herbicide-contaminated water, tadpoles that had not been exposed to the herbicide before had higher survival. Our results suggest that the herbicide can increase tadpole survival in predator-infested waters, thereby facilitating coexistence of amphibian larvae and their predators in herbicide-contaminated ponds.

Impacts of fragmentation and reforestation on the biodiversity of active limestone quarries in the Philippines

Bonifacio Pasion

bonifacio.pasion@gmail.com

Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences

I specifically want to talk about diversity patterns of native and exotic species in fragmented forest of different size, and reforested area of different age from north and southern regions of the Philippines. The study sampled trees, understories, and epiphytes from 10 fragments sites and 10 reforested sites. We identified species as exotic, native and threatened. Threatened species were found in the remaining forest patches. Interestingly, the number of exotic species decreased in bigger forest patches and in older reforested sites while the number of native species increased in older reforested sites. Conservation attention should focus on protecting the remaining forests and planting native species as part of a forest restoration strategy to enhance faster forest recovery and to re-connect the remaining forest patches.

Landscape impacts on two phytophagous genera of hoverflies Popov Snežana¹, Diti Irene², Burgio Giovanni², Vujić Ante¹ ekosneza@gmail.com

1 Department of Biology and Ecology, University of Novi Sad, Trg Dositeja Obradovića 2, Novi Sad, Serbia

2 Department of Agricultural Sciences, AlmaMater Studiorum University of Bologna, Bologna, Italy

The objective of the research was to examine how landscape composition affects hoverflies genera, in order to define practical measures for achieving the management objectives of certain areas. Land cover analyses were performed using GIS tools and related ecological software. We used the Canonical Correspondence Analysis to describe the responses of species of the two hoverfly genera to the chosen environmental variables. Our study indicates that there is a taxon - specific relationship between landscape metrics and species richness of the two genera of hoverflies, with different sensitivities to specific land use activities. Our findings call for a more differentiated approach in managing areas of anthropogenic activities by using the appropriate type of management in order to favor different taxa.

Importance of small forest fragments in agricultural landscapes for two pollinator guilds

Willem Proesmans

willem.proesmans@gmail.com

Ghent University

Pollinators are in decline. In intensive agricultural landscapes, which cover a large area in Europe, small forest fragments are often the only semi-natural habitat. The role of these forest patches as pollinator habitat is evaluated in this study. Bees and hoverflies were sampled in forest fragments in five regions with pan traps. The effect of local factors, such as presence of open soil, and landscape factors were evaluated. Their effect on pollinator abundance and diversity was assessed. The bee community was strongly affected both by local forest and forest edge characteristics and by landscape factors such as presence of hedgerows. The hoverfly community was less affected but older forest fragments had a more diverse community. Some clear management guidelines to conserve the pollinator community could be deduced, such as the preservation of old forest patches and hedgerows and the management of forest edges to provide sufficient nesting habitat for ground-nesting species.

Genetic viability of a reintroduced population of south-western Brush-tail Possum (*Trichosurus vulpecula hypoleucus*), Western Australia

Lara Semple

semplelara@gmail.com

Georg-August University

This talk addresses the commonly over-looked problem of genetic health during translocations or reintroductions of species back into their former range or into new suitable habitat. There are many risks involved in this field of research. Mammal Tissue preservation and extraction methodology - High Salt Methodology Microsatellite DNA analysis PCR DNA amplification VORTEX population viability analysis ARC-GIS population mapping software Inbreeding was lower and heterozygosity was higher in the translocated population than source populations, highlighting the benefits of outbreeding. Allelic richness is low suggesting the impact of population bottlenecks on genetic diversity. A

under-used method of boosting genetic variation within a population is to mix more than one population; known as outcrossing. This study highlights the potential benefits of this method. It also highlights the risks of losing allelic richness.

Re-evaluating forest dependency of local people after 15 years of conservation efforts, the case of Nyungwe forest reserve.

Bram Sercu

bramk.Sercu@ugent.be

Terrestrial Ecology Unit (TEREC), Department of Biology, Ghent University, K.L. Ledeganckstraat 35, BE-9000 Gent, Belgium

People living close to forest areas in developing countries are often dependent on forest products to sustain their livelihood. Poorer and larger households are found to have a higher forest dependency. Community conservation activities around established protected areas aim at changing attitudes and providing substitute economic activities to keep local people from livelihood activities that damage local biodiversity. This study aims to 1) compare the forest dependency of the households surrounding Nyungwe Forest Reserve in 2016 with an earlier survey in 2001, 2) quantify the change of attitude towards the national park and 3) quantify the role of conservation programs by NGO's and by the government in forest dependency and attitude. We interviewed 175 households around Nyungwe Forest Reserve about their socio-economic situation, their forest use and their participation in conservation programs. Forest dependency was much lower in 2016 than in 2001. Firewood and animal fodder were the most important resources that were collected in the forest. Half of the people that did not enter the forest avoid the forest out of fear for rangers. A large majority of the people (90%) recognized the positive aspects of conservation activities. However, still 40% thought it should be allowed to collect forest products. While we did not find immediate effects of participation in community conservation activities on the change in attitude and behavior, we observed a significant shift in both. People were more positive towards the conservation of the park and were less dependent on forest products than 15 years ago.

Mind the Gap: The importance of flowering phenology in pollinator restoration

Thomas Timberlake ¹, Ian Vaughan ², Jane Memmott ¹

thomas.timberlake@bristol.ac.uk

1 Community Ecology Group, University of Bristol, Life Sciences Building, BS8 1TQ, UK.

2 Cardiff University, Sir Martin Evans Building, Museum Avenue, Cardiff, CF10 3AX, Wales.

Insect pollinators are experiencing a worldwide decline in abundance and distribution due to a range of interacting threats. One of the most important of these drivers is the loss of floral resources as a result of agricultural intensification. Efforts have been made in recent years to reverse this decline, for example through agri-environment schemes which incentivise farmers to restore areas of wildflowers. However, these schemes largely ignore the flowering phenology of the plant species they add, limiting their effectiveness for pollinators requiring consistent resources throughout their long flight season. Our study addresses this issue by characterising and quantifying the supply of farmland nectar resources for the entire flowering season. The supply is highly seasonal with two main flowering seasons in May and July, a June resource gap in-between, and very little nectar available before May or after July. We compare the phenology of nectar supply with the phenology of pollinator demand, identifying two periods of deficit – one in March and one in August/September - which may be limiting pollinator populations. By studying pollinator dietary preferences and the phenology of wild plants, we identify plant species which can be added to farmland in targeted restoration schemes to improve the consistency of nectar supply. Through a large scale field experiment, we test the effect of this habitat manipulation on bumblebee populations. Our study demonstrates that by considering phenology in the design of agri-environment and restoration schemes, we can improve their success, particularly for pollinators which play a critical role in the functioning of natural and agricultural systems.

Developing suitable methods for chemical disinfection of amphibian embryos

János Ujszegi¹, Kinga Molnár², Attila Hettyey¹

ujszegi.janos@agr.ar.mta.hu

1 Lendület Evolutionary Ecology Research Group, Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Herman Ottó út 15, Budapest, 1022, Hungary

2 Department of Anatomy, Cell and Developmental Biology, Eötvös Loránd University, Pázmány s. 1/C, Budapest, 1117, Hungary

Spreading of infectious diseases is one of the major causes of amphibian biodiversity loss. Disease outbreaks have been reported for natural populations, but also for several captive-breeding facilities, so that effective disinfection methods that could be used under natural as well as laboratory conditions are urgently needed. Chemical disinfection has delivered positive results when applied on larvae, metamorphs and adults, but their applicability to amphibian embryos has remained untested. We experimentally tested for possible malign consequences of exposure to four effective and widely used disinfectants (voriconazole, chloramphenicol, neomagnol and virkon) on embryos of the common toad (*Bufo bufo*) and the agile frog (*Rana dalmatina*). We exposed embryos to chemicals at recommended, ×2, ×5 and ×10 concentrations for three days, then assessed development and hatching rates. Ten days after hatching, we counted survival and measured body mass of tadpoles. Virkon was lethal at all concentrations and for embryos of both species, while neomagnol and voriconazole exhibited negative impact on body mass. Teratogenic effect by voriconazole was observed in the development of viscerocranium of *B. bufo*. In general, our results suggest that embryos are more sensitive to disinfectants than larvae, despite the presence of otherwise protective egg-capsules. Also, consequences of exposure to chemical disinfectants during embryonic development can vary widely across species. In summary, for the disinfection of amphibian embryos we cannot recommend the application of voriconazole, neomagnol and virkon, while chloramphenicol may be employed safely and is likely to become a widespread, general disinfectant used at this early life-stage.

Distributions of two rare sister species of *Teinopalpus* butterfly and their spatial climate niches: to be similar or divergent

Zeng Juping^{1,2*}, Chensheng Zhang², Shanyi Zhou³, Oliver Schweiger², Josef Settele²

Juping.zeng@ufz.de

1. *College of Forestry, Jiangxi Agricultural University, Nanchang, 330045, PR China.*

2. *Helmholtz Centre for Environmental Research–UFZ, Halle, 06120, Germany.*

3. *Laboratory of Ecology of Rare and Endangered Species and Environmental Protection, Ministry of Education, Guangxi Normal University, Guilin, 541004, PR China*

*Corresponding author: Email: zengjupingjxau@163.com

Teinopalpus is one of ancient genus of butterfly in the world. In this genus, only two sister species, *T. imperialis* and *T. aureus*, are found occurring in the east (e.g. China) and southeast (e.g. China, Vietnam, Laos etc.) of Asia currently. *T.imperialis* is distributed more inland along the lowland of Himalaya, while *T.aureus* is more along the China Sea. They overlap partly in the Indo-China Peninsula. Their larvae feed the same plant family of Magoliaceae, but differentiate in host genus and species. This study aims to detect the conservatism of climate niche between the two sister species with twelve subspecies, through measuring niche similarity and overlap. Results showed *Teinopalpus* performed a significant preference in 16 of 19 bio-climate variables, which basically determined the butterfly niche in the climate background. However, species niche could be a continuum one with various overlaps of sub-niches of subspecies, and in sub-niche pair-wises, either the similarity or the divergence could be detected. Furthermore, climate niches tend to be similar between the two sister species, but could not be identical. And since different cencroids were detected, climate niche divergence could be assured to happen between two sister species of *Teinopalpus*. This study indicated species niche should be treated as a continuum one, consisted with several sub-niches, and then niche conservatism or divergence happened either in intra-species or in inter-species level. So different conservation policies could be adjusted and adapted to *Teinopalpus* butterflies, if we recognize the niche centroid or

divergent regions or populations. Keywords: Teinopalpus, sister species, climate niche, conservatism, similarity and divergence

Poster presentations

Understanding carbon dynamics after peatland restoration

Raquel Arias Font

raquel.ar.fo@gmail.com

Utrecht University

The restoration of hydrological conditions seeks to revert peatlands into C sinks, but the complexity of secondary succession and the lack of comparable monitoring have not provided conclusive evidence of its success. We investigated decomposition dynamics on restored peatlands at different successional stages in South Germany using a greenhouse and field litter experiment. In addition, we are developing a meta-analysis of decomposition, DOC and CO₂ studies. The restoration reverts functionality to the previous state, but physical changes in the peat inflicted by drainage might limit restoration success. Water table effects depended on the peatland topography and the water table stability. Given the rising human pressure in ecosystems and the expected changes in the climatic regions, conservation efforts should be based on the understanding of mechanisms driving ecosystem functions and its balance with human well-being.

Exceptionally protandry in autumn migration of three closely related *Acrocephalus* species

Nóra Czikkelyné Ágh

czikkelyne.agh.nora@gmail.com

University of Veterinary Medicine Budapest

In last decades lot of migratory bird had population decline. To understand even better the root cases, it would be necessary to study the migratory behavior, chiefly the differences between sexes. *Acrocephalus* species are excellent candidate for it. To study the migration we have used standard ringing

methodology. Since these species are sexually monomorphic, we determined the sexes with molecular methods. For analysis we used conditional inference trees, quantile and linear regression. Sex ratio was fluctuated among years and at the end of the migration biased to female. The adult males departed earliest the study sites. The mean body mass decreased during the migration except in the case of adult Marsh and juvenile Sedge Warblers. Wetland-dependent migratory songbirds represent one of the most vulnerable groups of birds, their migration is strongly affected by environmental changes. Every new details in their migratory strategy would be important for conservation.

Impacts of future climate change on the distributions of a forest amphibian

Anooshe Kafash ¹, Masoud Yousefi ¹

anooshe.kafash@gmail.com

1. Department of Environmental Sciences, Faculty of Natural Resources, University of Tehran, Karaj, Iran

Amphibians serve critical roles in forest ecosystems. Despite their importance in forest ecosystems and their sensitivity to environmental changes, little is known about potential impacts of future climate change on forest-dwelling amphibians. In present study we investigated the impacts of climate change on a typical forest amphibian, Balkan Crested Newt (*Triturus ivanbureschi*). We also evaluated the representation of suitable habitats of the species in protected areas under the current climatic condition and future climatic changes. Results of the distribution model showed that the species is likely to lose considerable proportions of its current suitable habitats in the future. Results also indicated that the future coverage of the suitable habitats for the Balkan Crested Newt inside the protected areas would drop by 8.3%.

Key words: Balkan Crested Newt, Niche modeling, Protected areas, Conservation.

Meta-analysis of exclusion experiments of day-night pollinator. Do plants respond to their expected pollination syndrome?

Javier Oñate Casado

javiatocha@gmail.com

Universidad Rey Juan Carlos

The pollination syndromes are the set of morphological and physiological characteristics of flowers developed to attract specific pollinators. The theory of pollination syndromes has been discussed but there have been few formal quantitative evaluations with angiosperm plants. In this study, a meta-analysis of daytime-nocturnal pollination syndromes was carried out from those studies where day-night exclusion experiments were performed in order to analyze plants reproductive success. The aim of this study was to check quantitatively whether the most effective pollinators, for different species, might be deduced through the set of floral features presented. Three measures of reproductive success (fruit set, seed set and number of seeds and/or fruits produced) were used to perform the meta-analysis. Three different treatments were established, two exclusion treatments (expected pollinator and non-expected pollinator according to pollination syndrome) and a control treatment (complete spectrum of pollinators), and compared between each other for the three measures of success used. When significant differences were found, factors related to pollinator type and several floral traits were introduced in order to see how they influenced in those results. No significant differences were obtained for "fruit set", "seed set" and "number of seeds/fruits produced", except in the case non expected pollinator-control, for number of seeds/fruits produced, where greater success in control treatment was found. Therefore, results indicate that many plant species, despite presenting specialised pollination syndromes, achieve similar success with complementary and generalist pollination systems.

Individual specialization in flower visitation in the Clouded Apollo butterfly (*Parnassius mnemosyne*)

Viktor Szigeti

szigeti.viktor@gmail.com

MTA-ELTE-MTM

Individuals of a population can be specialised in their resource-use, and conservation management planning should take this variation into account, instead of solely relying on population level data, to prevent diversity loss. We recorded flower visitation of *Parnassius mnemosyne* individuals, and estimated flower abundances. We calculated individual specialisation indices to reveal the effect of rapidly changing resource availability on individuals, during a flight period. Individuals differed in visit patterns. This was partly explained by rapid floral resource changes and that individuals occurred in different time windows. Consumption also changed within individuals indicating they can adjust to resource changes. *Parnassius mnemosyne* is a short-term specialist and long-term generalist. This foraging plasticity is likely to be essential for insect pollinators in rapidly changing environments. Future conservation management should consider individual variation.

Bacterioplankton Production in a Shallow Central European Great Lake (Lake Fertő Hungary)

Nóra Tugyi*, Lajos Vörös, Viktor Tóth & Boglárka Somogyi

tugyi.nora@okologia.mta.hu

Balaton Limnological Institute MTA ÖK

Lake Fertő is a shallow, eutrophic, steppe lake in central Europe. Half of the lake is covered by reed, forming numerous brown-water ponds (inner lakes) of variable size. In macrophyte-dominated shallow lakes, the activity of bacterioplankton is largely unknown. The aim of our study was to determine the role of bacterioplankton in a large shallow lake. Production was measured in the open water and in the reed belt monthly between October 2015 and September 2016. Bacterial production was determined with radiolabeled leucine incorporation. Microbial activity showed seasonal dynamics, the highest values measured in the warmer months. Production of the bacterioplankton was higher within the reed belt (10-340 mg C/m²/d) than in the open water (17-226

mg C/m²/d). Our results suggest that bacterioplankton assume a more active role in the littoral zone (reed belt) of Fertő than in the open water and that DOC originating from aquatic macrophytes is an important carbon source for bacterioplankton in shallow lakes.

Modeling the impacts of future climate change on a mountain dweller bird in Palearctic region

Masoud Yousefi*, Anooshe Kafash

masoud.yousefi52@gmail.com

Department of Environmental Sciences, Faculty of Natural Resources, University of Tehran, Karaj, Iran.

*Author for correspondence; email: yousefi52@ut.ac.ir

Climate change poses major threats to animal and plants especially mountain dweller species. In this study we assessed the impacts of future climate change on distribution of *Pyrrhocorax pyrrhocorax*, a mountain dweller bird in Palearctic region. We used MaxEnt software and Geographic Information Systems (GIS) to uncover how the species potential suitable habitats will change under the predicted climatic changes. Climatic variables for current and future climatic condition obtained from WorldClim. Species occurrence data were collected through fieldwork (in Iran) and downloaded from The Global Biodiversity Information Facility (GBIF). Results showed that the species potential suitable habitats will decrease under the predicted climate change. Results of this study are important in alerting conservationists and ornithologists to potential future risk that the species and other mountain dweller birds would face under the future climatic changes. Keywords: *Pyrrhocorax pyrrhocorax*, MaxEnt, Conservation, Habitat.