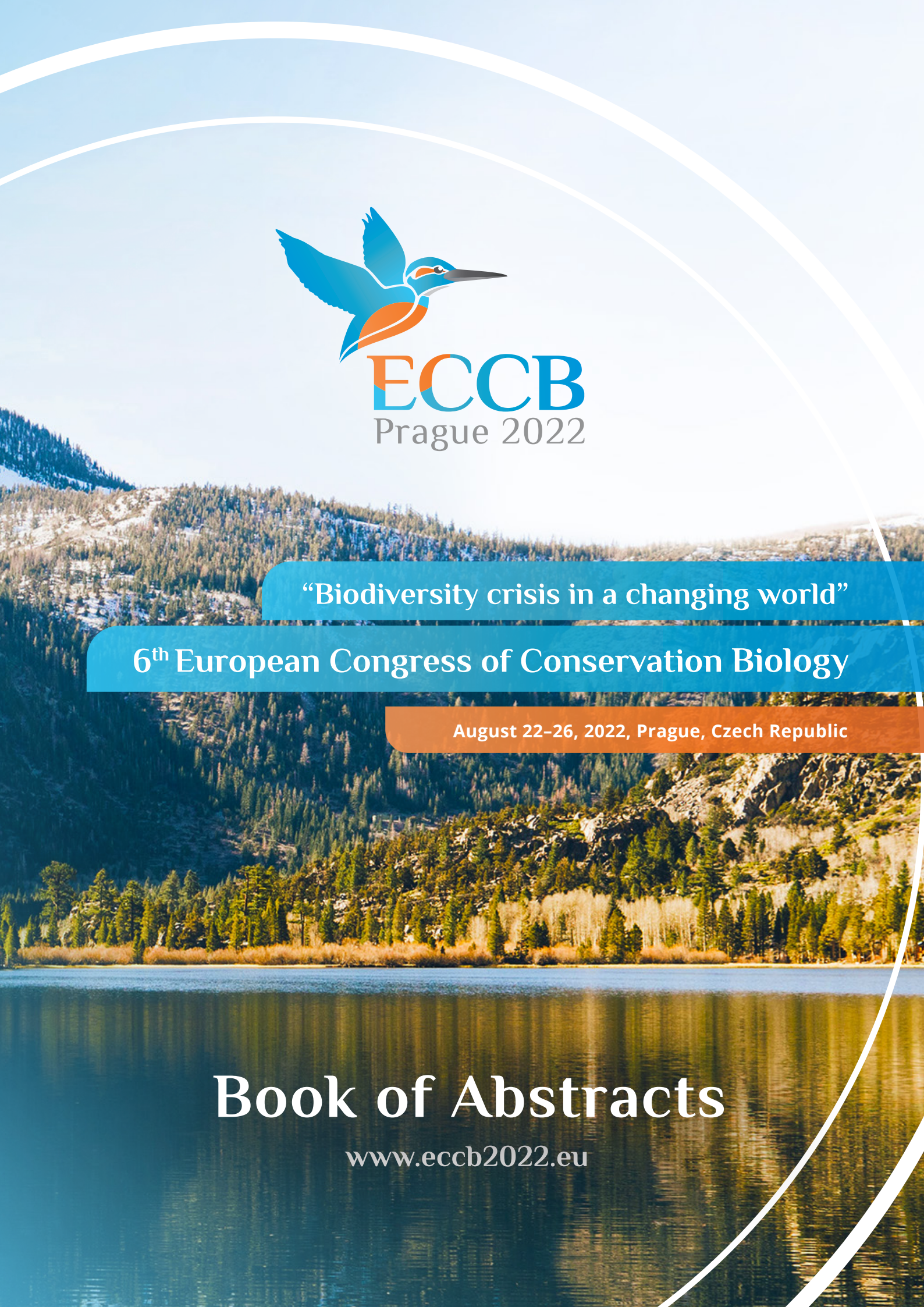

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Prague 2022

"Biodiversity crisis in a changing world"

6th European Congress of Conservation Biology

August 22–26, 2022, Prague, Czech Republic

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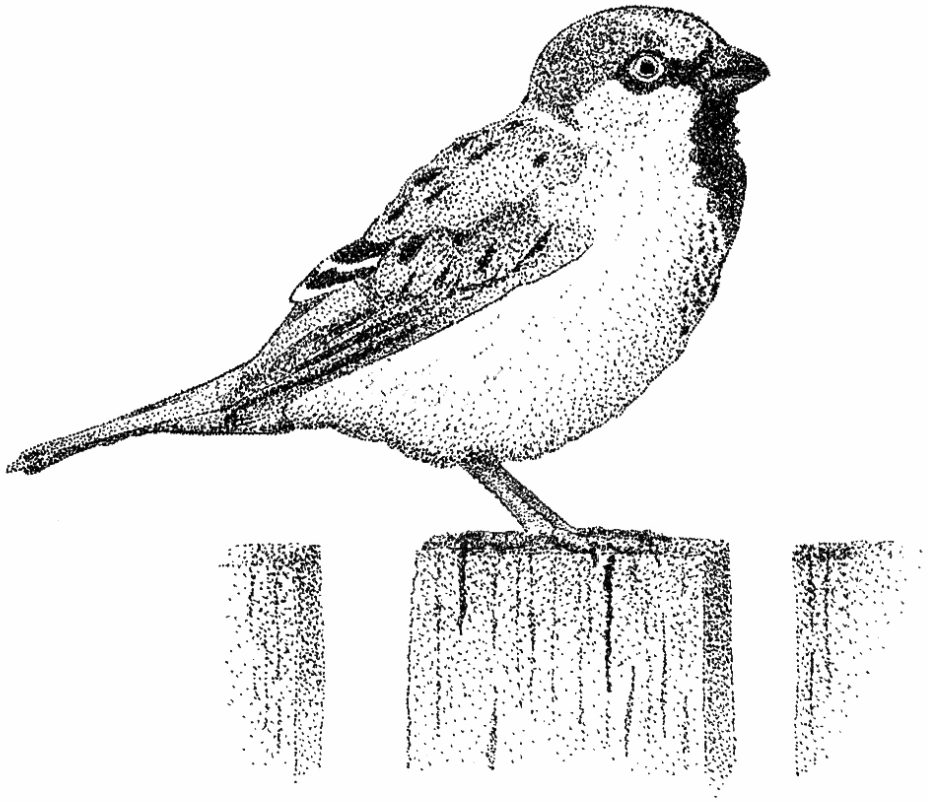

Graphics by: Sarah Maršíková
Passer domesticus

Exposure to urban metals alters bumblebee behavior

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Post–industrial cities have become focuses of pollinator urban greening initiatives due to their large holdings of vacant lands, however, also have a history of soil metal contamination. Urban bees are exposed to metal concentrations while foraging that cause elevated brood mortality. Sublethal exposure to certain metal pollutants challenge honey bee memory and foraging efficiency but the impact of sublethal metal exposure on bumblebee foraging is largely unknown. We examined how field realistic concentrations of chromium influence bumblebee behavior using RFID tracking systems. We predicted that bumblebees orally exposed to chromium will perform fewer and shorter foraging bouts compared to uncontaminated bees due to challenged memory. Eighty test bees from four naïve Bombus impatiens colonies were tagged with unique RFID tags, randomly assigned to treatment (0.46 µg/L Cr2O3) or control (uncontaminated sucrose solution), and deployed to forage for 14 days. Cr concentrations were based on field–realistic concentrations found within bumblebee collected provisions. Paired RFID readers measured directionality, foraging duration, and return colony ID for RFID tagged bumblebees. Chromium fed bees performed fewer and shorter foraging bouts and were more likely to enter a non–natal colony. Our findings illustrate that sublethal chromium consumption effects bee forage frequency, duration, and return navigation.

A national–scale assessment of the main non–native tree species invading forest categories in Italy

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In Europe, many non–native tree species have been introduced and, in some cases, have spread outside the planting areas causing impacts on biological and landscape diversity. Recent studies have focused on the distribution of invasive non–native trees in different natural and semi–natural habitats. However, there is a lack of studies considering their distribution among forest categories, units of classification of forest stands useful for their management. In this work, the forest categories currently or potentially undergoing invasion by invasive non–native tree species were identified for Italy. Based on published works, dedicated databases, and a standard evaluation method, the level of invasion by each non–native tree was assigned to each forest category. The most invaded forest categories were riparian, chestnut, and oak–hornbeam woodlands as well as the Mediterranean maquis. The forest categories most at risk of future invasion by non–native trees were oak, beech and pioneer forests. Tree of heaven and black locust invaded the greatest number of forest categories. Whereas, cherry laurel had the highest number of potentially invasible categories, representing an important future threat to Italian forests. Our results can provide support to forest management aimed at preventing invasions or mitigating their negative impacts on forest ecosystems.

Do we have enough data to assess large–scale trait diversity?

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Studying large–scale trait diversity can provide insights into the impact of human activity on ecosystem function and aid in conservation prioritisation. However, the trait datasets that can aid these studies are often biased or incomplete, and confusion remains about the impact this has on how we measure and compare trait diversity. To address this knowledge gap, we used a near complete bird trait dataset simulating random and biased removal of data to assess whether trait diversity metrics are resilient to data incompleteness, and whether data imputation can overcome missingness and bias in empirical data. Specifically, we compared three methods commonly used to define trait space (with their associated metrics of trait diversity): distance–based methods (rao), convex hull (richness) and probabilistic hypervolumes (richness, evenness and dispersion). We found that trait diversity metrics were resilient to moderate missingness and bias without imputation, and severe missingness and bias with imputation. Probabilistic hypervolumes were particularly resilient to missingness and bias when combined with imputation. While dedicated efforts to capture intraspecific variation and increase the number of traits represented should continue, our results suggest that available methods and data can successfully quantify large–scale trait diversity.

Citizen science for nature conservation in Hungary, an overview experiences three dimensions

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Our research aim is to assess nature conservation related citizen science (CS) projects in Hungary based on the analysis of documents and interviews carried out among CS project managers. First the main characteristics of the projects are described and compared. It is followed by the analysis of projects related to three dimensions of CS: 1. securing the scientific sound output of the projects by validation, 2. the use of project outputs in nature conservation, 3. environmental education of participating citizen scientists. Our results show that the duration of the assessed CS projects vary from decades to few years, they target protected and/or invasive species and projects are run by NGOs, state organizations and research institutes. There is a variation in the methods of monitoring from only registering the GPS coordinates to using an international monitoring protocol. Apps and more traditional methods are used for registering data, and results are shared through internet based platforms. Validation vary and might include even site visits. Outputs supplement scientific monitoring systems, are used for planning payment schemes and management of the species. Knowledge transfer to participants is usually done through internet based platforms. Possibilities for discussion might be used as well to enhance learning.

Habitats and climate change in Slovakia

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Over the centuries, Slovak landscape and its habitats have been changed by human activities and as a result todays the Slovakia is covered with a mosaic of natural and semi–natural habitats surrounding urban and other intensively used land. Habitats depend on natural conditions, especially relief, specific soil, hydrological and microclimatic conditions. The aim of our study was define the most threatened habitats by climate change. We focused on the current conservation status of habitats of community interest (defined in Habitats Directive), distribution, conservation measures and pressures and threats. The assessment was performed based on the results of monitoring data of habitat of Community Interest in the period of 2013–2018, focusing on threats/pressures related to climate change. The selection of threatened habitats was also supported also by literature review on climate change–dependent habitats and a sociological survey focusing on the perception of climate change and habitats by experts in the field of biodiversity and ecology. Climate change is altering key habitat elements that are critical to wildlife's survival and putting natural resources in jeopardy. The most threatened habitats by climate change are wetlands, however many other habitats are significantly affected as well. This work was supported by ITMS2014+ 313011W580 – URANOS.