Book of abstracts

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“Biodiversity positive by 2030”

17-21 June 2024 – Bologna, Italy

ECCB 2024 BOLOGNA

7th European Congress of Conservation Biology

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The B-Cubed project (Biodiversity Building Blocks for Policy) was initiated with the aim of ensuring that monitoring data be easily accessible, reliable, and useful, thereby enhancing the efficiency of future conservation-related decision making. The ongoing global biodiversity crisis necessitates robust, precise, reliable and recurrent biodiversity monitoring data for effective policy assessment. A considerable amount of data has already been collected, such as datasets coming from Habitat Directive reports of the European Union. However many of these dataset are not easily accessible, with temporal and spatial data often kept separately or not harmonized in terms of taxonomy. Additionally, biodiversity data are often influenced by errors that make their applicability uncertain in modeling species distribution. First, the project aims to integrate the use of virtual species and simulation, to assess how spatio-temporal and taxonomic uncertainty can affect our understanding of ecological niche and conservation needs of real species. Furthermore, through the use of the data cube format, B-Cubed aims to organize biodiversity data spatially, temporally, and taxonomically, making them easily usable and increasing efficiency in modeling change and status of biodiversity. These B-Cubed goals are crucial to align with the Biodiversity Strategy for 2030 and provide relevant recommendations for effective conservation planning.

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ID: 1025

Using the youngest fossil record to reconstruct life history changes in the exploited bivalve Arca noae in the northern Adriatic Sea

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Changes in life history of marine species in response to harvesting and human-induced environmental changes are frequently observed in modern ecosystems, but the true magnitude of these shifts is difficult to evaluate without the pre-impact data. The edible bivalve Noah's Ark shell (Arca noae L.) is commercially exploited in the Adriatic Sea, where its fishery rapidly expanded until a population collapse in the late 1940s. In spite of partial recovery, the lack of data on growth parameters of this species prior to that event complicates establishing sustainable levels of harvesting. To provide a baseline for assessment of the current state of populations of A. noae we compared modern and fossil (middle to late Holocene) specimens from the northern Adriatic using samples from benthic surveys and sediment cores. The maximum lifespan of fossil specimens estimated based on sclerochronological methods exceeded 85 years – more than twice the longevity documented in modern individuals. Our results indicate that modern populations of A. noae are characterized by faster individual growth and shorter lifespan compared to their Holocene counterparts, suggesting that harvesting pressure combined with warming and eutrophication of the northern Adriatic Sea had a significant impact on the life history of this species.

ID: 1026

The management of brackish inland lakes: the case study of Pergusa Lake (Sicily) with its sexual population of Chara canescens (Charophyceae)

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Pergusa Lake is a brackish endorheic lake, located in the centre of Sicily. In 1951 a racetrack was built all around the lake: this, in addition to reclamation of swamp areas, digging of wells, the construction of a village, and recently the introduction of alien species and the input of freshwater from other basins, impacted significantly on the lake ecosystem. Nowadays the lake falls within a Special Nature Reserve, a Natura2000 site, and a Geopark.

The lake is important also because it hosts one of the 8 known bisexual populations of the dioecious charophyte Chara canescens Loisel.: the species is limited to saline habitats with a restricted salinity range, but most populations are made only by female individuals (1).

A Biodiversa+ project ("ProPartS") focused on this species across Europe is currently ongoing. Its main goal is to develop management plans for inland brackish water sites that meet the requirements of Chara canescens, thus including primary producers alongside birds and other "flag" species. After the disappearance of the species from Pergusa Lake (2), we were happy to verify its return, and we are now interacting with managers and stakeholders to also include it in the management plans of the site.

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ID: 1027

A framework for understanding the experience of nature through cognitive mapping

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Human behavior plays a pivotal role in the biodiversity crisis and has a major impact on it. Yet, processes contributing to biodiversity decline (e.g., urbanization) also alienate people from nature. While connecting people to nature through nature experiences is considered a primary conservation challenge, our understanding of what constitutes nature experiences remains elusive. Here, we aim to understand what constitutes the experience of nature and propose a holistic framework. We conducted a multistage conceptual content cognitive map (3CM) process with 106 participants, employing a mixed-method approach across three different cultures (US, Switzerland, and Israel). Our findings reveal that the nature experience comprises three dimensions: interactions, encountered circumstances and internal response. These dimensions encompass 33 components which are consistently identified across the cultures. Frequently mentioned components include observing wildlife, landscapes or scenery, lack of human influence, weather conditions, relaxing, and awe for nature. Conversely, fear and home-based nature experiences were the least mentioned components. These results reveal that nature experience is a subjective perception shaped by three interconnected dimensions. The emphasized components underscore the significance of providing access to extensive, less human-influenced natural spaces. This, in turn, can foster a profound nature experience, promoting feelings of connectedness and care for nature.

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ID: 1034

Theory of demographic resilience

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This lecture will introduce the framework of demographic resilience (DR) that was recently proposed (Capdevila et al. 2020) to quantify resilience of populations to disturbances, inspired by a similar concept from community ecology. As with resilience in community ecology, DR is a multidimensional concept that consists of several different metrics. These metrics can be broadly grouped under two main resilience components: resistance and recovery. In addition to resistance that is measured analogously as at the community level (as the extent of the decline in population size after disturbance), compensation can be measured as part of DR (measured as the extent of increase in population size after disturbance) as some populations may exhibit overcompensatory dynamics . Similarly to how community matrices can be used to quantify resilience of communities, population matrix models can be subjected to the analysis of transient dynamics to compute DR metrics. This lecture will explain how to compute a set of such DR metrics, including: damping ratio, reactivity, maximal attenuation and maximal amplification. Further, we will introduce the transient envelope, which encompasses the most extreme possible increases and decreases of the population size after disturbance, and can thus be especially useful in comparative studies.

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ID: 1039

Developing a decision-making tool for sustainable climate action while harmonizing economic, GHG, and ecosystem service indicators in local initiative

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In the global pursuit of climate change mitigation and biodiversity conservation, effective leadership from public decision-makers is paramount. In this context, the carbon market serves as a tool to incentivize the development of sustainable habitat restoration initiatives. The objective of this research was to develop carbon compensation projects involving buffer strips on croplands that are socially, economically and environmentally viable. Specifically, we used state-of-the-art carbon accounting approaches to evaluate the viability of two enlarged buffer strip scenarios: switchgrass crops for the energy market and willow crops for the bioproducts market. We tested the parameter sensitivity of our economic model, including carbon source-sinks, time horizon, costs, revenues, and conversion factors. Our breakeven analysis showed that the two scenarios allow for the long-term maintenance of sustainable agriculture practices at lower cost while deficits quantify the value of the ecosystem services rendered. Our work illustrates the challenges of arbitrating between the economic costs and benefits of a buffer strip project lead by local farmers and the production of ecosystem services in terms of water quality and wildlife habitat restoration.

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