



Finanziato
dall'Unione europea
NextGenerationEU



Ministero
dell'Università
e della Ricerca



Italia Domani
DIPARTIMENTO
DIPARTIMENTO



NATIONAL
BIODIVERSITY
FUTURE CENTER



**Forum Nazionale
della Biodiversità**

20 21 22
maggio 2024
Palermo

A challenging study to address the complexity of extreme and threatened habitats: the BioAlpEC project (Biodiversity of Alpine Ecosystems in a Changing world)

Francesca Cagnacci, Andrea Corradini, Giulia Ferrari, Anita Gattei, Daniele Marinelli, Furrukh Mehmood, Sara Vettorazzo, Nicola Zadra, Franziska Zemmer, Adriano Boscaini, Maria Cristina Bruno, Leonardo Cerasino, Antonella Cristofori, Claudio Donati, Andrea Gandolfi, Damiano Gianelle, Elena Gottardini, Heidi C. Hauffe, Stefano Larsen, Mingai Li, Ulrike Obertegger, Federico Ossi, Annapaola Rizzoli, Nico Salmaso, Valentina Tagliapietra, Monica Tolotti, Charlotte Vanderlocht, Claudio Varotto, Cristiano Vernesi, Mario Pezzotti

Research and Innovation Centre, Fondazione Edmund Mach, via Mach 1, San Michele all'Adige, Trento
National Biodiversity Future Centre – NBFC, Palermo

Alpine ecosystems are unique in their extreme heterogeneity due to topography, geomorphology, geophysics, and microclimatic conditions. They are particularly exposed to climate change, with the regression of the snowline and thawing of glaciers inducing profound modifications to all habitats. While the timber line shifts upslope, freshwater bodies undergo radical changes in water regime and persistence. Forests exposed to extreme climatic events experience outbreaks of plant or animal invasive species and parasites, taking advantage of weakened communities. This scenario is made additionally complex by other forms of anthropogenic pressure; for example, although the abandonment of traditional landuse has made habitats available to an expanding large mammal community, the denser network of roads and trails and their increased use for outdoor activities have enhanced the potential for human-wildlife conflict. Here we used a multi-scale, multi-level approach to assess how these cascading effects have impacted biodiversity, pooling an ensemble of techniques and methodologies. From metagenomics of bioaerosol, ecto- and endo- microbial communities, and freshwater protists and metazoans to comparative genomics of flora and population genomics of endemic vertebrate species; from population demography of invertebrates and mammals to remote sensing of forest, grassland, and mammals' occurrence, and bio-logging of free-ranging ungulates, the BioAlpEC project is unravelling a gradient of biodiversity threats, but also of species' resilience and responses that are rapidly re-shaping the dynamics and functions of Alpine ecosystems.

This study was carried out within the National Biodiversity Future Centre and received funding from the European Union Next-GenerationEU (PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) – MISSIONE 4 COMPONENTE 2, INVESTIMENTO 1.4 – D.D. 1034 17/06/2022, CN00000033).