

Projet SOMBEE

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ABSTRACT

Global change scenarios are invaluable to guide long-term strategic policies, prompt management actions and increase public awareness of future trends in biodiversity. Although the degree of realism of scenarios and marine ecosystem models developed in support of an ecosystem approach to fisheries has greatly improved, in most cases, the Darwinian evolution of fish populations is still neglected in future projections. Evidence indicates that populations adapt to global change, either via phenotypic plasticity or genetic processes, leading to modifications in their life-history and physiology. Such adaptation can mitigate the impacts of global change on fish populations and prevent their extirpation, an evolutionary rescue, but it can also push them towards evolutionary traps due to the erosion of their genetic diversity and thus reduction of their evolutionary potential and resilience. SOMBEE addresses the role of eco-evolutionary dynamics and their consequences for the sustainable exploitation of fish resources in the future. To this end, we will build and test scenarios of the combined pressure of fishing and climate change on both intra- and inter-specific marine biodiversity, by explicitly modelling the phenotypic plasticity of fish life-history traits, their selection and adaptive evolution, and their genetic drift for multiple interacting species. The objectives are to: i) develop a cutting edge evolutionary ecosystem model with primary focus on fish; ii) apply it to a set of 6 contrasting ecosystems to better understand the selective pressures exerted by fishing and climate change; iii) project future changes in intra- and inter-specific biodiversity and related fishing production and economic profit under combined climate and fishing scenarios and iv) quantify the synergistic and antagonistic ecological, evolutionary and economic impacts of these drivers. SOMBEE will advance knowledge on the capacity of fish communities to adapt to global change and our ability to forecast their persistence and the future sustainability of fisheries and food production.