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Identifying conversion efficiency as a key mechanism underlying foodwebs adaptive evolution:
A step forward, or backward?

Abstract: In the litterature, several models of food web evolution have been introduced and numerically analysed. In this presentation, we aim at better identifying the key mechanisms and assumptions that promote the emergence of trophic network in a class of eco-evolutionary models previously proposed in the litterature. In particular, some biological conditions of these models seem to be arbitrary and not justified from an ecological point of view. We will show that relaxing strong assumptions of these models can give rise to degenerate trophic network. We will then propose a way to obtain satisfying foodweb topologies, without artificial constraints, modifying the biomass conversion efficiency in accordance with empirical data. Exploring a single family of functions for the biomass conversion efficiency, we will present the emerging foodweb structures w.r.t. the parameters of the family of functions, based on numerical simulations and fitness analysis. Moreover, we will discuss the importance of the relative evolutionary speed of evolving traits in the emerging foodweb structures.
Work in collaboration with Sylvain Billiard and Nicolas Champagnat.