Assessing the functional contribution of species across timescales

Alice Nadia Ardichvili*[1], Thomas Onimus[1], Jean-François Arnoldi[1], and Michel Loreau[1]

[1]Station d'Ecologie Théorique et Expérimentale – Centre National de la Recherche Scientifique, Fédération de Recherche Agrobiosciences, Interactions et Biodiversité – France

Résumé

Biodiversity provides services and functions that humanity and many living beings rely on. These include nutrient cycling, carbon storage, microclimate regulation, food production... If the positive role of biodiversity for ecosystem functioning (BEF) is now well established, a tension remains between two important corpus of ecological research. On one hand, BEF literature gives a central importance to the raw number of species, eg. the more plant species seeded, the higher the biomass production, and even more so over time. On the other hand, functional ecology, focusing on functional traits and biomass weighted community means, tends to demonstrate the major role played by a few dominant (plant) species, while struggling to quantify the functional role of rare ones. In the current ecological crisis, it is crucial to reconcile the two perspectives, so as to give clear, concrete, and operational ideas about species functional contributions and better manage, restore, and protect the eroding services that nature provides. Using a theoretical approach, we highlight the importance of time scales considered. BEF makes broad statements about the outcome of ecological assembly (dynamic contributions), whereas functional ecology characterizes the end point of assembly (static contributions). Knowledge about species interactions is required to quantify the difference between the two types of contributions. In some cases, functional traits are sufficient to predict species functional contributions. However, when interactions are highly variable, functional contributions become unpredictable.

Mots-Clés: biodiversity, ecosystem funcitoning, functional traits, theory

*Intervenant