Effects of generalism on temporal stability in complex communities

Alain Danet*[1], Robert L Hawkins[1], and Andrew P Beckerman[1]

[1]University of Sheffield [Sheffield] – Royaume-Uni

Résumé

Predicting the stability of ecological communities is a central question in ecology. Diversity-stability has been mainly studied in plant communities and species assemblages, lacking the trophic complexity of natural communities. One of key features of predator-prey and competitive interactions is that they can synchronise or desynchronise species fluctuations over time, thereby affecting asynchrony, species stability, and ultimately community stability and its relationship with species richness. Using a stochastic Bioenergenetic food-web model of 2-50 interacting species, embedded in plant, plant-herbivore, plant-herbivore-carnivore communities, we investigate how competition and predator generalism affect community stability, asynchrony and species stability. We found that competition generally generates asynchrony among plants but that herbivores can override these effects. We further show that the presence of generalist predators can further synchronise communities, thereby decreasing community stability, but also increases population stability, thereby increasing community stability. I will then briefly show how food-web structure and species richness jointly drive community stability in complex food-webs. Those studies highlight the need to account for the complexity of community structure to understand community stability.

Mots-Clés: temporal stability, foodweb, theoretical modelling, generalism

*Intervenant