Plant functional diversity through space and time: what happened in the shallow ponds of the Iles Kerguelen for five years?

Jérémy Bacon*[1], Pauline Eymar-Dauphin[1], David Renault[2], Florian Mermillod Blondin[1], Laurent Simon[1], Félix Vallier[1], and Anne-Kristel Bittebiere[1]

[1]Laboratoire d'Ecologie des Hydrosystèmes Naturels et Anthropisés – Université Claude Bernard Lyon 1, Ecole Nationale des Travaux Publics de l'Etat, Centre National de la Recherche Scientifique – France
[2]Ecosystèmes, biodiversité, évolution [Rennes] – Université de Rennes, Institut Ecologie et Environnement - CNRS Ecologie et Environnement, Centre National de la Recherche Scientifique, Observatoire des Sciences de l'Univers de Rennes – France

Résumé

Plant community assembly results from combined effects of three processes: dispersal, ecological drift, and environmental filtering. These processes may change through time, resulting in the plant community dynamics (modification in plant species composition) and in variations in plant species strategies (intraspecific trait variations). Ultimately, this should then affect the functional diversity of the plant community. In this context, we aim here at determining the process that most influence the functional diversity of aquatic plant communities through space and time.
We then conducted an analysis of a five years dataset compiling traits measured on all aquatic plant species encountered in temporary freshwater ponds of the Iles Kerguelen (South Indian's Ocean), as well as environmental parameters measured at fine spatial scale (physico-chemical parameters of water and sediments, and water depth), descriptors of pond size and locations (distance to sea and to the nearest pond), and plant species richness and abundances. As sub-polar regions are subject to rapid climate changes, environmental parameters are likely to vary significantly through short periods of time. We computed a path-analysis based on a Structural Equation Modeling approach, to link variations in the functional diversity of plant communities and all the above parameters.
Preliminary results reveal an effect of environmental filtering through the distance with the sea, pH, and conductivity on plant functional diversity. All these variables appeared to be structured by temporal or geographical distances. Also, variability in pH was positively correlated with the mean water temperature. Ecological drift was detected through the positive correlation between time and functional diversity. Surprisingly, results opposite to those expected in the case of dispersal limitation were found. These preliminary results will be deepened to determine how functional diversity varies through time in the studied communities.

Mots-Clés: beta functional diversity, path analysis, macrophyte, dispersal limitation, ecological drift, environmental filtering

*Intervenant