
Birds community structure through available energy in french ecosystems

Claire Lorel^{*1}, Maud Mouchet¹, Isabelle Le Viol¹, and Emmanuelle Porcher¹

¹Centre d'écologie et de sciences de la conservation (CESCO) – CNRS : UMR7204, Université Pierre et Marie Curie (UPMC) - Paris VI, Muséum National d'Histoire Naturelle (MNHN) – 55 rue Buffon 75005 PARIS, France

Abstract

The acknowledged growing urbanization and agriculture intensification pose considerable threats to biodiversity and ecosystem services worldwide. Energy is the basis of productivity and ecosystem functioning but its availability for biodiversity is reduced by intensification practices. So far, few studies have examined the large scale response of the different components of biodiversity and functional diversity, to land use intensification. Using the French Breeding Birds Survey, coupled with a trait database, land use maps, we investigated the variations in the functional structure of bird communities to several indicators of intensification (e.g. HANPP), over agricultural and semi-natural landscapes. Specifically, we evaluated habitat specialization (CSI) and average trophic (CTrl) position, functional richness (FRic), evenness (FEve), divergence (FDiv) and dispersion (FDis) of these communities along a gradient of intensification (HANPP and energy availability after harvest (NPpt)).

We have demonstrated that the energy available (NPpt) for avian communities strongly depends on the land cover type: NPpt in semi-natural habitats is overall higher than in farmlands. Habitat specialization and trophic position show an opposite trend along the gradient of NPpt: specialized communities tend to be associated to in extreme energy levels low and high levels of NPpt while communities characterized by high trophic level tend to be more abundant at intermediate levels. Besides, the relationship between NPpt (or HANPP) and functional diversity differ among indices and across functions (diet, foraging behavior, all traits taken together).

Our findings could contribute to a new light about mechanisms through which HANPP impact birds in different types of land use.

Keywords: birds, community, HANPP, fonctionnal diversity

^{*}Speaker