PhD opportunity

"Balancing urban and agricultural development with biodiversity conservation: evaluating Human footprint on biodiversity using a functional and multi-trophic approach"

On a global scale, and particularly in Europe, natural ecosystems have been replaced to a mosaic of landscapes driven by human activities, therefore altering the relationships between biodiversity and landscape patterns (Tscharntke et al. 2012). The approach developed by Haberl et al. (2007), that distinguishes the amount of energy available from the amount harvested by and for human activities, offers an integrative view linking land uses and the different aspects of intensification. Indeed, the productivity of ecosystems is a major determinant of intra- and interspecific diversity and of the complexity of food chains. Greater availability of resources (or energy) allows including greater subdivision of resources (increasing specialization), reduces competition, resulting in the coexistence of a larger number of individuals, populations, species, or the establishment of complex food webs (Brown, 1981, Hawkins et al. 2003, Cusens et al. 2010, Evans et al. 2005). Although the theoretical pathways linking energy and biodiversity, or land use intensification and energy availability have been discussed (Aronson et al. 2010, Pereira et al. 2010, Kraussman et al. 2013, Sol et al. 2014 ), few has empirically explored the relationship between biodiversity and intensification by considering the energy left in ecosystems after harvest.

This PhD project aims to study the effect of several components of intensification on the spatial patterns of taxonomic and functional diversity of several trophic levels using diversity (e.g. Rao’s quadratic entropy) and specialization (CSI) indices using a set of geo-referenced data already available (i.e. biodiversity data were collected through a citizen-based monitoring program, Vigie-Nature). This will be done at different levels (e.g. regional, national), with a particular focus on agricultural areas and (peri-) urban. The PhD will aim to answer the following questions:

- Axis 1: How will the different components of land use intensification affect the components of biodiversity (i.e. taxonomic and functional diversity, community structure at different trophic levels) and related services?
- Axis 2: How does the shape of the biodiversity-intensification relationship vary with the scale (national vs. regional)? What are the determinants (landscape structure, climate, etc.) of this relationship at each spatial scale?
- Axis 3: What are the best scenarios to reconcile urban development, agriculture and biodiversity conservation?

The PhD student will be part of the CESCO lab (Muséum National d’Histoire Naturelle, Paris, France), which includes a large number of researchers and students working on various conservation issues. The PhD student will also benefit from an ongoing collaboration between CESCO and a team of researchers from the Institute of Social Ecology (UNI Klagenfurt, Vienna, Austria), that developed and mapped a set of indicators of land use intensification.

Qualifications: Master’s degree or equivalent in biodiversity, functional ecology or theoretical Ecology. Good skills in statistics and R programming.

Funding: The PhD position will start between 1st October 2015 and 31st December 2015. It’s a 3-year position. The allocation will be around € 1,430 per month, which corresponds to a PhD grant from the

If interested, please send a cover letter and a CV before 1st June 2015 to:
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References