

Estimation of dispersal rates with incomplete biodiversity inventories and temporal series of landscape images

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Abstract: A general understanding of the spatial dynamics of natural populations is needed to both predict their response to changing environments and design efficient conservation actions. Most biodiversity data are static and incomplete, which makes difficult the quantification of population dispersal rates for most organisms. We here develop an original approach to improve the estimation of population dispersal rates in fragmented landscapes. This approach is based on the idea to complement incomplete snapshot biodiversity data with a temporal series of landscape images. We develop a pseudo-likelihood method to make use of such data under the framework of metapopulation theory, which builds on the ideas of ter Braak and Etienne (2003) and Verheyen et al. (2004). We test the power and robustness of our method with simulated data and apply it to inventory data of forest understory plants of the Ile-de-France region in France for which landscape images are available since 1700.

References

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