

Butterflies: 'Twice-punished' by habitat fragmentation and climate change

December 9 2011



The diversity of European butterflies conceals fundamental principles of inter-relationships between dispersal and life-history. Credit: Michel Baguette

New findings by Virginie Stevens (CNRS), Jean Clobert (CNRS), Michel Baguette (Museum National d'Histoire Naturelle) and colleagues show that interactions between dispersal and life-histories are complex, but general patterns emerge. The study was published as open access paper in the journal *Ecology Letters*.

As dispersal plays a key role in [gene flow](#) among populations, its [evolutionary dynamics](#) under environmental changes is particularly important. The inter-dependency of dispersal with other life history traits may constrain dispersal evolution, and lead to the indirect selection of other traits as a by-product of this inter-dependency.

Identifying the dispersal's relationships to other life-history traits will help to better understand the evolutionary dynamics of dispersal, and the consequences for species persistence and ecosystem functioning under global changes. Dispersal may be linked to other life-history traits as their respective evolutionary dynamics may be inter-dependent, or, because they are mechanistically related to each other.

The authors identified traits that are predicted to co-vary with dispersal, and investigated the [correlations](#) that may constrain dispersal using published information on butterflies. The [quantitative analysis](#) revealed that (1) dispersal directly correlated with demographic traits, mostly fecundity, whereas phylogenetic relationships among species had a negligible influence on this pattern, (2) gene flow and individual movements are correlated with ecological specialisation and body size, respectively and (3) routine behaviours only affected short-distance dispersal. Together, these results provide important insights into evolutionary dynamics under global environmental changes, and are directly applicable to biodiversity conservation.

Specialist species with narrow tolerance to temperature are also those butterflies that have weak dispersal ability. For such species, the combination of [habitat fragmentation](#) and climate warming is thus a kind of 'double penalty'. Those species should thus be the priority targets in conservation actions. Besides, these results show that the size of a butterfly is not a reliable proxy of most of the components of its ability to disperse across inhospitable parts of landscapes, and is particularly poor at describing species' ability to maintain spatial gene flow.

More information: *Ecology Letters*, (2011) [doi: 10.1111/j.1461-0248.2011.01709.x](https://doi.org/10.1111/j.1461-0248.2011.01709.x)

Provided by Pensoft Publishers

Citation: Butterflies: 'Twice-punished' by habitat fragmentation and climate change (2011, December 9) retrieved 23 June 2024 from <https://phys.org/news/2011-12-butterflies-twice-punished-habitat-fragmentation-climate.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.