
Recent trends in the distribution of butterflies and dragonflies in Western Europe

Gaël Delpon^{*1,2}, H el ene Vogt-Schilb³, Fran ois Munoz⁴, Franck Richard⁵, and Bertrand Schatz³

¹Centre d' cologie fonctionnelle et  volutive (CEFE) – CNRS : UMR5175, Universit  Montpellier II - Sciences et techniques, Universit  Montpellier I, Universit  Paul Val ry - Montpellier III,  cole Pratique des Hautes  tudes [EPHE] – Campus CNRS - 1919 route de Mende - 34293 Montpellier cedex 5, France

²Biotope – Aucune – 22 Boulevard Mar chal Foch, 34140 M ze, France

³Centre d' cologie fonctionnelle et  volutive (CEFE) – CNRS : UMR5175 – Campus CNRS - 1919 route de Mende - 34293 Montpellier cedex 5, France

⁴Botanique et Bioinformatique de l'Architecture des Plantes (AMAP) – Universit  Montpellier II - Sciences et techniques – Bd de la Lironde TA A-51/ PS 2 34398 Montpellier cedex 5, France

⁵Centre d' cologie Fonctionnelle et Evolutive (CEFE) – Universit  Montpellier II - Sciences et techniques – 1919 route de Mende;34293;Montpellier Cedex 5, France

Abstract

Butterflies and dragonflies show a high vulnerability to global changes because of their specialized interactions and their sensitivity to habitat structure and fragmentation. Despite increasing research addressing their conservation issues, analyses of range changes over large spatial and temporal scales remain rare, particularly for insects. Our aim is to characterize the recent trends in the distribution of these two groups in Western Europe, in connection with environmental gradients (climate, land cover ...) and species ecology.

We performed diachronic analysis of species distribution by compiling presence data in France, Belgium and Luxembourg during the last thirty years. Random range changes were simulated by null models and allowed testing the significance of appearance/disappearance dynamics of species observed in each administrative unit, as well as the direction of significant range shifts.

We found contrasting patterns of range dynamics among butterflies and dragonflies species. A strong latitudinal gradient of decline appeared for Rhopalocera, whereas Odonata showed heterogeneous patterns, related to local regression of aquatic habitats. For both, dynamics of range changes seemed mainly resulting from growing urbanization, intensification of agricultural landscapes and degradation of wetlands. Species responses to these changes appear closely link to their ecological preferences, with increased decline of specialist species associated with sensitive and declining habitats.

These dynamics entail increasing contrast of species richness patterns between the North and South of the study area and underscore the responsibility of Mediterranean region in the conservation of these two insects' groups. Conservation priorities are also identified in terms of species and administrative areas.

*Speaker

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