

# Movements and flight morphology in the endangered Large Blue butterflies

## Communication

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**Abstract:** Movements and flight morphology of the endangered Large Blue butterflies *Phengaris teleius* and *P. nausithous* in southern Poland were studied with mark-release-recapture surveys and GIS analyses. Most individuals moved relatively small distances (<40 metres) within their habitat patches. Distances covered by both species were positively related to season progression and wing length, and negatively related to body mass. *P. teleius* movement distances slightly exceeded those of *P. nausithous*. In addition, females moved longer distances than males, although the difference was significant only in *P. teleius*. Morphological traits appeared to be good indicators of the inter-specific and inter-sexual differences in mobility. While *P. teleius* individuals were heavier than *P. nausithous* ones, they had considerably longer wings, which may explain longer movements in the former species. Similarly, females were heavier than males in both species, but they invested more in wing size, which is likely to compensate for the negative impact of body mass on movement distances. Our results indicate that combination of GIS analysis of movement distances recorded with mark-release-recapture methods and morphometric measurements taken in field during non-lethal handling of captured individuals proved useful for studying the mobility potential of the endangered insect species.

**Keywords:** Dispersal • Maculinea • Metapopulation • Mobility • Morphometric measurements

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## 1. Introduction

In light of global biodiversity loss, understanding factors affecting animal mobility has grown in importance, due to many species living in increasingly fragmented landscapes [1-3]. Higher mobility increases the probability of colonisation of vacant habitat patches as well as the chances of rescue effects for declining local populations, and thus enhances viability of entire metapopulations [1]. In turn, information on within-patch movements offers insight into space and resource use by individuals living in local populations [4,5]. It is also

believed that within-patch mobility may be useful for assessing potential for inter-patch dispersal [4,6].

In recent years, growing attention has been given to heterogeneity in mobility among individuals and how it is affected by morphological traits. Studies on butterflies indicate that variation in individual mobility, reflected by flight speed and acceleration capacity, can be related to differences in certain morphological parameters, particularly body mass and wing loading [7,8]. Furthermore, it has been found that individuals from populations that were newly established through colonisation events are larger and have relatively

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