

## Living in the metropolis: how landscape anthropization shapes morphology of two charismatic insect pollinators

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### Abstract:

Landscape anthropization represents the principal cause of natural habitats loss and fragmentation, with intensive agriculture and urbanization as the major drivers of land-use change. The response of biodiversity and its interactions to environmental conditions occurring in these anthropogenic habitats is still poorly understood.

In this study, we analyzed functional traits variation in two pollinator insect species: *Bombus terrestris* and *B. pascuorum*, through a geometric morphometric approach. We investigated the variations in body size and wings size and shape asymmetry in response to environmental conditions associated to land-use change (i.e., temperature and landscape structure). We conducted samplings at 47 sites distributed along a gradient of landscape anthropization in the metropolitan area of Milan.

Our results described a species-specific response, with higher temperatures in cities determining a phenotypic shift towards smaller size in *B. pascuorum* and higher wing size asymmetry in *B. terrestris*. Wing shape did not show any significant variation in response to our predictor variables. These morphological variations could result in an impaired dispersal capability of these two pollinator species that could negatively affect the service of pollination with negative consequences on ecological, social and economic issues.