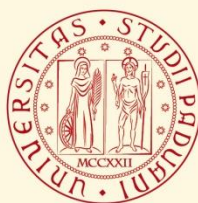


Similar life history trait combinations interact to determine species' sensitivity to habitat fragmentation and climate change

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The life history traits of species are known to be associated with species vulnerability to anthropogenic disturbances such as habitat fragmentation and climate change. Species with certain traits are more likely to persist within altered ecosystems than others, but the sensitivity of species to these two global changes may also depend on the covariance among traits, with certain trait combinations likely to elevate the extinction risk for particular species. Here, we tested this hypothesis using data on 32 species of ground beetle (Coleoptera: Carabidae), collected from 300 pitfall traps in a mountain forest landscape in the eastern Italian Alps. We detected significant interaction effects among species traits that determined their sensitivity to gradients of habitat fragmentation (patch size and edge effects) and altitude (a surrogate for climate change). In line with expectations, we found that large-bodied species with restricted dispersal and specialised diets were most susceptible to environmental change. In addition, dimorphic and macropterous forest specialist species, together with smaller wingless open habitat specialists were negatively affected by increasing grassland patch areas. Importantly, we found a positive correlation between species susceptibility to habitat fragmentation and climate change, indicating that the two environmental changes acting simultaneously may exert stronger combined effects on biodiversity than either change acting independently.



XXV CONGRESSO NAZIONALE ITALIANO DI ENTOMOLOGIA

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