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ORIGINAL ARTICLE

Road effects on demographic traits of small mammal populations

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Abstract Recent studies have highlighted the positive effects of road verges on the abundance of small mammals. However, most of these studies occurred in intensively grazed or cultivated areas, where verges were the last remnants of suitable habitats, which could mask the true effects of roads on population traits. We analysed the effects of roads on small mammal populations living in a well-preserved Mediterranean forest. We used the wood mouse (*Apodemus sylvaticus*) as a model of forest-dwelling small mammals that probably are among the species most affected by road clearings. Our study compared populations in similar habitat areas with and without road influence. We assessed abundance, survival and temporary emigration using extended Pollock's robust design capture-recapture models. Moreover, we analysed population turnover, sex ratio, age structure and body condition. We found that wood mouse abundance and body condition were lower at the road bisected area, whereas the remaining population traits were similar. This suggests that the reduced habitat availability and quality due to the physical presence of the road and verge vegetation clearing are the main drivers of demographic differences in wood mouse populations between areas. Nevertheless, our results also suggest that in high-quality habitats surrounding national roads, wood mouse populations present similar dynamics to others living in undisturbed areas, despite the decrease in abundance and body condition. Overall, the often-reported increased small mammal abundance in road surroundings should not be generalized independently of habitat quality or to other population traits.

Keywords *Apodemus sylvaticus* · Capture-recapture · Extended robust design models · Population estimation · Roadless area · Road effects

Introduction

Roads are essential to modern human societies. These infrastructures exist throughout most landscapes, and their extension, complexity and use are set to rise around the world due to growing economic and social demands (Forman et al.

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