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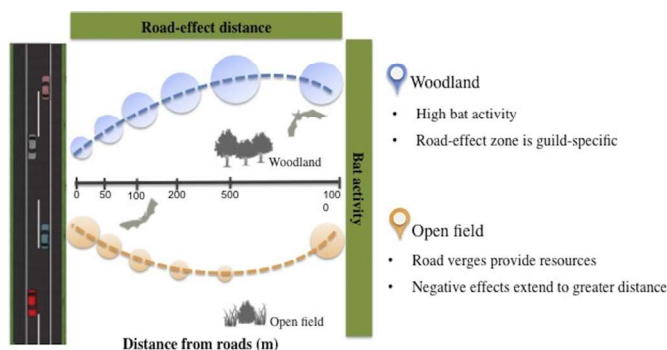
Road effects on bat activity depend on surrounding habitat type

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HIGHLIGHTS

- Low-medium traffic roads have a major negative impact on bat activity.
- Road-effect zone is guild-specific and depends on the surrounding habitat.
- Negative effects extend to about 300 m from the roads in woodland and >500 m in open field habitat.
- High-suitable habitats buffer the negative effects of roads.
- Road verges may provide resources for bats in lower-suitable habitat.

GRAPHICAL ABSTRACT



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ABSTRACT

The effects of roads on bats are still a poorly documented issue. Most of the available research focuses on large and high-traffic highways, while low-medium-traffic roads are often assumed to have negligible impacts. However, small roads are ubiquitous in landscapes around the world. We examined the effects of these roads, as well as habitat types, on the activity of three bat guilds (short-, mid- and long-range echolocators) and the most common bat species *Pipistrellus kuhlii*. We performed three bat acoustic surveys between May and October 2015, with these surveys being performed along twenty transects that were each 1000 m long and perpendicular to three roads with different traffic volumes. The surveys were performed in dense Mediterranean woodland (“montado”) and open agricultural field habitats, which were the two dominant land uses. At each transect, bat activity was simultaneously registered at 0, 50, 100, 200, 500 and 1000 m from the road with the use of an ultrasound recorder. According to the generalized linear mixed effects models, the overall activity of bats and of the short- and mid-range echolocators increased with increased distance from the roads and was dependent on the surrounding habitats. In contrast, the long-range echolocators and *P. kuhlii* were more tolerant to road. Our results also show that the activity was higher in woodland areas, however road verges seem to be a significant habitat in an open agricultural landscape. The major negative effects extended to approximately 300 m from the roads in woodlands and penetrate further into the open field (>500 m). The

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