RESEARCH ARTICLE

Inferring the effects of landscape structure on roe deer (*Capreolus capreolus*) movements using a step selection function

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Abstract In this study, we sought to understand how landscape structure affects roe deer movements within their home-range in a heterogeneous and fragmented agricultural system of south-western France. We analysed the movements of 20 roe deer fitted with GPS collars which recorded their locations every 2–6 h over several months (mean = 9 months). Based on empirical observations and previous studies of roe deer habitat use, we hypothesised that roe deer should avoid buildings and roads, move preferentially along valley bottoms and through the more wooded areas of the landscape. To test these hypotheses we paired each observed movement step with 10 random ones. Using conditional logistic regression, we modelled a step selection function, which represents the probability of selecting a given step as a function of these landscape variables. The selected model indicated that movements were influenced by all the tested landscape features, but not always in the predicted direction: our results suggested that roe deer tend to avoid buildings, roads, valley bottoms and possibly the more wooded areas (although the latter result should be interpreted with caution, as it may be influenced by a bias in the rate of GPS fix acquisition in woods). The distances to buildings and to roads were the most influential variables in the model, suggesting that the avoidance of potential sources of disturbance may be a key factor in determining ranging behaviour of roe deer in human dominated landscapes.

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Introduction

Landscapes undergo modifications triggered by natural events such as storms or floods, but also, and more importantly these days, by human activities (Wiens 2001). This may lead to both the destruction and creation of habitat patches, but also to changes in their size, shape and quality. One of the most pronounced effects of human activities on landscapes is habitat fragmentation, the process of subdivision of a continuous habitat into smaller patches (Andrén 1994) due to the expansion and intensification of human land use (Burgess and Sharpe 1981). Wild (animal and plant)