
Home range size and environmental heterogeneity: a review of metrics and an inter- and intra-specific comparative study

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Abstract

Understanding how animals move in heterogeneous landscapes is key to forecast their response to environmental changes, at the scales of individual decision-making, individual home ranges, population density, and species distributions. After decades of research (Kie et al. 2002), we still have issues addressing this fundamental question of the link between the heterogeneity of the environment and the spatial ecology of animals. This is largely because of inconsistent definitions of heterogeneity, but also because we lack a clear understanding of species- and individual-variation in spatial behavior. For my PhD work (2017-2020), I focus on the intra- and inter-specific differences in movement behavior in four species of ungulates (roe deer, red deer, chamois and mouflon) at seven heterogeneous study sites in France. These species and populations have broadly similar ecologies, but they exhibit key differences, e.g., in post-natal behavior, predator avoidance, feeding strategy and in the amount of thermal stress. I study the causes and consequences of these differences as they pertain to spatial ecology, with the broader objective to upscale the insights into population and community-level inference. I jointly document the variation in home range size and the variation in environmental heterogeneity. I compare different metrics of heterogeneity focusing on different scales and on spatial vs. temporal heterogeneity. Among metrics of heterogeneity, I particularly focus on those derived from spectral analyses (e.g., Fourier transform). This presentation would be suitable for a thematic session on "Movement Ecology" with its main organizer Simon Chamaillé-James.

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