
Animal home ranges: where are we at?

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Abstract

In a context of increasing abundance of movement data and diversification of statistical methods, it seems timely to pause and reflect once again on the concept of home range and the implication of a choice of a strategy for home range estimation. I review the different operational definitions of the home range, both in terms of the factors that drive home range formation and the spatio-temporal scale at which the term is defined. I insist that often-used kernel density estimation methods include many alternative realizations of the movement process, that the animal did not actually follow, into the home range; and this may not be what the end users intended. By contrast, the standard definition of the home range sensu Burt (1943) calls for interpolation methods like the Brownian bridge. In addition to the distinction between interpolations and extrapolations, home range studies can be categorized into mechanistic, parametric approaches (mechanisms → home range) and observational, non-parametric approaches (home range → mechanisms). In between, I propose a new type of semi-parametric home range extrapolator. I also emphasize the notion of home range scale, as opposed to home range area. Simple metrics based on asymptotic semi-variance or asymptotic net squared displacement perform well at measuring the home range scale. This may be sufficient in many situations. I illustrate this review with the analysis of an example dataset from a plains zebra (*Equus quagga*) moving in a mosaic of vegetation types and interacting with a permeable barrier. Home range size and composition estimates varied about 10-fold depending on the choice of estimation strategy. I conclude with a summary of best practices and recommendations for applications to the study of home range size, home range borders, and home range composition.

NOTE: Cette présentation aurait sa place dans une session ‘Ecologie du déplacement’.

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