ARPHA Conference Abstracts 9: e202126
doi: 10.3897/aca.9.e202126

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Conference Abstract

Mind the gap: mismatches between presence records and expert range maps in global mammal distribution data

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Received: 01 Jun 2026 | Published: 01 Jun 2026

Citation: Tedeschi L, Schertler A, Lenzner B, Arlé E, Biancolini D, Essl F (2026) Mind the gap: mismatches between presence records and expert range maps in global mammal distribution data. ARPHA Conference Abstracts 9: e202126. https://doi.org/10.3897/aca.9.e202126

Abstract

Understanding species' distributions is crucial for conservation and invasion biology. The two most widely used types of biodiversity data, presence records and expert-drawn range maps, each have strengths and limitations (Graham and Hijmans 2006). Yet, the degree to which these two data types may spatially agree remains largely unassessed for species introduced beyond their native distribution (i.e., non-native species). Mismatches between these data sources can influence the ecological conclusions drawn about mammal distributions.

In this study, we estimate range fit as the proportion of presences that fall within species' range polygon(s) for native and non-native mammals globally. We further test whether mismatches between datasets can be explained by species' attributes, biogeographic status, and invasion histories. Presences were obtained from the Global Biodiversity Information Facility (GBIF 2026) and cleaned with standard procedures, while range maps were obtained from the International Union for Conservation of Nature (IUCN 2025) and the Distribution of Alien Mammals database (DAMA; Biancolini et al. 2021).

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About 70% of presences fell within native ranges, whereas less than 15% fell within non-native ranges, and a substantial share was located outside any range. Median range fit across species was similar between native and non-native ranges, but the quartile distributions showed a marked difference. This suggests that, although many non-native mammals show range fit values comparable to those of native species, a subset shows important mismatches between presences and range maps. This pattern may reflect ongoing colonization processes and rapidly expanding invasion fronts among these non-native species.

Our results highlight the importance of integrating different types of distribution data to study the spatial ecology of mammals. Range fit provides a simple and informative metric to identify species or regions where mismatches are high, highlighting areas where ranges may be shifting (for instance, due to climate change or increased introduction events). This information can be used in practice to support invasive species management and tailor conservation actions for native species.

Keywords

data quality, GBIF, IUCN, non-native species, point data, range size, species distribution range

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Presented at

Neobiota 2026, the 14th International Conference on Biological Invasions

Conflicts of interest

The authors have declared that no competing interests exist.

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