

A global database of butterfly species native distributions

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Abstract

Butterflies represent a diverse group of insects, playing key ecosystem roles such as pollination and their larval form engage in herbivory. Despite their importance, comprehensive global distribution data for butterfly species are lacking. This lack of comprehensive global data has hindered many large-scale questions in ecology, evolutionary biology, and conservation at the regional and global scales. Here, I use an integrative workflow that combines occurrence records, alpha hull polygons, species' dispersal capacity, and natural habitat and environmental variables within a framework of species distribution models to generate species-level native distributions for butterflies at a global scale in the contemporary period. The database releases native range maps for 10,372 extant species of butterflies at a spatial grain resolution of 5 arcmin (~10 km). This database has the potential to allow unprecedented large-scale analyses in ecology, biogeography, and conservation of butterflies. The maps are available in the WGS84 coordinate reference system (EPSG:4326 code) and stored as vector polygons in the GEOPACKAGE format for maximum compression, allowing easy data manipulation using a standard computer. I additionally provide each species' spatial raster. All maps and R scripts are open access and available for download in Dryad and Zenodo, respectively, and are guided by FAIR (Findable, Accessible, Interoperable, and Reusable) data principles. By making these data available to the scientific community, I aim to advance the sharing of biological data to stimulate more comprehensive research in ecology, biogeography, and conservation of butterflies.

KEY WORDS

butterflies, database, Hedyloidea, Hesperiidae, Papilionoidea, Rhopalocera, species distribution models, species richness

CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data are available in Dryad at <https://doi.org/10.5061/dryad.bzh189h9>. Code is available in Zenodo at <https://doi.org/10.5281/zenodo.12738350>.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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