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DATA PAPER

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The biodiversity of human dwellings: A dataset of 24,000 observations of indoor life in the United States and Canada

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Abstract

While modern ecologists spend much of our lives indoors, we have long overlooked the ecological processes taking place there: inside our homes, offices, and classrooms. Yet, the indoors can be a biodiverse landscape in which a variety of interesting ecological phenomena take place. To better understand the indoor ecosystem, we created a citizen science project called *Never Home Alone* that encourages users of the biodiversity monitoring project

For affiliations refer to page 3

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iNaturalist to document wildlife found in their homes and other indoor spaces. These observations consist of photos, spatiotemporal data, and notes provided by the observer. In April 2024, we began reviewing project observations from the United States and Canada, removing records that did not meet our inclusion criteria that organisms must be (1) wild, and (2) observed indoors. A team of taxonomic experts then identified every observation to the finest possible taxonomic resolution. The final reviewed dataset contains 23,782 observations of indoor life observed by approximately 3000 observers between May 1996 and April 2024. The data span all US states and Canadian provinces (though not the Canadian territories). Most observations were from homes, but participants also submitted observations from offices, schools, airports, and other human dwellings. Approximately 95% of observations were arthropods, predominantly insects (60%; mostly Coleoptera, Diptera, Lepidoptera, Hymenoptera, and Hemiptera) and spiders (30%). Chordates (4%)—primarily reptiles and mammals—made up most of the remainder, though the database also contains indoor fungi, plants, annelids, mollusks, crustaceans, ciliates, and many other groups. The most common species (>200 observations each) were, in descending order, the Asian lady beetle (*Harmonia axyridis*), brown marmorated stink bug (*Halyomorpha halys*), house centipede (*Scutigera coleoptrata*), varied carpet beetle (*Anthrenus verbasci*), long-bodied cellar spider (*Pholcus phalangioides*), triangulate combfoot spider (*Steatoda triangulosa*), bathroom moth fly (*Clogmia albipunctata*), and Eastern parson spider (*Herpyllus ecclesiasticus*). In total, the dataset includes nearly 2100 unique species, though this is likely an undercount given that 44% of observations could not be identified to species level. Approximately 52% of the species in the dataset were only observed indoors once. This dataset represents the first continental-scale survey of indoor species. While a few previous studies have surveyed indoor biodiversity, this prior work was either at a much smaller spatial scale or used eDNA techniques that have certain taxonomic biases and comparatively lower taxonomic resolution. Given that data collection for this project was not effort-controlled, this dataset likely contains biases of its own (e.g., overrepresentation of large-bodied taxa). Additionally, some organisms observed indoors are not necessarily synanthropic, instead, being documented after becoming trapped inside human structures. Nevertheless, this dataset provides a useful complement to the few existing indoor biodiversity surveys and the data are particularly relevant to understanding the synanthropic species most commonly encountered by people. As indoor space expands globally, this dataset offers new opportunities to explore the life traits, evolution, natural history, and distribution of organisms that may be exploiting new niches created by the built environment. Such studies may lead to findings relevant to evolutionary ecology, community ecology, urban ecology, global change, and human health. The data are available for reuse under CC BY 4.0 licensing. Please cite the data release on Zenodo and this data paper when reusing the dataset.

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KEYWORDS
biodiversity, built environment, citizen science, community science, global change, homes, human structures, iNaturalist, indoor, participatory science, synanthropic, urban ecology

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The complete dataset and code are available as Supporting Information in Data S1. Data and code are also available in Zenodo at https://doi.org/10.5281/zenodo.20722692.

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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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