

# How do animals and plants survive and thrive in cities?

May 4 2023

---



Credit: AI-generated image ([disclaimer](#))

Urban ecology is a growing research field. To find orientation in the information jungle on this topic, a team led by IGB and Freie Universität Berlin (FU Berlin) has created a map of 62 important research hypotheses in urban ecology. Among them are the idea of the daring city dweller, life on credit or the biological monotony of cities. Research has

yet to show how robust the hypotheses are and to which cities they apply. The new overview provides an important basis for this endeavor. It is [openly available](#) in Wikidata.

Urbanization is increasing worldwide. In order to make cities more sustainable and to preserve biodiversity outside of [nature reserves](#), research has increasingly been devoted to the field of urban ecology in recent years.

One research hypothesis is, for example, that some species may be able to adapt to urban conditions faster and better than others because of certain characteristics. These include learning ability, mobility and flexibility. It is also known that animals such as squirrels and birds are often bolder in [urban areas](#) than their counterparts in the countryside. Or that although population density is higher in cities, this does not have a positive effect on biodiversity. One of the aims of the project is to gather concrete evidence on these and other [hypotheses](#).

"In some cases, completely new ecosystems are created in cities, and each city has its own history, its own climatic, landscape and cultural conditions. In each city, so to speak, a separate ecological and evolutionary experiment is taking place. Bundling the various findings and hypotheses, and finding out how transferable they are is a challenge," says Dr. Sophie Lokatis, explaining the principles of urban ecology. She did her doctorate at the IGB and the FU Berlin and led the study.

## **Map of scientific hypotheses provides framework for targeted research**

In this study, published in *Biological Reviews*, the team of urban ecologists identified 62 important hypotheses on urban ecology and

located them on a scientific map, a so-called hypothesis network. This map can then be linked to information from empirical studies. In this way, the scientists aim to contribute to making research in this rapidly growing field more efficient: existing research and opportunities for cooperation easier to find, and research projects better connected with each other.

"We are openly providing our hypothesis overview in Wikidata and hope to further develop this project cooperatively in the future," explains Prof. Jonathan Jeschke, researcher at the IGB and FU Berlin and co-author of the study. "Cities can preserve and promote biodiversity, and we want to contribute from the research side to making knowledge about this more available," added Dr. Tina Heger, IGB researcher and also a leading author of the study. Together with Jonathan Jeschke, she initiated the platform [www.hi-knowledge.org](http://www.hi-knowledge.org), where a network of hypotheses on invasion biology is published.

The Urban Ecology Hypothesis Network is divided into four main themes: Urban species traits and evolution, Urban biotic communities, Urban habitats and Urban ecosystems.

To illustrate the types of research hypotheses that exist about nature in the city, we have selected five hypotheses as examples.

## **Five fascinating hypotheses in urban ecology**

The following and other hypotheses collected in the project are based on individual observations and studies. Whether they apply across cities, and how general they are, remains to be seen as specific evidence is gathered on the hypotheses—this is a future aim of the project.

## **The idea of the ideal urban dweller**

Some species adapt faster and better to urban conditions than others because of certain characteristics. The focus is on predicting and explaining which traits characterize species living in urban areas and how species adapt to the urban environment, for example through fast learning, mobility or greater dietary flexibility.

## **The bold urban dweller**

It has been found that animals also adapt their behavior: they tend to become bolder in urban areas than in non-urban areas. This has already been shown for squirrels and birds, for example. The vigilance and escape distance decrease.

## **Credit card hypothesis**

This hypothesis states that the lower variability of resources in cities and the lower risk of being killed by a predator allow for higher population densities of species in urban areas because many weak competitors survive. This assumption focusing on urban birds is called the credit card hypothesis, because the [urban environment](#) allows animals to "live on credit."

## **The density-diversity paradox in cities**

In biological communities, the number of species usually increases with the number of individuals. However, cities tend to have lower biodiversity than natural areas, despite often having higher numbers of individuals.

## **Biotic homogenization of cities**

As a result of globalization, not only do shops look alike no matter in

which city you are, but species in cities across the globe are also becoming increasingly similar as urbanization continues.

Whatever nature looks like in the city, there are always ways to protect and enhance it, and thus create unique and special urban ecosystems.

**More information:** Sophie Lokatis et al, Hypotheses in urban ecology: building a common knowledge base, *Biological Reviews* (2023). [DOI: 10.1111/brv.12964](https://doi.org/10.1111/brv.12964)

Provided by Forschungsverbund Berlin e.V. (FVB)

Citation: How do animals and plants survive and thrive in cities? (2023, May 4) retrieved 24 April 2024 from <https://phys.org/news/2023-05-animals-survive-cities.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.