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Editorial: Urban biodiversity in the Global South

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Editorial on the Research Topic

Urban biodiversity in the Global South

The increasing urban population trends point to the expansion of urban areas into rural and natural areas, as well as densification within cities (Morello et al., 2000; Lin et al., 2015). These urbanization processes are likely to have a significant impact on both human well-being and biodiversity (Li et al., 2022). Urban ecology research enhances our understanding of the complex relationship between biodiversity and the changing urban environment, shaping urban planning and design. However, our global knowledge of urban ecosystems remains highly biased, as most studies have been conducted in temperate regions of the Global North, including North America, Europe, and Australia (Rega-Brodsky et al., 2022). The resulting geographic imbalance in knowledge limits our capacity to generalize findings, as ecological processes and urbanization effects vary substantially between regions. Applying conclusions from studies in the Global North to the Global South without considering regional differences may lead to misguided conservation and urban planning decisions.

Several key factors contribute to differences in the relationship between biodiversity and urbanization between these regions. First, cities in the Global North tend to be less densely populated than those in the South (Xu et al., 2020). As a result, they often contain more green spaces and experience lower levels of human disturbance, which can favor biodiversity. For instance, Leveau (2021) found greater bird species richness in urban parks of the Northern Hemisphere compared to the Southern Hemisphere. Secondly, socioeconomic factors play a crucial role. Studies have shown that wealthier neighborhoods tend to support higher biodiversity, partly due to increased vegetation cover and habitat availability (Chamberlain et al., 2020; Villaseñor and Escobar, 2022). Finally, climate and species diversity differ markedly between regions. While most cities in the North are located in temperate regions, cities in the South are more evenly distributed across temperate and tropical areas. These areas harbor greater species richness and distinct species pools (Hawkins et al., 2007) and are likely to experience more significant biodiversity losses due to urbanization (Leveau et al., 2017).

This Research Topic seeks to address the existing geographic disparities in urban ecology research by presenting six contributions from tropical and subtropical regions of South America and Africa. The topics covered include spatial patterns of bird and amphibian diversity (Matthew et al., Demartín et al., Garizabal-Carmona et al.), long-term patterns in bird communities (Leveau), bird behavior (Telleria and Garitano-Zavala), and the potential effects of rodenticides on biodiversity (Jaramillo-Q. et al.).

Spatial patterns of bird communities were analyzed in tropical savanna-woodland and evergreen forest by Matthew et al. and Garizabal-Carmona et al., respectively. Matthew et al. focused on species richness, abundance, and composition along a rural-urban gradient, finding that bird abundance and richness declined with increasing anthropogenic structures and noise. Interestingly, the negative effect of noise persisted across all urbanization levels, suggesting that even green areas with elevated noise pollution may experience bird species loss. The authors highlight the importance of incorporating species traits into future studies to better understand bird species responses to urbanization. In this regard, Garizabal-Carmona et al. examined how biological traits affect urban tolerance in birds. They categorized species based on their occurrence frequency across different urbanization levels, considering their presence in the urban core and building cover. Species that avoided urban areas tended to have narrow altitudinal ranges and primarily frugivorous or frugivorous-insectivorous diets. In contrast, species residing in urban areas were more likely to have omnivorous diets.

Demartin et al. analyzed taxonomic and functional diversity of amphibians in green areas along an urban-rural gradient. Surprisingly, they found that species richness and functional richness peaked at intermediate urbanization levels. Authors suggest that these habitats have a high environmental heterogeneity, allowing the coexistence of species with varied habitat requirements. In addition, species composition showed significant turnover among green areas, suggesting that species replacement was driven by varying abilities to cope with urbanization pressures.

Focusing on long-term dynamics, Leveau analyzed changes in bird communities during 10 years in urban, suburban, and periurban habitats of Mar del Plata, Argentina. He found that species composition changed progressively over time at similar rates in the three habitats. Given the lack of changes in local habitat conditions, these long-term bird composition dynamics appear to be mostly related to regional changes in climate and land use rather than by immediate urbanization effects.

Bird behavior in urban areas was explored by Telleria and Garitano-Zavala in the inter Andean valley of Bolivia. They analyzed intraspecific and interspecific playback responses of the territorial Sparkling Violetear hummingbird (*Colibri coruscans*), finding that it was more aggressive toward other nectarivorous species during the dry season, when nectar resources were scarcer.

Lastly, Jaramillo-Q. et al. examined the use of anticoagulant rodenticides (ARs) in Medellín, Colombia, a biodiversity hotspot in the northern Andes. The study assessed the spatial distribution of AR application sites over five years and identified critical risk zones

within the city's main ecological structure. More than half of the AR application sites overlapped with key biodiversity areas, posing a serious threat to non-target species, particularly raptors and carnivorous mammals. These findings highlight the need for stricter regulations and toxicological studies to understand the long-term impacts of AR exposure on urban wildlife.

Through our Research Topic, we contribute to expanding the representation of urban ecological research performed in South America and Africa, regions that remain underrepresented in global discussions despite their ecological significance. Moreover, we emphasize the importance of increasing such studies in the Global South, as previously stated by other colleagues (Ortega-Álvarez and MacGregor-Fors, 2011; Muñoz-Pacheco and Villaseñor, 2022; Leveau et al., 2022). Readers are invited to enjoy the set of papers that comprise this Research Topic and we hope to motivate their interest and action in studying the urban biodiversity across the region.

Author contributions

LL: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. LP: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. RO-A: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Conflict of interest

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References

- Chamberlain, D., Reynolds, C., Amar, A., Henry, D., Caprio, E., and Batáry, P. (2020). Wealth, water and wildlife: Landscape aridity intensifies the urban luxury effect. *Global Ecol. Biogeography* 29, 1595–1605. doi: 10.1111/geb.13122
- Hawkins, B. A., Diniz-Filho, J. A. F., Jaramillo, C. A., and Soeller, S. A. (2007). Climate, niche conservatism, and the global bird diversity gradient. *Am. Nat.* 170, S16–S27. doi: 10.1086/519009
- Leveau, L. M. (2021). Big cities with small green areas hold a lower species richness and proportion of migrant birds: A global analysis. *Urban Forestry & Urban Greening* 57, 126953. doi: 10.1016/j.ufug.2020.126953
- Leveau, L. M., Leveau, C. M., Villegas, M., Cursach, J. A., and Suazo, C. G. (2017). Bird communities along urbanization gradients: a comparative analysis among three neotropical cities. *Ornitología Neotropical* 28, 77–87. doi: 10.58843/ornneo.v28i0.125
- Leveau, L. M., Villaseñor, N. R., and Lambertucci, S. A. (2022). Ornitología urbana en el Neotrópico: Estado de situación y desafíos. *El Hornero* 37, 1–1. doi: 10.56178/eh.v37i2.403
- Li, G., Fang, C., Li, Y., Wang, Z., Sun, S., He, S., et al. (2022). Global impacts of future urban expansion on terrestrial vertebrate diversity. *Nat. Commun.* 13, 1628. doi: 10.1038/s41467-022-29324-2
- Lin, B., Meyers, J., and Barnett, G. (2015). Understanding the potential loss and inequities of green space distribution with urban densification. *Urban Forestry & Urban Greening* 14, 952–958. doi: 10.1016/j.ufug.2015.09.003
- Morello, J., Buzai, G. D., Baxendale, C. A., Rodríguez, A. F., Matteucci, S. D., Godagnone, R. E., et al. (2000). Urbanization and the consumption of fertile land and other ecological changes: the case of Buenos Aires. *Environ. Urbanization* 12, 119–131. doi: 10.1177/095624780001200210
- Muñoz-Pacheco, C. B., and Villaseñor, N. R. (2022). Urban ecosystem services in South America: A systematic review. *Sustainability* 14, 10751. doi: 10.3390/su141710751
- Ortega-Álvarez, R., and MacGregor-Fors, I. (2011). Spreading the word: the ecology of urban birds outside the United States, Canada, and Western Europe. *Auk* 128, 415–418. doi: 10.1525/auk.2011.10082
- Rega-Brodsky, C. C., Aronson, M. F., Piana, M. R., Carpenter, E. S., Hahs, A. K., Herrera-Montes, A., et al. (2022). Urban biodiversity: State of the science and future directions. *Urban Ecosystems* 25, 1083–1096. doi: 10.1007/s11252-022-01207-w
- Villaseñor, N. R., and Escobar, M. A. (2022). Linking socioeconomics to biodiversity in the city: The case of a migrant keystone bird species. *Front. Ecol. Evol.* 10, 850065. doi: 10.3389/fevo.2022.850065
- Xu, G., Zhou, Z., Jiao, L., and Zhao, R. (2020). Compact urban form and expansion pattern slow down the decline in urban densities: a global perspective. *Land Use Policy* 94, 104563. doi: 10.1016/j.landusepol.2020.104563