



Original Research Paper

Evolutionary Rescue in Urban Fauna and Genomic Signatures of Adaptation to Chronic Environmental Stress

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Key Words

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Abstract

Urbanization has resulted in chronic stressful conditions on wildlife, marked by constant stressors such as pollution, habitat fragmentation, urban heat islands, noise, artificial light, and changed resource supply. Although these conditions tend to reduce the population, there are still certain urban fauna, which means that there are adaptive evolutionary mechanisms. This paper is a synthesis of existing information on evolutionary rescue in the case of urban fauna, particularly looking at the genomic signatures of adaptation that can help populations to endure the long-term stresses of the urban environment. An organized literature review of evolutionary ecology and urban genomics was carried out, incorporating conceptual frameworks, genomic and regulation-based information, and exemplary case studies of larger animal groups. There was a focus on the connection between chronic stressors in urban areas and adaptive genomic reactions and the population-scale outcomes. Synthesis reveals that evolutionary rescue among the urban fauna is assisted by coordinated genomic adaptations of genomic stress response, detoxification, immune regulation, metabolism, behavior, and gene regulation. The genomic signatures of allele frequency changes, regulatory changes, and adaptive divergence are always related to the characteristics that can be seen to make individuals become tolerant of urban stress. Theoretical studies have shown that in the event of sustained moderate selection, evolutionary rescue is most probable when the standing genetic variation is sufficient and there is demographic stability. Urban setting functions as a selective filter, which causes the adaptation of heredity, not only acclimation in the short term. The contribution of genomic evidence to urban ecological studies enhances the ability to predict species resilience and conservation interventions that increase the adaptive capacity and long-term survival of species in more urbanized environments.

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Introduction

The process of urbanization has proven to be among the most widespread and unrelenting form of environmental alteration, transforming the ecosystems and imposing multidimensional and ongoing stress on the wildlife (Salmón et al., 2021). Urban fauna is subjected to prolonged stresses like habitat discontinuity, chemical contamination, heat, anthropogenic light and noise, altered trophic status, and constant human interference (Kmetiuk et al., 2025). These stressors are intergenerational, and such can tend to lower the population viability and make it more vulnerable to extinction. However, more animal species are increasingly surviving in urban areas, which indicates the existence of some adaptive processes that allow the species to survive in persistent environmental stress (Isaksson et al., 2020).

Another conceptual framework that is increasingly popular in explaining this persistence is evolutionary rescue, which is the process by which populations can escape extinction because of a rapid adaptive evolutionary change in response to a dramatic environmental deterioration (Perry et al., 2020). Evolutionary rescue is especially relevant in an urban fauna context, where genetic variation is inherited and thus the natural selection process can selectively disregard genes that disallow traits beneficial in adapting to urban stress factors, but instead selectively retain genes promoting tolerance to urban stress factors, resulting in a stabilized population growth rate (Clark-Wolf et al., 2024). The idea of

evolutionary rescue, in contrast to a temporary buffering effect by short-term phenotypic plasticity, suggests long-lasting genetic adjustment that can sustain the existence of the population in long-lasting perturbed conditions.

Figure 1 provides the conceptual framework on how chronic urban environmental stressors elicit evolutionary rescue in urban fauna. The continuous selection pressures on animal populations are caused by the long-term, repeated effects related to pollution, high temperature, noise, and habitat fragmentation. These forces influence the already existing standing genetic variation, which triggers the process of genomic adaptation in the form of an allele shift in frequencies and the shift in gene regulation (Perrier et al., 2020). Without adequate adaptive response, the populations undergo demographic loss, which threatens local extinction in the long run. Nevertheless, in cases where adaptive genomic alterations occur at a sufficiently rapid rate, such populations experience evolutionary rescue, which stabilizes or recovers population dynamics and allows such populations to survive in urban habitats in the long term (Carmona et al., 2025). The framework emphasizes temporality of the stress exposure (T 0) to population outcomes (T 1) and the importance of genomic adaptation as an important mediator of urban stress on conservation outcomes.

Genomic signatures of adaptation have become the focus of study in trying to understand the evolutionary rescue in urban systems (Egerer & Buchholz, 2021). The current progress in population genomics, transcriptomics, and epigenetics can enable scientists to identify

molecular signatures of adaptation, such as changes in allele frequencies, evidence of positive selection, altered gene expression, and environmentally induced epigenetic changes. These signatures of genomic changes are commonly associated with stress response, detoxification, immunity, metabolism, and

behavior pathways in urban fauna (Moreira & Smith, 2023). A study of these signatures can give firsthand information on whether urban survival is a sign of real evolutionary change and not a temporary acclimation, and provide a measure of the ability of species to respond to current environmental stress.

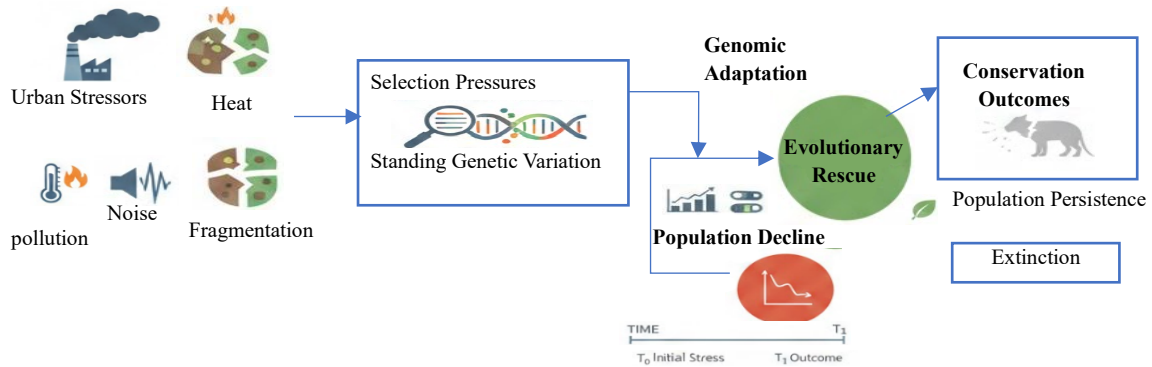


Figure 1: Conceptual Framework of Evolutionary Rescue in Urban Fauna under Chronic Environmental Stress

Regardless of the growing amount of empirical evidence, the study of evolutionary rescue among urban fauna is still disjointed across taxa, geographical areas, and study methods. Synthesis. There is a paucity of synthesis that directly correlates evolutionary rescue theory with genomic data of adaptation in response to chronic urban stress. In this respect, the overall research question that will be used to carry out the review will be as follows: How do genomic markers of adaptations help in evolutionary rescue in urban wildlife in the face of protracted environmental stress?

This paper has three major contributions. One, it gives an integrative synthesis of evolutionary rescue theory in the context of urban animal populations. Second, it integrates and critically appraises genomic data of adaptation to chronic urban stressors in a wide range of taxa.

Third, it provides the consequences of these adjustive processes to urban conservation and wildlife management, and highlights the necessity to integrate the evolutionary and genomic viewpoints into the decision-making process about the environment (Pandey et al., 2025).

The rest of the paper is structured in the following way. Section II explores the evolutionary rescue concept as it applies to urban fauna, including theoretical underpinnings and empirical data. Section III pays attention to the genomic markers of the adaptation, which assign major molecular processes and methods of their analytical tools to find adaptive responses. The case studies of the fauna in the cities with an illustrative example of the evolutionary rescue in the context of genomic evidence are described in Section IV. Section V deals with future research

directions and conservation implications. Lastly, Section VI will summarize some main findings and give recommendations on how to incorporate evolutionary genomics into urban wildlife conservation strategies.

Evolutionary Rescue in Urban Fauna

The urban ecosystems cause unremitting and multidimensional environmental strain on the animal populations, which radically changes ecological conditions and selective regimes. The physiological mechanisms, behavior, and reproductive success of urban fauna are disrupted by chronic stressors like habitat fragmentation, chemical pollutants, and elevated ambient temperatures, artificial light and noise, and low habitat connectivity (Ayalew et al., 2021). These stressors, unlike episodic disturbances, are non-episodic and long-term and may result in the decrease of genetic diversity, changes in population dynamics, and a greater danger of extinction. In most species, the rate and irreversibility of environmental change to cities surpass the adaptive limits of history, leading to population losses or local extinction.

It is in this context that the theory of evolutionary rescue has received a high profile as a means to explain how certain urban populations survive even when the environment is in great degradation. Evolutionary rescue is a process that results in adaptive genetic traits being modified in a manner that is responsive to adverse demographic patterns, enabling populations to survive or stabilize once it is founded and (as a result) before extinction happens. Due to the high and persistent selection pressures in urban settings, evolutionary rescue is shaped by

adaptations to alleviate stressors of anthropogenic origin, including increased thermal tolerance, changed behavioral patterns, increased detoxification ability, or altered life-history (Rogivue et al., 2025). The importance of evolutionary rescue in urban systems is that long-term persistence is explained by having a heritable adaptation, and not by just short-term acclimation (Rellstab et al., 2020).

Occurrences of evolutionary rescue have more recently been empirically demonstrated in urban fauna, but have been disproportionately studied in less evolutionarily successful taxa (Pandey et al., 2025). The literature on city birds has documented fast divergence in song frequency, stress physiology, and reproductive timing characteristics, which indicates that the birds are adapting to noise pollution, changing climatic conditions, and urban resources (Kristensen et al., 2020). On the same note, urban mammals such as rodents and mesocarnivores have been found to be more tolerant to pollutants and have changed their metabolic and behavioral characteristics in urban life. Insects in particular have been found to have among the best evidence of evolutionary rescue, with a rapid evolutionary response to urban heat islands, exposure to chemicals, and fragmented habitat. Although a significant number of these studies originally concentrated on phenotypic change, there has been a recent development of studies that incorporate demographic information and genetic findings to argue in favor of the phenomenon of evolutionary rescue instead of reversible plasticity.

An accumulation of these findings suggests that evolutionary rescue is not a unique or exceptional event in an urban ecosystem, but rather a common pattern when the pressure of intense and sustained anthropogenic selection on an ecological space is high. Cities are natural selection filters, and these are known to select genotypes able to endure chronic stress and get rid of maladaptive variants. But it seems that the phenomenon of evolutionary rescue is dependent on such factors as standing genetic variation, the size of the population, and the strength of environmental change (Vogt, 2022). This conclusion highlights the need to go beyond the phenotypic observations so as to determine the genetic mechanisms that underlie adaptive persistence. Therefore, a genomic approach is crucial in the differentiation of real evolutionary rescue and short-term plastic reactions, as well as in evaluating the endurance of urban flora (Bernatchez et al., 2024).

Genomic Signatures of Adaptation

Genomic Signatures of Adaptation and Their Relevance to Evolutionary Rescue

Genomic signatures of adaptation: Genetic, regulatory, or epigenetic data patterns that represent heritable change in a population in response to environmental selection forces are called genomic signatures of adaptation. These signatures occur in urban fauna when the genome of the fauna starts to change in response to chronic stressors (e.g., pollution, heat, noise, habitat fragmentation, altered diet) that selectively act on the particular variants, detectable across generations. Characteristic

markers are the difference in allele frequencies between urban and non-urban samples, indications of positive selection in particular regions of the genome, and a decrease in genetic diversity in regions around the selected sites (selective sweeps) and a relative uniformity in differences in gene expression based on the trait in question (survival-relevant traits). These signatures are directly associated with evolutionary rescue since they give molecular data that persistence is facilitated by adaptive evolutionary change, as opposed to immediate physiological acclimation. Put differently, genomics assists in testing whether or not the survival of an urban population is an indication of real rescue, that is, the adaptive variants are spread as fast as necessary to stabilize demography under chronic stress.

Figure 2 illustrates the key genomic and functional processes by which urban fauna adapts to the chronic environmental stress. Constant selection forces of populations put under continuous pressure are persistent stressors like pollution, heat, and noise in urban areas, habitat fragmentation, disturbed food resources, and human disturbances. Adaptive responses entail integrated processes of stress reactions, detoxification mechanisms, immune regulation, metabolism, behavior, and regulation of genes, which are facilitated by adaptive responses between the environment and genomic expression. The combination of these directions allows adaptation to persistence and leads to evolutionary rescue in cities.

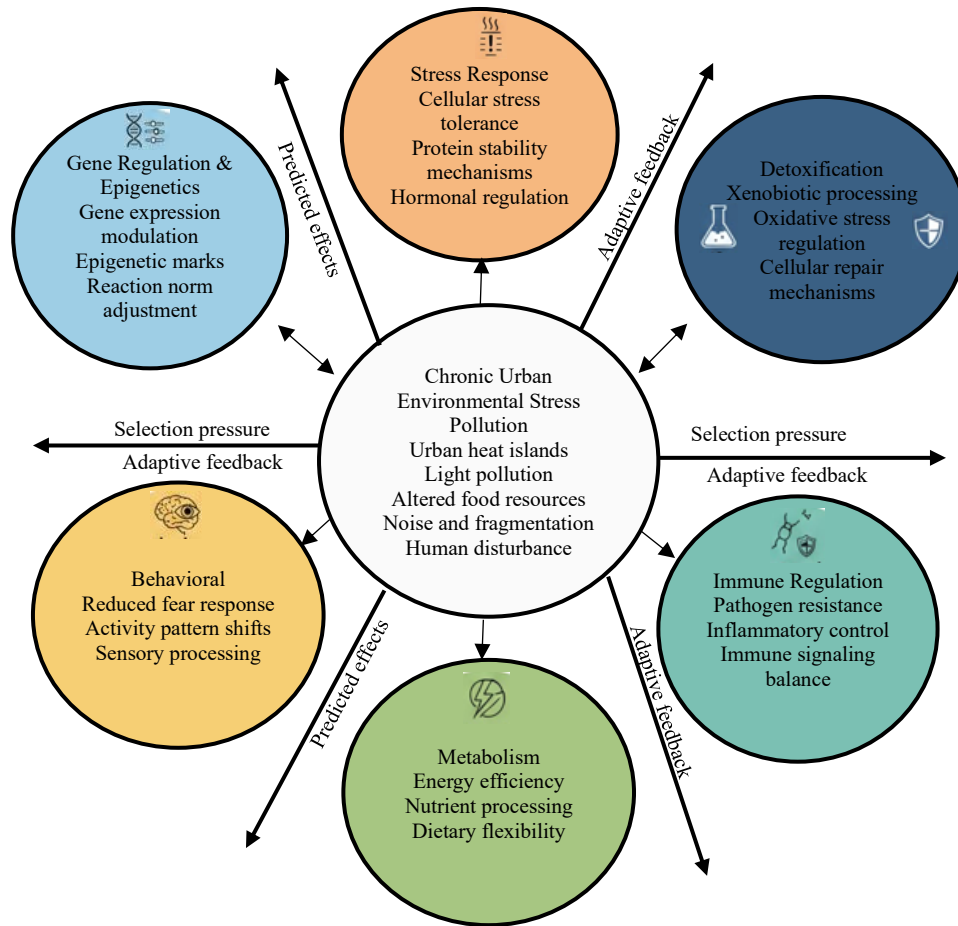


Figure 2: Genomic and Functional Pathways Mediating Adaptation to Chronic Urban Environmental Stress

Table 1: Chronic Urban Environmental Stressors and Associated Adaptive Responses in Urban Fauna

Urban Stressor	Primary Selective Pressure	Affected Biological System	Type of Adaptive Response
Pollution	Toxic exposure	Detoxification, metabolism	Genomic/regulatory
Urban heat islands	Thermal stress	Stress physiology	Genomic + phenotypic
Noise & light	Sensory disturbance	Behaviour, neurobiology	Behavioural + genomic
Habitat fragmentation	Isolation	Dispersal, demography	Genetic structure
Altered food resources	Nutritional shift	Metabolism	Genomic

Table 1 presents the key anthropogenic environmental stress factors experienced in urban ecosystems and the selective pressure

exerted on urban fauna. It also outlines the main biological systems that are targeted by each of the stressors and the prevailing forms of adaptive

responses, which are evident, such as genomic, regulatory, phenotypic, and behavioural adaptations. The synthesis explains how the reliable urban stress factors influence the overriding evolutionary adaptive pathways that aid in evolutionary rescue and enduring population in the urban setting.

Methods for Studying Genomic Signatures of Adaptation in Urban Fauna

Several complementary genomic methods are applied to identify adaptation in urban wildlife, and their best inferences usually arise through a combination of these methods:

1. Population Genomics (Urban vs. Non-Urban Comparisons)

Researchers sample those in urban and surrounding non-urban (or less-disturbed) populations and employ genome-wide markers (e.g., SNPs) to determine divergence and candidate adaptive loci. There are common analyses of differentiation (e.g., F_{ST} outlier scans), environmental association (between genetic variants and stress gradients), and demographic modelling (to separate selection and drift) analyses.

2. Selection Scans and Haplotype-Based Tests

Techniques that identify areas that have undergone recent selection (e.g., extended haplotype structure, depth of reduced diversity around loci) have been used to identify recent and intense adaptive selection in areas that are anticipated with rapid urban change.

3. Transcriptomics (Gene Expression Under Urban Stress)

Studies utilizing RNA are compared between urban and non-urban animals, or the state of the organism before and after exposure to stressors (heat, pollutants, noise). These observations help in explaining functional pathways that may be used to deal with chronic stress, particularly with physiological/behavioral outcome measures.

4. Epigenomics (DNA Methylation and Regulatory Changes)

Epigenetic studies determine the contribution made by regulatory changes, which are usually associated with exposure to stress, to adaptive phenotypes. This is most practical in the urban systems where plasticity and environmental training may be intense, yet interpretation should be keen to distinguish between the inherited patterns and reversible responses.

5. Genome–Environment Association and Landscape Genomics

These techniques actually indicate a correlation between genomic variation and stress gradient in cities (temperature, heavy metals, noise, light, fragmentation), reinforcing assertions that the environment is a force of selection but not necessarily geographic isolation.

6. Integrated Evidence with Phenotypes and Demography

To make the claims of evolutionary rescue convincing, genomic patterns are to be interpreted in parallel to the factors of fitness (survival, reproduction) and, where available,

population dynamics (decline then stabilization/recovery) as well.

Key Findings on Genomic Adaptation to Chronic Urban Environmental Stress

The genomic patterns in the literature of urban fauna studies show that the adaptation to chronic environmental stress is always characterized by a repetitive combination of biological functions, although the genes involved in the process of selection can change depending on the taxa. Cities often display evidence of this selection or selective expression of genes in pathways involved in detoxification and oxidative stress defense that have accumulated over time due to these urban centres being exposed to heavy metals, hydrocarbons, and other man-made pollutants. Continued thermal stress levels due to urban heat islands have also been associated with alterations to the genome of cellular mechanisms of stress response, protein stability, and metabolic regulation, which allow organisms to continue physiological functions in high temperatures. Besides this, the urban structures

of high population density and the change in the dynamics of pathogens contribute to new disease pressures leading to the selection of genes associated with immunity that promote increased resistance or tolerance to chronic inflammatory stress. The availability of food in cities also influences adaptive genomic mechanisms, with selection on metabolic routes to nutrient processing, energy regulation, and dietary plasticity, and is in line with changes to an anthropogenic diet or altered prey. Another imperative element of urban persistence is behavioral adjustment, with genomic and transcriptomic indicators in neural, hormonal, and sensory pathways becoming linked to diminished fearfulness, increased behavioral plasticity, and altered circadian activity patterns. Taken together, these results indicate that urban adaptation is a multi-dimensional process that entails the coordinated reaction of physiological, metabolic, immune, and behavioral systems on a genomic basis, which highly supports molecular evidence of evolutionary rescue in a chronically stressed urban environment.

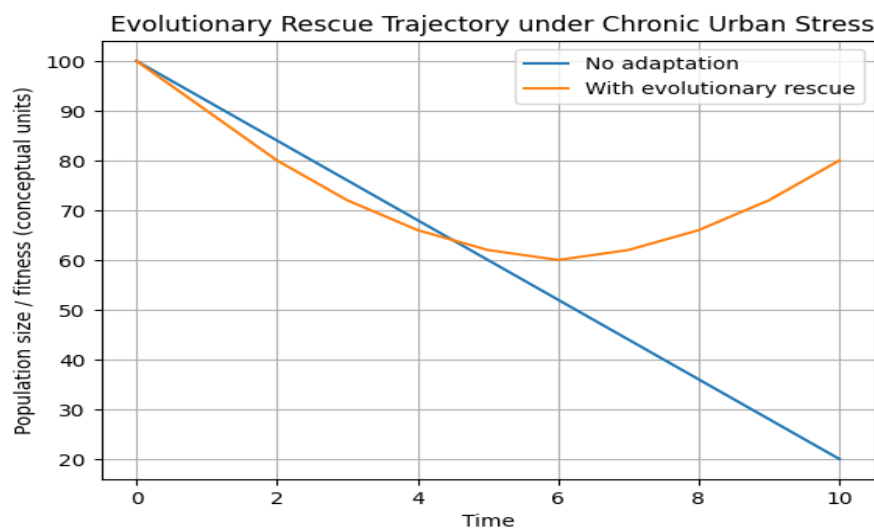


Figure 3: Evolutionary Rescue Trajectory under Chronic Urban Stress

Figure 3 represents the patterns of populations of urban fauna under persistent environmental pressure. Without adaptive responses, the populations experience a steady decrease towards extinction. Conversely, evolving populations initially suffer degradation but later recover due to the acquisition of adaptationally relevant genetic variation that enhances fitness, leading to long-term survival. The graph identifies adaptation to the rapid pace as a stabilizing factor in the dynamics of the population under the sustained urban pressure.

Case Studies

White-footed mouse in New York City (mammal)

The strongest evidence of evolution under the influence of the city is seen in white-footed mice (*Peromyscus leucopus*) living in an interrupted forest within the city of New York (Huynh et al., 2021). The comparison of urban and non-urban people indicates genomic patterns that are congruent with the local evolution, especially with genes related to metabolic reactions, including lipid and carbohydrate metabolism. These genomic variations are highly likely to be the result of exposure to modified urban diets and resource availability over an extended time. Evolutionary rescue. An evolutionary rescue example of how intense and consistent selection in urban fragments can prefer metabolic phenotypes that increase fitness in altered habitats to allow populations to persist despite isolation and long-term environmental stress is demonstrated in this case.

Great tit across Europe (bird)

Great tits (*Parus major*), among other bird species, are a good example to support the idea that urbanization has the potential to create repeatable genomic patterns across different cities that are geographically separated (Caizergues et al., 2022). Comparisons between various urban habitats have shown a consistent divergence in genomic patterns with urban occupation, which implies that there is a parallel selection pressure, which concerns new regimes of food, higher disturbance, and new microclimates. Moreover, the transformation of urbanization affects the total genomic variation and adaptive capacity of populations, which is the key factor to evolutionary rescue. These trends emphasize the need to ensure connectivity and adequately high population levels in urban green areas in order to ensure genetic variation that is required to sustain persistence in the long term.

Urban Anolis lizards in heat islands (reptile)

The phenomenon of urban heat islands provides a strong natural environment in which the process of rapid adaptation to thermal stress can be studied (Lailvaux, 2020). Integrative studies that combine phenotype and genomic data have demonstrated that urban populations of Puerto Rican crested anoles (*Anolis cristatellus*) have a higher temperature gradient and heat tolerance. These reactions are coupled with concomitant genomic and regulatory alterations that are related to adaptation to heat. It is interesting to note that adaptive shifts seem to be associated with alterations of reaction norms in

which plastic responses are diminished or adapted when such become chronic and maladaptive. The case can be used to support evolutionary rescue as it illustrates that the persistence of hereditary changes in physiological performance can support persistence through sustained urban thermal stress, which is likely to increase with continued warming of the climate.

A Neotropical urban bird: adaptive divergence in the city

Urban evolutionary rescue has been observed to exist not just in temperate or model systems.

Table 2: Summary of Case Studies Demonstrating Evolutionary Rescue in Urban Fauna

Taxonomic Group	Urban Stressor	Key Adaptive Trait	Genomic Evidence Type	Evolutionary Rescue Outcome
Mammals	Diet, pollution	Metabolic efficiency	Selection signals	Persistence
Birds	Disturbance, food	Behavioural flexibility	Genomic divergence	Persistence
Reptiles	Heat islands	Thermal tolerance	Regulatory adaptation	Strong rescue
Tropical birds	Urbanisation	Multi-trait adaptation	Genomic differentiation	Emerging

Table 2 summarizes exemplary case studies of urban fauna with the association between important urban stressors, adaptive features, genetic evidence, and the conjectured evolutionary rescue effective results. It brings out general modes of adaptation among taxa and how the alteration of genomes leads to survival under continuous stress in the urban environment.

Genomic studies of a Neotropical urban bird show trends that correspond with evolutionary divergence associated with urbanization (Mascarenhas et al., 2023). These results indicate that genomic differentiation, even in diverse tropical areas, can be evoked by selection in relation to the urban stressors. The case raises the comparative framework of urban evolutionary ecology by extending evidence to less studied locations and taxa and highlights the applicability of urban evolutionary ecology across the world through the evolutionary rescue of humans in urbanized settings.

Synthesis and conservation implications

In these case studies, a fairly similar trend appears where urban stressors developed over a long period of time are linked with adaptive genomic modifications that include metabolic and dietary change, increased thermal tolerance, and increased multi-trait divergence. The general conclusion is that evolutionary rescue of urban fauna occurs most probably when there is high, persistent pressure of selection, populations have adequate standing genetic variation, and the urban environment allows demographic stability

to allow the spread of adaptive alleles. Conservation-wise, these lessons imply that urban wildlife management no longer requires merely providing habitats, but emphasizing the quality and connectivity of habitats. Planning measures that include preservation of green belts, minimization of pollutant loads, isolation of thermal extremes with vegetation cover, and encouragement of heterogeneous micro habitats can increase immediate survivability and evolutionary possibilities of the urban fauna in the long term.

According to Table 3, the most significant gaps in the research on the evolutionary rescue of urban fauna are expressed, which reveal the existing limitations and the related directions of their study in the future. It underlines that integrative, multi-scale techniques are necessary to enhance the knowledge about adaptive persistence in urban locations.

Future Directions

Table 3: Research Gaps and Future Directions in Urban Evolutionary Genomics

Research Gap	Current Limitation	Recommended Direction
Short-term studies	Plasticity vs evolution unclear	Longitudinal genomics
Single-city focus	Limited generalization	Cross-city comparisons
Genomics only	Fitness not measured	Genomics + demography
Habitat isolation	Genetic erosion	Connectivity planning

Figure 4 illustrates the connection between the strength of selection pressure, which is urban-based, and the likelihood of the population's survival. At low stress levels, it is through phenotypic plasticity that populations will survive. Evolutionary rescue is enhanced at moderate chronic stress levels, where adaptive

Advancing Research on Evolutionary Rescue in Urban Fauna

Future research in evolutionary rescue in urban fauna needs to avoid cross-sectional comparisons and use longitudinal and multi-generational studies. Following the genomic, phenotypic, and demographic variations with time will enable the researchers to establish whether the adaptive responses are heritable and adequate to stabilize population growth in chronic urban stress or not. The necessary comparative studies across cities, habitat types, and taxonomic groups should also be designed to determine generalizable evolutionary rescue dynamics as well as determine the impact of local environmental contexts on adaptive results. Causal inference on the role of selection in urban environments can be enhanced through the combination of experimental methods with field observations.

changes in the genetics are realized. Adaptive capacity fails in the face of extreme stress, elevating the risks of extinction. The graph underlines threshold-related results of adaptation to urban environments.

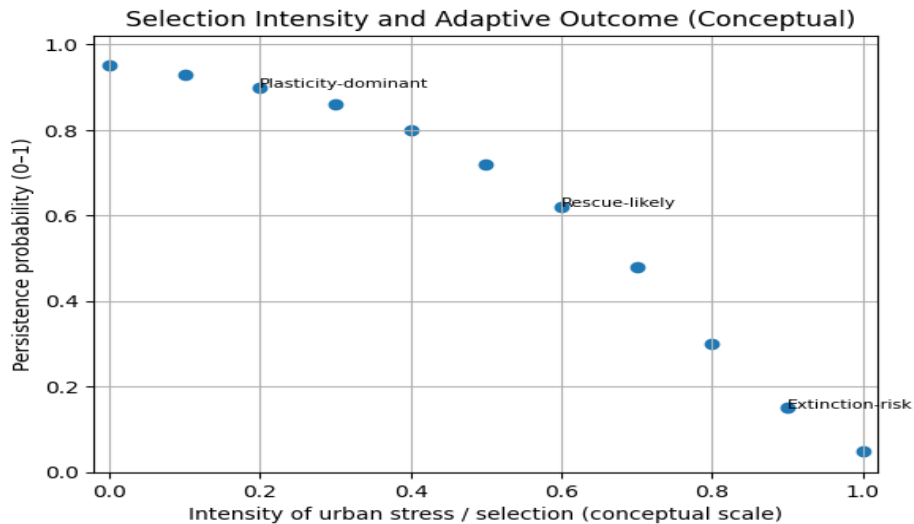


Figure 4: Relationship between Selection Intensity and Adaptive Outcome in Urban Fauna

Challenges and Opportunities in Studying Genomic Signatures of Adaptation

The study of genomic adaptation of urban fauna has a number of methodological issues. The cityscapes are very heterogeneous, which complicates the attempts to distinguish between the influences of natural selection and those of genetic drift, low dispersal, and bottlenecks in the demographics. Also, it is a great challenge to differentiate between heritable genomic accommodation and plasticity and epigenetic alterations in response to the environment in chronic stress environments. Nevertheless, new possibilities have emerged in order to address those limitations due to the recent progress in the field of population genomics, landscape genomics, and genome-environment association analysis. Similar to cost-effective sequencing and advanced analytical models, a wider variety of urban species, including both rare and inaccessible species, are becoming accessible in genomic studies.

Implications for Urban Wildlife Management and Conservation

Evolutionary rescue and genomic adaptation are relevant to urban wildlife management and conservation planning. The understanding of adaptive potential difference between populations has led to the need to preserve genetic diversity and connectivity in urban landscape. Tactics by management that alleviate chronic stressors, provide heterogeneous habitats, and promote movement of animals among urban green spaces can increase the probability of evolutionary rescue. In addition to that, the use of genomic data in conservation analysis can be used to determine the populations at risk of maladaptation or decline, and to take a more proactive approach to their conservation. With the increasing rate of urbanization in the world, it will become critical to incorporate evolutionary and genomic thinking into the city conservation strategies to ensure long-term sustainability and biodiversity in the anthropogenic spaces.

Conclusion

Urban surroundings are chronic and quickly escalating landscapes of environmental pressure on the animal populations, which contest their survival and sustainability. In this paper, the authors have reviewed existing knowledge on the subject of evolutionary rescue in urban wildlife and have highlighted the role of chronic stresses, including pollution, habitat fragmentation, thermal extremes, sensory disruption, and altered resource availability, in determining adaptive behaviours among taxa. The evidence reviewed suggests that, although most populations are initially subjected to demographic recession due to urbanisation, some are able to survive by adaptive evolutionary events and not simply through acclimation over a short period of time. One of the main contributions of the review is the fact that genomic signatures of adaptation are now part of the evolutionary rescue paradigm. Genomic and regulatory alterations linked to stress response, detoxification, immune functionality, metabolism, behaviour, and gene regulation are regularly observed to be pivotal to aiding adaptive persistence in the urban setting. These signatures offer an indication of molecular evidence that urban survival can be heritable, so that populations can recover or stabilize when subjected to a marked environmental pressure. This paper demonstrates the multidimensionality of the evolutionary theory of adaptation in human-dominated landscapes by connecting it with the knowledge of evolutionary theory, the genome, and representative case studies.

In the future, longitudinal and comparative genomic studies that directly present adaptive

genetic change in relation to fitness and demographic effects should be given priority in future research. Combining genomics, ecological surveillance, and city planning will be very crucial in determining populations with high adaptive capacity and determining thresholds by which evolutionary rescue will not be possible. Conservation In conservation terms, the conservation of habitat quality, connectivity, and minimization of chronic stress can increase evolutionary capacity and resilience. Evolutionary and genomic views of urban wildlife management will be essential to maintaining biodiversity and promoting adaptive processes in a world that is becoming more urbanized.

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