Received: 1 February 2021 | Revised: 11 February 2021 | Accepted: 10 February 2021

DOI: 10.1111/mec.15843

NEWS AND VIEWS

PERSPECTIVE

MOLECULAR ECOLOGY WILEY

Rodents harbouring zoonotic pathogens take advantage of abandoned land in post-Katrina New Orleans

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Leptospirosis is a disease that disproportionately affects impoverished urban communities, but is likely to become more prevalent as changing climate alters flooding regimes. The persistence and transmission of the *Leptospira* pathogen is reliant on small vertebrate animals, predominantly rodents. In this issue of *Molecular Ecology*, Peterson et al. demonstrate how changes in rodent diversity and abundances across the complex mosaic of abandonment and recovery investment in post-Katrina New Orleans can predict zoonotic infection prevalence. Understanding the ecological conditions that support persistence and transmission of zoonotic pathogens in urban ecosystems, where they are most likely to affect humans, is critical to effective monitoring and prevention.

Many studies have shown that diverse ecological communities may be more resistant to parasitism, including pathogen infections (Civitello et al., 2015). When pathogen competence varies among host species, the addition of less-competent species to a community will often result in reduced pathogen exposure and amplification in the dominant host (e.g., Keesing et al., 2006). This is a central theory in disease ecology and an important motivating argument for biodiversity conservation. Yet, context and scale are critical components in predicting how relative changes in species diversity will alter pathogen transmission. In this issue of *Molecular Ecology*, Peterson et al. (2021) examined abundance and composition of rodent communities in a highly disturbed landscape and found that *Leptospira* infection prevalence was actually higher at sites where rodent diversity was greatest. In addition to exotic urban species (Figure 1), additional rodent species found at unmanaged vegetated sites are native and have lower competence as pathogen reservoirs. The authors go beyond pattern identification to demonstrate that pathogen amplification occurs at these sites because the unique combination of habitat and resources created by land abandonment, accumulation of rubbish and unmanaged vegetation (Figure 2) supports high rodent diversity without reduction in host abundance. High host density coupled with a pathogen that can persist in soil is an ideal setting for amplified transmission to all species present, including the low-competence native rodents. The study findings also suggest a hypothesis that predation and competition pressures on the rodent community are low at these sites, which could potentially be managed to encourage greater functional diversity and reduce rodent populations. Of course, diverse ecological communities may not be easily reconstructed or sustained in residential communities, nor are they universally desired.

Adding vegetation cover to green urban landscapes is a critical tool for managing public health challenges, including those related to air and water quality, as well as heat exposure. Access to parks and even small pockets of nature in the city has been linked to better mental health, reduced respiratory and cardiovascular disease, and improved educational metrics (e.g., Wolf et al., 2020). However, the removal of impervious and open water surfaces was originally implemented to improve human well-being (Childers et al., 2014) and how we re-introduce "nature" into cities has important implications for residents at both local and regional spatial scales. Opportunistic revegetation on unmanaged vacant land can create a "green blight" (Gulachenski et al., 2016), which may include novel health risks for local residents, even while contributing to improved air, water and heat issues at regional scales.

The combination of poor garbage management and overgrown vegetation in counter-urbanizing neighbourhoods is also associated with prevalence of *Trypanosoma cruzi* infection of rodents during the heat of the New Orleans summer (Ghersi et al., 2020) and also with dense vector mosquito infestations and predominance of bloodmeals from rats in Baltimore, Maryland (Goodman et al., 2018). Rodents are ubiquitous and frequent reservoirs for zoonotic pathogens in cities across the globe, where they can exploit built infrastructure and failures in human garbage management. While rodents can be found across all socio-economic

FIGURE 1 A trapped rodent (*Rattus rattus*) waits for testing in New Orleans

FIGURE 2 Uneven investment in post-Katrina recovery has left some neighborhoods abandoned and overgrown

categories, they are often most abundant in communities where investment in waste removal and maintenance resources are low (Peterson et al., 2020). Cities are generally hotter than surrounding landscapes, and vegetation moderates temperature extremes that otherwise limit animal activity and survival. Accumulated garbage and refuse at sites with overgrown vegetation is a rodent buffet with shade.

Peterson et al.'s findings provide another example in a growing list of social and ecological disamenities that have disproportionate consequences for urban poor and Black communities in the United States. Unmanaged green spaces are not parks, and opportunistic ecological assembly in these landscapes is likely to include pests and pathogens that can adapt to life with humans and our pets. Urban land vacancy is most persistent in neighbourhoods where low housing values overlap with disturbing historical legacies of racialized social, economic and environmental disamenities (Grove et al., 2018). Studies that integrate ecological and social processes to better identify the conditions that exacerbate or maintain status quo inequities are critical and timely. While *Leptospira* and similar under-reported, zoonotic pathogens are most studied in low-latitude, tropical countries, it is clear that exposure to these pathogens is also a burden on impoverished and minority communities in temperate countries, including the United States (Hotez & Booker, 2020).

DATA AVAILABILITY STATEMENT

This is a Perspectives essay—data are associated with Peterson et al. 2021, to be published concurrently.

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How to cite this article: LaDeau SL. Rodents harbouring zoonotic pathogens take advantage of abandoned land in post-Katrina New Orleans. *Mol Ecol*. 2021;00:1–3. https://doi.org/10.1111/mec.15843