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| **Supplementary Box 1. The Direction of Urban Selection** We have, so far, focused on the biogeography of islands as related to their diversity and diversification. But there has long been an alternate approach to island biogeography, an approach that focused on generalities with regard not to the number of species on islands, but instead the traits of those species. While MacArthur and Wilson were developing their theory, the biologist Sherwin Carlquist was developing a separate general theory of island traits; his general theory entailed 24 key principles, each one a testable hypothesis [(See for example... Carlquist, 1967; Midway and Hodge, 2012)](https://www.zotero.org/google-docs/?TPqhNj). Carlquist hypothesized, for example, that the traits of island species differed from those of mainland species due to 1) the need of species to arrive on islands, 2) the need of species to avoid dispersing away from islands (and into the sea) once having arrived, 3) the altered trophic structure of islands (including escape from some continental predators) and other details of island life.Many of Carlquist’s predictions, recently revisited by Midway and Hodge [(2012)](https://www.zotero.org/google-docs/?JoeQRu), have the potential to also apply to the consideration of the island city. Carlquist, for example, hypothesized that species that colonize oceanic islands will be disproportionately likely to be those able to self (plants) or to give birth via parthenogenesis (animals). This appears to be the case in cities for at least some taxa. For example, a relatively large number of household cockroach species are at least facultatively parthenogenetic, including the American cockroach (*Periplaneta americana)*, the brown cockroach (*Periplaneta brunnea*), and the Surinam cockroach [(*Pycnoscelus surinamensis*; Parker and Niklasson, 2002)](https://www.zotero.org/google-docs/?qm6nC9). Similarly, the invasive ant species, *Paratrechina longicornis,* now common in many cities [(Santos et al., 2019)](https://www.zotero.org/google-docs/?D4v2cF), is also parthenogenetic [(Pearcy et al., 2011)](https://www.zotero.org/google-docs/?REucIw). Carlquist also predicted that once having colonized islands that many species would lose their ability to disperse, leading to the origin of flightlessness (in birds and bats) and reduced seed dispersal in plants. In cities, there is some evidence for similar phenomena. For example, *Crepis sancta*, a small herbal plant found in urban sidewalk populations from South of France have more non-dispersing seeds than nearby non-fragmented, rural populations [(Cheptou et al., 2008)](https://www.zotero.org/google-docs/?F0NDKV). These traits are genetically determined and likely driven by urban paved surfaces where seeds cannot germinate (Cheptou et al. 2008). In addition, some urban populations of migratory birds, including some blackbirds (*Turdus merula*), appear to cease migrations in cities; this is a behavioral change, but it is one with consequences for gene flow and hence divergence [(Møller et al., 2014)](https://www.zotero.org/google-docs/?T2Conj). Carlquist also predicted that plants on islands will tend to have a taller stature. Similarly, urban ecological studies suggest that plants in urban habitats tend to be taller than their rural counterparts, which are often restricted in size due to cold and open exposed habitat [(Thompson and McCarthy, 2008 and references therein)](https://www.zotero.org/google-docs/?zuWKE2).While some of these predictions might hold in cities, a dominant, and quite distinct, set of selective pressures on urban islands is likely to be those due to human actions. In outdoor green and, especially, grey habitats, urban heat island effects are likely to lead to selection for heat tolerance [(Diamond and Martin, 2020)](https://www.zotero.org/google-docs/?wE9tTI). In some cases, this selection may favor individual genes associated with heat tolerance. For example, C4 plants tend to be more able to deal with warm conditions in general and, at least in Europe, are disproportionately more likely to thrive in cities with strong heat island effects [(Duffy and Chown, 2016)](https://www.zotero.org/google-docs/?1lcc0d). Selection might also favor species able to thrive using human food resources. Ants living in the grey habitats of cities [(Penick et al., 2015)](https://www.zotero.org/google-docs/?MwZbeG), as well as some red foxes [(Handler et al., 2020)](https://www.zotero.org/google-docs/?aezKbL), but not feral honey bees [(Penick et al., 2016)](https://www.zotero.org/google-docs/?6UBX5Y) have been shown to get much of their energy from human food (particularly corn-based food). Selection might be predicted to favor metabolic traits associated with preferring human food or digesting it, as has been shown to be the case with dogs compared to wolves [(Axelsson et al., 2013)](https://www.zotero.org/google-docs/?3xqDlm). Industrial pollution [(Whitehead et al., 2017)](https://www.zotero.org/google-docs/?DrB9vR), light pollution [(Hopkins et al., 2018)](https://www.zotero.org/google-docs/?OeNBPw) and sound pollution [(Classen-Rodríguez et al., 2021)](https://www.zotero.org/google-docs/?q6HR61) are also proving to be potent selective agents in cities. The strongest current human selection pressures, however, undoubtedly relate to biocides. Extraordinary quantities of biocides, in the forms of herbicides, insecticides, rodenticides, antifungals and antibiotics are used each year in cities. In general, rates of use of most of these biocides are increasing and rapid evolutionary responses have already occurred in response. For example, populations of German cockroaches have repeatedly evolved an aversion to glucose used as a feeding stimulant in toxic baits, perceiving it as bitter, rather than sweet [(Wada-Katsumata et al., 2015)](https://www.zotero.org/google-docs/?8kTntt). Additionally, rodents have repeatedly evolved warfarin resistance [(Rost et al., 2009)](https://www.zotero.org/google-docs/?bUyv10), and bed bug populations have evolved resistance to multiple insecticides [(Dang et al., 2017)](https://www.zotero.org/google-docs/?nV9613).  |