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Networked domestic gardens boost urban biodiversity

Urban development is changing the composition of the natural landscape. A recent study has highlighted the importance of connecting fragments of green space, such as gardens, with ecological corridors to improve biodiversity and help spiders and beetles disperse within the urban landscape.

Urban biodiversity can play a key role in improving green infrastructure, with positive effects for human health and climate change adaptation. However, it is often threatened by expanding city structures which have fragmented natural areas, creating small patches of green spaces in amongst buildings and roads. For example, patches of urban woodlands are generally separated from each other, which affects the ability of many woodland species to disperse, or move among different locations with similar habitats.

Ecological corridors or connections between urban woodlands or other green spaces are recognised as a way to limit the negative effects of fragmentation. Corridors support biodiversity by allowing some species, especially the less mobile ones, to disperse to distant locations. However, there is little research investigating the impact of corridors in urban settings.

This study investigated the effectiveness of green corridors in helping wildlife disperse, to enhance urban biodiversity in gardens. Communities of spiders, carabids (ground beetles), and staphylinids (rove beetles) were compared in four sites near Paris, France. Within each site there were four types of green spaces: urban woodlands, considered to be the source of the spider and beetle communities; a woody corridor; a domestic garden connected to the woody corridor and a second type of garden, which was not connected to the woody corridor. In all, there were four woodland sources, four corridors, 16 connected gardens and 16 unconnected gardens.

The researchers analysed the effect of corridors on the variety of species, the number of individuals, the means by which species disperse (in the air or on the ground) and the main habitats in which the species are typically found.

They identified a total of 75, 25 and 61 species of spiders, carabids and staphylinids, respectively, from all four sites. There were fewer numbers of species of staphylinids in gardens that were not connected to corridors than in sources, corridors and connected gardens. The few species of staphylinids that were found in unconnected gardens typically had strong dispersal abilities and were able to fly many kilometres across the city.

There were fewer staphylinids and spiders in disconnected gardens than in sources, corridors and connected gardens, and the composition of the communities of spiders, carabids and staphylinids in connected gardens was similar to the community composition found in the corridors. Therefore, not only do corridors affect the dispersal of individual species, they also allow species to maintain community structure.

The study suggests that differences between garden communities were mainly caused by the gardens' connection or non-connection to the corridor. This result seems to be related to the dispersal capabilities of the different species and their abundance in the different areas or sources. For example, woodland staphylinids were abundant in the woodland sources and many species are unable to fly. As a consequence, corridors are functional and important for this group. The woodland carabids have generally lower dispersal capabilities than woodland staphylinids. Thus, the researchers expected that carabids could use corridors more than staphylinids or spiders. However, woodland carabids were surprisingly rare in the woodland sources, which could be caused by the fragmentation of woodlands at a regional scale. The researchers suggest corridors that connect sources to gardens should be considered an essential part of the wide-scale planning of green spaces in urban areas.

Source: Vergnes, A., Le Viol, I., Clergeau, P. (2012) Green corridors in urban landscapes affect the arthropod communities of domestic gardens. *Biological Conservation.* 145: 171–178. Doi:10.1016/j.biocon.2011.11.002.

Contact: alan.vergnes@gmail.com

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