

Urbanized grasslands favor species with short generation time

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Urbanisation is one of the major cause of declining biodiversity. Although many studies have been conducted on biodiversity in urban areas, a few have looked at megacities with population of more than 10 million.

Although effects of urbanisation on biodiversity are complex and varying, these effects can be categorized in to direct and indirect effects. Direct effects are habitat loss and fragmentation due to urban development, and indirect effects are degradation of habitat quality due to increased human activities in urban areas. The manifestation of these effects differ in timing and magnitude between various species groups.

Our objective is to evaluate the loss of biodiversity in urban areas and understand its mechanisms. 20 semi-natural grassland at the margin of rice paddy were chosen as sample sites along urban-rural gradients in Hanshin metropolitan area, Japan. Degree of recent urbanisation was quantified using 1km buffer from each sample site. Environmental conditions and management practices were recorded. We surveyed species richness of native and exotic vascular plants, and two herbivorous insect orders, Lepidoptera and Orthoptera. In addition, various life-history forms within each taxonomic groups have been examined to observe the differing effect of urbanisation. Structural equation modelling(SEM) analysis was used to highlight the mechanisms behind these differing effects.

Biodiversity of plants and herbivorous insects decreased with larger degree of urbanisation. However, both native and exotic annual plants were shown to be more species rich in areas with high degree of urbanisation, while native perennial and woody plants decreased in species richness. Similarly, short generation Lepidoptera species were less affected by changing land-use due to urbanisation compared to longer generation species. Using field sampling, land-use change analysis and SEM analysis, this study has highlighted the varying effect that urbanisation has on species groups with different life-history form, and its complex mechanisms behind these effects.