Exploring Driving Forces of Avian Diversity in a Subtropical Asian City.

Chun-Wei Huang\textsuperscript{1}, Yi-Lei Hsu\textsuperscript{2}, Hui Xian Lau\textsuperscript{3}, and Jerome Chie-Jen Ko\textsuperscript{4}

\textsuperscript{1}Ming-Chi University of Technology, General Studies Center, Taiwan (cwhuang@mail.mcut.edu.tw; chun-wei.huang@aya.yale.edu)
\textsuperscript{2}National Taiwan University, Department of Civil Engineering, Taiwan
\textsuperscript{3}National Taiwan University, Department of Geography, Taiwan
\textsuperscript{4}Taiwan Endemic Species Research Institute, Taiwan

Global urbanization has led to biodiversity decline. Although some case studies reveal rich biodiversity in cities, we still know little about the underlying factors that shape biodiversity at different levels of urbanization. This study statistically analyzes the relationships between environmental, socio-economic and landscape-ecological factors with avian diversity along the rural-urban gradient of Taipei, Taiwan. We use stepwise regression to explore factors that are correlated to variation of bird diversity. First, based on a citizen-science based breeding bird survey in Taiwan (BBS Taiwan), we identify avian richness at different levels of urbanization, using population density as a proxy. Then we correct median income, proportion of tertiary education attainment, precipitation and temperature data from open government data of Taiwan. Finally, we quantify landscape structures using landscape metrics. The results indicate that landscape-ecological factors, such as cohesion of forest, the edge length between building and wetland and area size of building, etc. are correlated with avian richness. On the other hand, socio-economic factors, such as median income and education level are not correlated with avian diversity. Our results reveal that the luxury effect, which describes the positive influence of wealth on urban biodiversity, may not be influential at a subtropical compact city in Asia. On the contrary, we suggest an eco-friendly landscape design that creates a landscape mosaic with scattered trees or wetlands can lead to a network of ecological stepping stones through urban areas for improving bird diversity.