

# Ecological Characteristics of the Kyo-machiya Garden Located in the Former Touen School District of Kyoto City as Small Green Spaces

Ryo UENO

*Keyword : urban area, Kyo-machiya garden, small green space, private space, connectivity, birds*

## 1. Background and Objective

The creation and conservation of green spaces to improve biodiversity in urban areas are required recently. In particular, small green spaces in private space are important in Kyoto City because few spaces can be greened by the government<sup>1)</sup>. Kyo-machiya garden, one of the small green spaces in private space, have been reduced due to the demolition of Kyo-machiya (traditional wooden townhouses)<sup>2)</sup>, but they create green connectivity. Also, many kinds of creatures have been found in the gardens by the owners<sup>2)</sup>. Therefore, Kyo-machiya gardens may play a role as a habitat for creatures in urban areas. However, there are no studies about the characteristics of Kyo-machiya gardens as a habitat and the actual situation in Kyo-machiya gardens. In this study, we will clarify the characteristics of the gardens as a habitat by understanding the appearance of birds as an environmental indicator in Kyo-machiya gardens. Besides, we conducted a questionnaire survey to understand what the owners think about Kyo-machiya garden. Finally, we considered the future tasks for preserving Kyo-machiya gardens by analyzing the results of these two investigations.

## 2. Method

We investigated in the former Touen school district in Kamigyoku, Kyoto, where Kyo-machiya gardens remain and few factors significantly affect bird distribution. First, the green space analysis was conducted by using GIS to understand the current distribution of Kyo-machiya gardens and other green spaces. Next, vegetation and bird surveys were conducted in 10 gardens from May to September 2019 to understand the environmental characteristics and the appearance of birds in Kyo-machiya gardens. Also, correlations between the number of bird species and the distance to large green spaces, vegetation cover ratio, building coverage ratio, and CON index were calculated. Besides, a questionnaire survey was conducted on 168 Kyo-machiya gardens located throughout the former Touen school district in September 2019 to understand the owners' idea of Kyo-machiya-gardens (response total: 44, response rate: 26.2%.)

## 3. Result and Consideration

As a result of bird surveys, we found some birds adapted to urban environments, and various behaviors such as "perching on trees" and "bathing" were confirmed inside the gardens. Also, in the questionnaire survey, the garden owners had often confirmed birds that can adapt to urban environments. These results indicated that Kyo-machiya gardens may play a role as an auxiliary habitat for birds in urban areas.

The result of the green space analysis indicated that Kyo-machiya gardens occupy about 30% of the green spaces in this district. Besides, from the results of the bird survey and the questionnaire survey, there was a positive correlation between the connectivity of green spaces around the garden and the number of bird species. Therefore, the Kyo-machiya garden is one of the parts that create the connectivity of green spaces, and there is a possibility that the number of bird species will increase by conserving Kyo-machiya gardens. However, the results of the questionnaire survey indicated that it is difficult to maintain the Kyo-machiya gardens because there are few successors and the owners need maintenance costs and physical strength by aging. In the future, it is important to disseminate the value of Kyo-machiya gardens as a habitat. Also, it is necessary to create new green spaces with connectivity at the site of demolished Kyo-machiya. Besides, we have to clarify the relationship between bird distribution and small green spaces in more detail.

**【Reference】** 1) Kyoto City(2010) : The Basic Plan for Green of Kyoto City, 6-31 2) Akiko NIINO(2014) : An Integrated Evaluation of the Green Spaces Remained as Traditional Downtown House Gardens in Central Area of Kyoto City, Master's thesis ※unpublished