Technologies to preserve biological diversity in the city

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1. Research background and purpose

As was witnessed with the resolutions of treaties at the Convention on Biological Diversity COP10 held in Nagoya in 2010, the importance placed on biodiversity preservation in cities is increasing. However, the definition of "city" is not exactly clear-cut, as can be ascertained by the various degrees of urbanization found in the city centers of large cities and its suburbs, to provincial cities etc. As well, with the forecast of population decline facing most cities in Japan, examinations into the implementation of compact cities are currently being conducted. Up to the present, the administrative stance towards parks and greenery was centered on how to secure greenery in the midst of a growing population and development constraints. In the future, however, in order to effectively pursue even further, the preservation of biodiversity in cities, an optimal preservation/creation plan for greenery that includes "quality" and "placement" factors will be required.

The purpose of this research is to analyze the effects that the scale of greenery, vegetation structure and surrounding environment etc. has on biodiversity over a wide range of urbanization levels (high population density, fewer green space areas etc.), and to clarify the most effective greenery preservation/creation measures, according to the various city situations and visions.

2. Research Overview

An investigation was conducted over a wide area from the city center to the suburbs, covering city parks, green roofs and roadside planting etc., where environmental conditions like the habitation situation of birds and insects, the vegetation structure inside each green tract, and the presence of water was monitored (see figure). Presently, w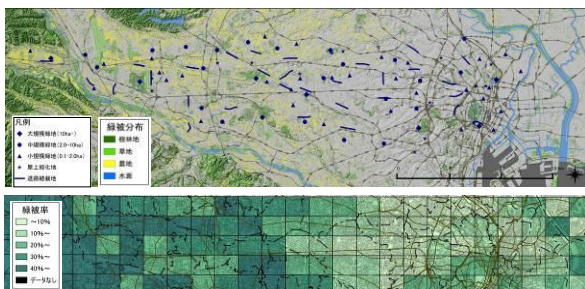e are analyzing the results of this investigation concurrently with investigations on site conditions like land use and the topography around the target site, in order to clarify the factors affecting biodiversity in cities and its degree of affectation. For example, the following observations have been made clear through this research.

1) The relation with the degree of urbanization

As a general trend, as the degree of urbanization increased, conversely fewer varieties of birds and insects were found. However, since the degree of this effect fluctuates depending on the movement ability of each species, this trend may serve as an index reference to comprehend the nature of biodiversity and its changes.

2) Biodiversity preservation functions in urban green spaces

While the amount of time spent investigating at each green space was limited, with a focus on large-scale parks, a wide variety of species including those listed in the Red Data Book of Tokyo could be found. It can be said that urban green spaces contribute to biodiversity conservation in cities.

3. Future works

In the future, we will continue to analyze our investigation results, and compile a technical guide that can be utilized in Park and Green Space policies for the preservation of biodiversity in the city.

(Reference)

1) Yusuke Uneo/Naoyuki Sone/Masao Kurihara (2014): The effects of urbanization on biodiversity - interaction among urbanization, patch area, and the taxonomic group - : Japan Association for Landscape Ecology, 24th Kanazawa Meeting, meeting program and lecture notes, p64
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Figure: Distribution of the survey area (top) and the green coverage ratio range (bottom)

Photo: Example of creatures found in the investigation of urban green spaces