



Abstract

Spatial and Temporal Variation of Species Composition and Structure of Unmanaged Secondary Forest (Abandoned *satoyama*) Adjacent to Late-Successional Forest †

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Abstract: There are several ecological issues associated with unmanaged secondary forests, or abandoned *satoyama*, in Japan, such as decreasing species diversity and invasions by alien species. To understand its vegetation dynamics, we investigated changes in the stand structure of an unmanaged secondary forest over 15 years. Study plots were established in a secondary forest at varying distances from a late-successional lucidophyllous forest. We calculated the Bray–Curtis similarity indices of the plots over space and time and compared them using nMDS (non-metric multidimensional scaling). The species composition of the proximal secondary forest was more similar to the lucidophyllous forest than that of the distal secondary forest, indicating that late-successional species are spreading into the unmanaged secondary forest. Over the 15-year study period, the species composition of the distal secondary forest approached that of the lucidophyllous forest. This was due to a decreasing abundance of shade-intolerant species, such as *Rhododendron*. Stand structure, however, changed very little because dominant canopy trees, namely *Quercus serrata* and *Quercus variabilis*, continued to grow. Although late-successional species are regenerating in secondary forests, it may take several decades for the stand to reach a late-successional structure, where evergreen broadleaved trees, namely *Castanopsis cuspidata*, dominate the canopy.

Keywords: succession; nMDS; vegetation dynamics; stand structure



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