

# Tree Population Dynamics of Large-scale Mature Urban Forest in Kyoto city, Japan

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## Abstract

Tadasu-No-Mori forest was a large-scale mature urban forest in Kyoto city, Japan. This forest surrounded Shimogamo-Jinja shrine, which was the oldest shrine in Kyoto city and had been registered as the World heritage of UNESCO in 1994.

This forest had been dominated by *Ulmaceae Aphananthe aspera*, *Celtis sinensis* and *Zelkova serrata*, deciduous broadleaved species, because it located at the junction of two vast rivers. So it had been disturbed so many times before river improvement. This natural disturbance process had prevented this forest from reaching climax phase, evergreen broadleaved forest. It was said that *Ulmaceae* forests had covered most parts of Kyoto plain in ancient times, therefore *Ulmaceae* forests might be the native vegetation of this area. However, recently, *Cinnamomum camphora* had become competitive species against *Ulmaceae* species in this forest. *C. camphora* was non-native plant in Kyoto city but saplings of this species were introduced into this forest about 70 years ago.

So we censused all trees larger than or equal to 10cm diameter at breast height in 1991 and 2002 in the whole area (9.08 ha) of this forest and examined the population dynamics of each species. In 2002, *C. camphora* occupied the largest portion of total basal area. It indicated that *C. camphora* was the most dominant species in this site. To clarify the mutual relationship among main species, *A. aspera*, *C. sinensis*, *Z. serrata*, *C. camphora* and *Quercus glauca*, we compared size frequency distribution and the traits of growth rate, mortality rate and recruitment rate. The initial growth rate of *C. camphora* was relatively high. *C. camphora* had the lower mortality rate than *C. sinensis* and *Z. serrata*. The frequencies of *Ulmaceae* species and *C. camphora* in the small DBH class were low. In contrast, *Q. glauca* showed reversed J-shaped size distribution. And *Q. glauca* had the high recruitment rate. These results suggested that *C. camphora* would maintain the most dominant position for the time being and *Q. glauca* would take the place of *C. camphora* in the canopy layer in the further future.