

## Phylogeography of Intraspecific Differentiation of *Hydrangea serrata* (Hydrangeaceae), a Widespread Shrub Species in the Japanese Archipelago

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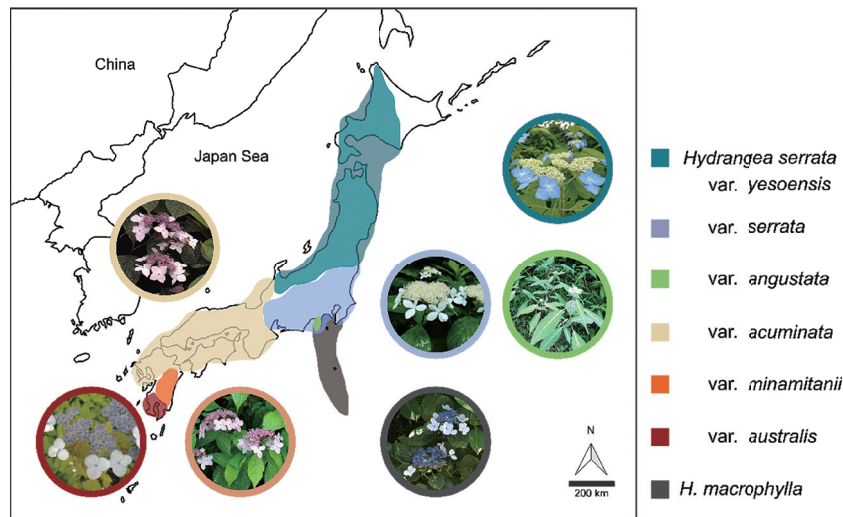
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*Hydrangea serrata* (Thunb.) Ser. is a deciduous shrub species, distributed throughout Japan and in a part of East Asia. This species comprises of six varieties, var. *serrata*, var. *acuminata* (Siebold et Zucc.) H. Ohba et S. Akiyama, var. *yessoensis* (Koidz.) H. Ohba, var. *minamitanii* H. Ohba, var. *australis* T. Yamaz., and var. *angustata* (Franch. et Sav.) H. Ohba (Ohba and Akiyama, 2016); since their distributions are allopatric in Japan and composes sect. *Macrophyllae* together with *H. macrophylla* (De Smet et al., 2015), *H. serrata* will be a useful material to understand allopatric speciation in the plants distributed widely in the Japanese Archipelago. Although several phylogenetic studies of *H. serrata* have been previously conducted, the phylogenetic relationships among these varieties remain unclear because of limited information by genetic markers used and incomplete taxon samplings (Uemachi et al., 2014; Hirota et al., 2022). Therefore, more comprehensive phylogenetic analyses are required to elucidate the phylogenetic relationships and the history of diversification within sect. *Macrophyllae*, particularly at infraspecific level of *H. serrata*.

In this study, we reconstructed an infraspecific phylogeny of *H. serrata* and estimated divergence time of sect. *Macrophyllae*, including *H. serrata*, from the sister species, based on genome-wide SNPs. Additionally, we reconstructed the ancestral geographic areas to investigate phylogeographic history of *H. serrata*.

The phylogenetic trees reconstructed in this study showed the monophyly of most varieties of *H. serrata*. The divergence time between sect. *Macrophyllae* species and the outgroups was estimated to be in the Pleistocene period. The ancestral biogeographic history of *H. serrata* suggested some evidence of biogeographic isolations at various scales in the Japanese Archipelago.



**Figure.** Distributions of varieties of *Hydrangea serrata* and *H. macrophylla* in the Japanese Archipelago