

Phylogenetic Origin of *Cryptomeria japonica* on Kinkasan Island in Japan

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Sugi (杉) – *Cryptomeria japonica* is widely planted throughout Japan accounting for about 44 % of the total area of planted forests but its natural populations with its original local lineage are limited. Natural forests and local tree lineages are important for regional biodiversity and future breeding resources. Kinkasan in Miyagi prefecture is known as an island where the natural forest has been protected; therefore, we thought that it is a candidate for an unknown natural population of the species. Therefore, we wanted to figure out if the population on the island has a surviving local lineage of this region or not.

We collected 24 samples from the island including individuals from natural habitats as well as planted populations. We also used reference samples (83 samples from 17 natural populations in Japan and 28 samples from local populations near Kinkasan) to compare the genetic structure. Genome-wide SNP data was collected with the MIG-seq approach and genetic analysis was conducted by using Stacks (ver. 2.60), RAxML (ver.8.2.12), and ADMIXTURE (ver. 1.3.0).

The results showed that the eight trees from the natural habitats were supposed to be originated from a local lineage related to the local populations near Kinkasan. Their values of genetic diversity and inbreeding coefficient are almost the same levels as other natural populations. In addition, the lineage of the Pacific Ocean side was found in planted populations and partial mixing of the Sea of Japan side lineage was also observed in some individuals which may indicate genetic disturbance in the natural genetic structure.

The trees with local lineage discovered in this study are important for the conservation of the local genetic resources and diversity. It is important to consider the conservation of local genetic diversity in upcoming afforestation and restoration projects.



Photos 1 and 2. Over hundred years old trees of *Cryptomeria japonica* on Kinkasan island