

## Phylogeography of *Juniperus* Species (Cupressaceae) with a Disjunct Distribution in the Island Areas of Japan

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A coastal conifer, *Juniperus taxifolia* var. *lutchuensis* (Cupressaceae) is distributed in the Ryukyu Islands, Izu Islands, and a part of the Izu peninsula. This species is treated as a variety of *J. taxifolia* var. *taxifolia* which is endemic to the Bonin (Ogasawara) Islands. Since these three Island groups are separated by more than 1,000 km away, it is interesting where this species originated and how it expanded its distribution. On the other hand, *J. conferta* is distributed in Hokkaido, Honshu, and Kyushu Islands. This species grows in a coastal environment like *J. taxifolia* var. *lutchuensis* and the two taxa are distinguished by the traits of their leaves. In areas where distributions of these two species overlap, morphologically intermediate individuals have been reported; however, their phylogenetic relationships are unclear.

In this study, we collected 267 samples of 7 *Juniperus* species including 27 populations of *J. taxifolia* and *J. conferta* from Japan and Taiwan Island in order to reveal the phylogeographic relationship among these three taxa. We extracted DNA from leaves by the CTAB method and obtained genome-wide SNPs by the MIG-seq analysis. Based on MIG-seq data, we conducted phylogenetic and population genetic analyses.

The result of the phylogenetic analysis indicated that *J. taxifolia* var. *lutchuensis* didn't form a monophyletic clade with var. *taxifolia* but with *J. conferta*. Moreover, *J. taxifolia* var. *taxifolia* was monophyletic with *J. formosana* which is endemic to Taiwan Island and southeast of mainland China. The results of the population genetic analyses indicated that *J. taxifolia* var. *lutchuensis* from Izu Islands is genetically different from the Ryukyu Islands population and is closely related to *J. conferta* from Honshu Island. These results suggest that *J. taxifolia* var. *taxifolia* originated from Taiwan or mainland China and that *J. taxifolia* var. *lutchuensis* has the same origin as *J. conferta* with some genetic differentiation by expanding its distribution along the coast.



**Photo.** *Juniperus taxifolia* var. *lutchuensis* in Amami Oshima Island