

## Research Highlights

### Importance of introgression on intra-specific genetic differentiation and adaptive divergence

The origin of alpine plants in Japan can be traced back to migration from northern regions such as the northern Pacific and Arctic during the Pleistocene glacial period. In contrast to this biogeographic history, alpine plants in Japan have to overcome different environmental conditions compared with more northern populations, such as higher temperature and shorter photoperiods. As a result, some adaptive divergence may have accumulated between northern and southern populations. To elucidate the mechanistic basis for adaptive evolution, analyzing genetic variation is an efficient approach.

Here, Hajime Ikeda at the Institute of Plant Science and Resources at Okayama University and colleagues have found that the arctic-alpine plant *Phyllodoce caerulea* in northern Japan is genetically distinguishable from its northern populations in the northern Pacific. Notably, a simulation analysis demonstrated that the genetic variation in northern Japan originated by introgression from a relative species *Phyllodoce aleutica*. Furthermore, they show that northern Japan and northern Pacific regions have differences in annual precipitation.

Accordingly, the genetic structure caused by introgression is associated with the geographic distributions as well as environmental differences. This suggests that *P. caerulea* having alleles of *P. aleutica* may be adaptive to environments in Hokkaido with higher precipitation. This study contributes to the understanding of the evolutionary importance of introgressive hybridization, which has been long disputed in plant evolutionary biology.

#### Reference :

- Authors: Ikeda H, Sakaguchi S, Yakubov V, Barkalov V, Setoguchi H.
- Title of original paper: Importance of demographic history for phylogeographic inference on the arctic-alpine plant *Phyllodoce caerulea* in East Asia.
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- Department website: <http://www.rib.okayama-u.ac.jp/wild/index.html>

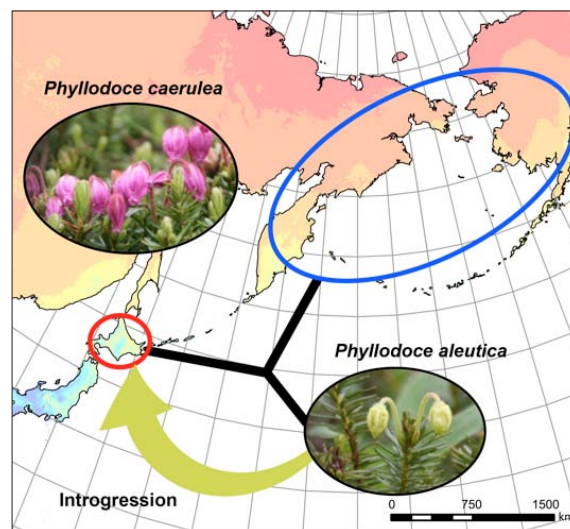


Figure: Summary of the finding. *Phyllodoce caerulea* in the northern Pacific and northern Japan belongs to distinct clade, where the latter clade was influenced by introgression from a relative species *Phyllodoce aleutica* (as shown by the large arrow). The color of land in the map represents annual precipitation, in which the bluish color harbored higher precipitation than reddish color.