

A comparison on internal structures of a leaf in *Dryas octopetala* between populations growing in the Arctic and mid-latitude alpine II

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An arctic and alpine plant, *Dryas octopetala*, has a widespread occurrence from the high Arctic tundra to mid-latitude alpine in the northern hemisphere. Foliar traits of this species show large variations between populations, especially in the high Arctic and mid-latitude alpine (e.g., Wada et al., 2003; Wada, 2008). For examples, semi-evergreen leaf habit has been reported in the subarctic tundra (Jonasson, 1989), while deciduous leaf habit in the mid-latitude alpine of Japan (Shimizu, 1982). Most studies, however, have been reported external morphology of a leaf, and no study examines variation in internal structure of leaves between populations. We reported internal structures of a leaf of *D. octopetala*, such as sizes of epidermal and mesophyll cells, as well as external morphological traits such as leaf area and its shape (Wada et al., 2017), in order to elucidate the reason why this species has large variations in foliar traits such as morphology, phenology, and photosynthetic performances (Sekikawa and Wada, 2017). We found differences of size of mesophyll cells and the number of chloroplasts between populations of Tateyama in Japan and Adventdalen in Svalbard (Wada et al., 2017). The higher number of chloroplasts and the higher density of mesophyll cells per unit area appeared to cause the higher photosynthetic rate in the mid-latitude alpine than in the arctic populations. However, this result was obtained only from each one population, and so multi-site comparison will be necessary to confirm the universality of variation in internal structures of a leaf of *D. octopetala*. In this report, we add more three populations, Hoken-dake (Kisokomagatake) and Ioh-dake (Yatsugatake) in Japan, and Ny-Ålesund in Svalbard, to confirm structural variation in leaves between alpine population in Japan and the Arctic population in Svalbard.

References

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