

ECOLOGICAL STUDIES OF TWO PERENNIAL HERB PLANTS IN KAMCHATKA

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We did a field survey for two ecological studies in June 2014 around Petropavlovsk-Kamchatsky. This report provide a brief overview of two our studies.

1. The evolution of leaf variations in *Corydalis* species.

Some *Corydalis* species which are distributed on far east (mainly Japan and/or far east Russia), have conspicuous morphological variations (leaf form, color of a flower and the fruit, and so on.). For example, in Hokkaido and Primorskii (suburbs of Vladivostok), *Corydalis ambigua* frequently have the leaf form variations within a population under same environment (Fig. 1). The phenomenon is also observed at other *Corydalis* species (e.g. *C. lineariloba*, *C. orthoceras*, *C. repens*, *C. remota*). It is very important for plants, because the form of leaf is related with all their functions and their environment. Nevertheless, why does these species have various leaf form variations within a population? We hardly had the basic information about this phenomenon. Accordingly, now we are examining the range of their variations and their incidence within population, and doing the molecular phylogenetic analysis which are conducted using cpDNA non-coding regions and nuclear DNA ITS region. Our study aims are to reveal the evolutionary process of conspicuous morphological individual variations, and to consider these ecological meanings.

Moreover, we are trying to resolve the taxonomic problem about a species classification of *C. ambigua*. Liden (1996) and Liden and Zetterlund (1997) suggested that *C. ambigua* was only distributed in Kamchatka, and reclassified the others to three different groups ectopically (Hokkaido and Sakhalim; *C. fumariifolia* subsp. *azurea*, Northern Honshu; *C. fukuharae*, Primorskii; *C. fumariifolia* subsp. *fumariifolia*). The key of these taxonomic character was mainly flower features (Liden and Zetterlund, 1997). However, in our previous research which compared the plants of Hokkaido (*C. fumariifolia* subsp. *azrea*) and it of Honshu (*C. fukuharae*), we could not distinguish them in this features clearly. In addition, the results of the genetic analysis indicated that the two plants were very similar each other.

To progress our study and also validate the taxonomic problem more, we measured some morphological character and collected the samples for genetic analysis in Kamchatka populations of *C. ambigua*.



Fig. 1. The example of leaf variations in *Corydalis ambigua*. A: Normal type, B: Small leaflet type, C: Slender leaf type, D: Lobed leaf type

2. Comparative study of ecological traits in Kamchatka and Hokkaido.

To reveal the effect of latitude gradient on the ecological traits of plants, we focused on the perennial herbs, *Trillium camschatcense* Ker Gawl. (In Japan, we generally use it as synonym of *Trillium kamtschaticum* Pall. ex Pursh) which distributed from Kamchatka (northern limit) to Japan (southern limit). In June 2014, we established a total of twenty 1 m² plots, randomly placed on the forest floor of the three populations (Paratunka, Svetloye Lake, Svetloye stream) in Kamchatka. All plants within these plots were classified by stage (seedling: sd, one-leaf: 1L, three-leaves: 3L, flowering: FL), and the morphological characters (mainly leaf width and plant length) were recorded. Because we already had the data of populations in Japan (e.g. Tomimatsu and Ohara 2006), the data obtained from Kamchatka were able to compare with these. A part of the results which was shown in Fig. 2, 3, suggested that the plants density tended to be low,

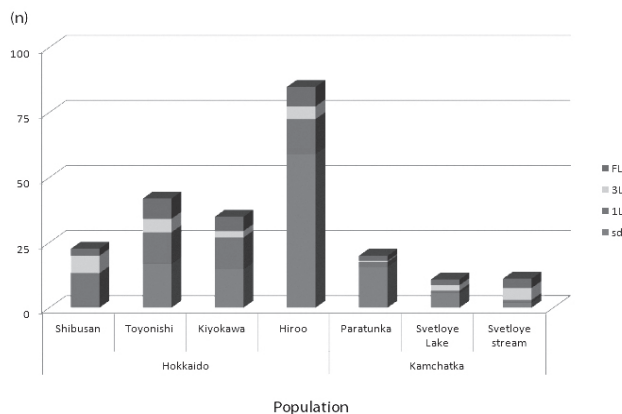


Fig. 2. The number of individuals growing in 1 m². Shibusan, Toyonishi, Kiyokawa population is located in small forest (<1 ha). The density of individual in Kamchatka populations tend to be lower than in Hokkaido populations. The data of Hokkaido are from Tomimatsu and Ohara (2006)

and especially the number of one-leaf stage was smaller than in Hokkaido. This results indicated that the plants might have different mechanisms of population maintenance between Kamchatka and Hokkaido. In the future, to understand the mechanism of population maintenance in detail, we would like to research the population dynamics, mating systems, genetic diversities in Kamchatka.

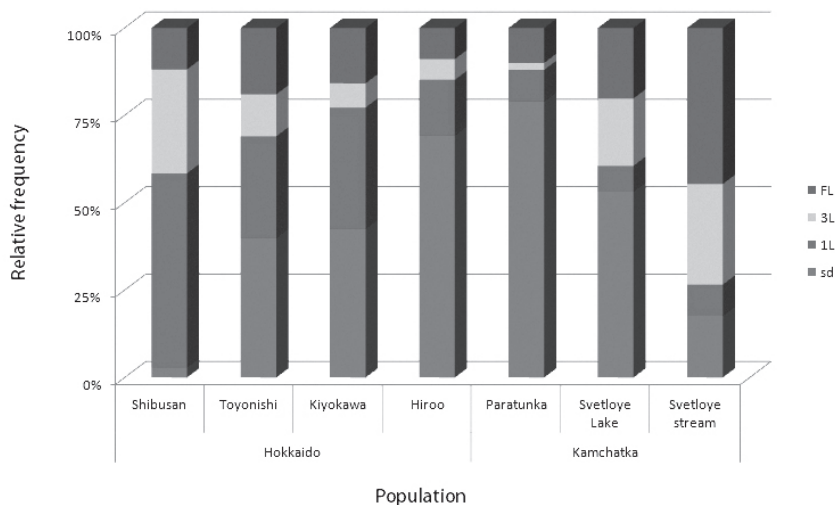


Fig. 3. Stage structure (relative frequency of four growth stages) for seven populations. In Kamchatka, the frequency of one-leaf stage tend to be low. The data of Hokkaido are from Tomimatsu and Ohara (2006)

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