

## Effect of mountainous topography to genetic differentiation of two *Leptocarabus* beetles that inhabit different altitude

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We studied genetic differentiation of two *Leptocarabus* subgenus (*Carabidae*; *Carabus*) that inhabits different altitude to reveal the role of mountainous topography as geographic barrier. In the Japanese Alps, *C. (L.) arboreus* and *C. (L.) procerulus* are high- and low-altitude species, respectively. The high-altitude species has seven morphological subspecies in the Japanese Alps. In this study we tested two hypotheses (1) high-altitude species is genetically more differentiated than low-altitude species and (2) geographic barrier, especially saddle altitude between mountain ranges affects genetic differentiation of high- altitude species; and examined (3) whether subspecies are supported by molecular phylogeny.

Focal species were sampled in two or more sites of each of eight mountain ranges in the entire Japanese Alps. DNA sequences of two nuclear genes (28S rDNA, and *Wingless*) were obtained for 1 - 2 individuals for each species in each site (total seven subspecies, 37 individuals of high-altitude species and 36 individuals of low-altitude species). We did multiple regression analysis to reveal the effect of the pairwise the horizontal distance and the altitudinal distance on the genetic distance.

Our results showed (1) high-altitude species had more number of haplotypes and was genetically more differentiated than low-altitude species (Fig.), (2) in only high-altitude species, the pairwise genetic distance increased with the altitudinal distance (Fig.), particular when the saddle altitude was lower than 1000m, suggesting the importance of mountainous topography on the pattern of genetic differentiation and (3) approximately half of subspecies had peculiar haplotypes and morphological subspecies were supported by molecular phylogeny.

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