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Does the history of the host resemble the history of its symbiont? Evolutionary ecology of *Dasyscyphella longistipitata* in Japan

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Purpose: The effects of the Last Glacial Maximum in the Japanese Archipelago have been extensively assessed for tree species. However, the effect of this environmental event on the populations of saprophytic fungi is still poorly understood. This study aimed to examine genetic diversity, past environmental variables, and past demographic fluctuations of *Dasyscyphella longistipitata* and *Fagus crenata* to understand the historical events that shaped the current distribution of the genetic diversity of *D. longistipitata* in a space-time context.

Methods: 274 *D. longistipitata* isolates from 14 localities were genotyped using ITS and Beta tubulin sequences to estimate the genetic diversity and structure. Distribution modeling analyses were performed to evaluate the influence of past environmental changes in the distribution of *D. longistipitata* and *F. crenata*. Finally, the past demographic trends and dispersion routes were estimated using coalescent-based analytical tools.

Results and conclusions: The analysis displayed high levels of genetic diversity of *D. longistipitata* with low structure. The distribution models displayed past environmental changes that lead to shifts in habitat suitability. Also, the estimated effective-size in both species suggested a historical demographic growth while dispersion routes corresponded to areas of environmental suitability. The results resembled the strict relationship between *D. longistipitata* and *F. crenata*.