Hybridization promotes range expansion: a case study of the *Daphnia longispina* species complex in China

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The idea that hybridization promotes range expansion has received recent attention, but support from field studies is limited. We hypothesized that in the cladoceran waterflea *Daphnia*, parental species are geographically and ecologically separated, whereas hybrids occupy intermediate or occasionally extreme environments, potentially facilitating range expansion of parental species. We assessed the distribution of the *D. longispina* species complex across 44 lakes in China, and related it to geographical and environmental lake descriptors. Parental species were geographically separated: *D. dentifera* occurred in western and central China, and *D. galeata* in eastern and central China, whereas hybrids were found in the western and central parts of country. However, after controlling for geographical differences, the effect of environment on species distribution was strong and significant. Specifically, *D. dentifera* was present in high-altitude oligotrophic lakes, *D. galeata* in low-altitude eutrophic lakes, and hybrids at intermediate to high altitudes, mainly in mesotrophic lakes. Hybrids were locally produced rather than having migrated from elsewhere; they probably resulted from encounters between expanding *D. galeata* and resident *D. dentifera*. The present study provides evidence that hybrids can survive in habitats that are otherwise suitable for only one of their parental species, emphasizing the importance of hybridization in expansion of species gene pools.