Altered precipitation affects plant hybrids differently than their parental species[1]

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Abstract

• *Premise of the study:* Future changes in environmental conditions may alter evolutionary processes, including hybridization in nature. Frequency of hybrids could be altered via range shifts by the parental species or by changes in prezygotic or postzygotic reproductive isolation. We examined the potential for range shifts and change in postzygotic isolation by determining effects of increasing and decreasing precipitation on leaf physiology and fitness components in the subalpine herbs *Ipomopsis aggregata* (Polemoniaceae), *I. tenuituba*¸ and their natural hybrids in a common garden in the habitat of *I. aggregata*.

• *Methods:* Summer precipitation was experimentally doubled or halved over 3 yr in comparison with ambient conditions. We measured relative growth rate, specific leaf area, intrinsic water-use efficiency, survival to reproduction, biomass, number of flowers produced, and floral morphology.

• *Key results: Ipomopsis tenuituba* increased relative growth rate with higher precipitation more so than did *I. aggregata* during the first summer, but this response did not result in changes across treatments in relative survival or final reproductive success of the two species. When precipitation was reduced, the relative success of hybrids was greater than that of the home species, *I. aggregata*. In dry conditions, hybrids increased water-use efficiency and fitness as indexed by number of flowers more so than the other plant types did.

• *Conclusions:* Increased reproduction in hybrids in the reduced precipitation regime indicates that postzygotic reproductive isolation may breakdown under imposition of dry conditions. These results suggest the potential for frequency of hybrids to increase if severe droughts become more common.

Key words:

- hybrid
- hybrid zone
- *Ipomopsis*
- Polemoniaceae
- precipitation manipulation
- water-use efficiency