**Demographic consequences of soil moisture variation for an invasive, hybridizing weed**

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Cultivated plants are known to readily hybridize with their wild relatives, forming invasive populations that can become more weedy than their parental phenotypes. With global climate change, increasingly variable precipitation may create new advantages for weeds in agricultural habitats. To assess the relative ability of new populations to grow and invade a new location, we compared the demography of wild radish (*Raphanus raphanistrum*) and crop-wild hybrid radish (*Raphanus raphanistrum* x *Raphanus sativus*) populations across a soil moisture gradient. Field populations of wild radish and F1 hybrid radish were established in 2012 and received one of four watering treatments over the 2012-13 field seasons. Weekly population censuses assessed the number of seedlings emerging, their rate of survival and eventual fecundity. Hybrid populations had higher λ than wild populations but λ did not differ across precipitation treatments. Fecundity represented the greatest contributions to λ and was the most elastic demographic parameter relative to other life history stages. Predicting the likelihood that a weedy genotype will successfully invade requires an understanding of its λ and compositional demographic transition rates relative to its competitors. This study better informs selective weed control by isolating the most effective life-history stage ‘choke point’ to suppress population growth.