Hybridization Rapidly Reduces Fitness of Native Cutthroat Trout in the Wild

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Human-mediated hybridization between native and invasive species is a leading cause of biodiversity loss worldwide. How hybridization affects fitness and what level of hybridization is permissible pose difficult conservation questions with little supportive empirical information to inform policy and management. This is particularly true for salmonids, where widespread introgression among nonnative and native taxa often create hybrid swarms over extensive geographic areas, threatening natives with genomic extinction. Here, we used parentage analysis with multilocus microsatellite markers to measure how varying levels of genetic introgression with nonnative rainbow trout (*Oncorhynchus mykiss*) affect reproductive success (number of offspring per adult) of native westslope cutthroat trout (*O. clarkii lewisi*) in the wild. Small amounts of hybridization markedly reduced reproductive success of male and female trout, with fitness sharply declining by ~50 percent with only 20 percent nonnative admixture. Despite heavy fitness costs, our data suggest that hybridization may spread due to relatively high fitness of first-generation hybrids and inordinately high reproductive success of a few males with high levels of nonnative admixture. This outbreeding depression suggests that even low levels of nonnative genetic admixture may have negative effects on reproductive success in the wild and that policies protecting hybridized populations may need reconsideration.