

Variation in Salinity Tolerance and Competitive Ability of Invasive
Spartina Hybrids in San Francisco Bay

By

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ABSTRACT

An invasion by a hybrid swarm (*Spartina alterniflora* X *Spartina foliosa*) threatens to significantly alter community structure in San Francisco Bay's intertidal zone. Exotic *Spartina* hybrids exhibit wide ecological tolerance compared to native *S. foliosa*. Heterogeneous hybrid genotypes exhibiting traits of both salinity tolerance and competitive vigor are predicted to increasingly advance into higher marsh zones historically dominated by the native species *Salicornia virginica*. We conducted two experiments to address the threat of hybrid colonization of *Sa. virginica* habitat, a removal experiment to examine competitive suppression of hybrids by *Sa. virginica*, and a greenhouse experiment to examine hybrid salinity tolerance. Hybrids exhibit great variability in morphological traits, response to salinity stress and competitive suppression by *Sa. virginica*. The most consistent indicator of relative salinity tolerance between hybrids was dead/total aboveground biomass ratio. Morphological vigor (e.g., total biomass) was not indicative of salinity tolerance, and mixed results were obtained for a physiological trait relating to tolerance, cation ratio (Na^+/K^+). Select hybrids show a combination of competitive vigor in the field and relatively stronger performance in higher salinity conditions. The native *Sp. foliosa* has weaker competitive abilities and tolerance for salinity. Relative competitive ability of hybrid genotypes as determined by our study is correlated to their relative clonal expansion ability, indicating synergy between processes occurring at different spatial scales. Informed by potential mechanisms of hybrid spread in *Sa. virginica* habitat, we posit that rampant proliferation of the hybrid swarm can be viewed in a habitat-dependent framework, wherein natural selection drives niche differentiation among diverse hybrid genotypes.

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