Title
Frequency, Distribution and Ecological Impact of Cryptic Hybrid Invaders: Management Tools for Eradication of Invasive Spartina

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Author
Feinstein, Laura

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Four species of nonindigenous Spartina cordgrass have been introduced to San Francisco Bay. One of them, *Spartina alterniflora*, from the East Coast, has hybridized with the native *S. foliosa* and become highly invasive. These hybrids and their backcrosses are problematic to conservation objectives as they colonize nearly every ecological niche of a marsh – high and low marsh elevations, and across a range of salinities and sediment types. Where established, the hybrids inevitably pollen swap with native Spartina, creating yet more hybrids. With time, rare wetlands can be converted into uniform expanses of grass. Efforts to eradicate invasive Spartina have been based largely on visually identifying the most threatening, biggest, tallest and thickest, red-stemmed, big-flowered cordgrass plants and spraying these with herbicide. The strategy has been highly successful in reducing the invasion’s size – from about 800 net acres in 2005 to about 50 net acres in 2011. But, it also appears to have selected for “cryptic” hybrids – cordgrass plants that resemble native Spartina but contain exotic genes.

For the genetics study, the Delta Science fellow tested the resolution and accuracy of a panel of 18 genetic markers, which researchers have been using to find hybrid Spartina, and then isolated an optimal sub-panel of 5 loci that can more expeditiously detect the presence of exotic genes. In ongoing work, these markers are being used to study Spartina’s population structure in the bay.

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Of the environmental variables monitored in this experiment, soil salinities appear to be the most predictive of cordgrass survivorship. In particular, very saline conditions (observed in autumn) were lethal to all of the transplanted genets, except for some plants in the lower elevations of the tidal mudflat. A year later, these plants were still growing and filling in the mudflat. Genetic testing will confirm whether or not some of these survivors are cryptic hybrids.
The genetics study has shown that cordgrass genotype and phenotype are closely linked: Plants that resemble the native are mostly native genetically. Genetic markers also suggest that there have been multiple introductions of East Coast cordgrass to the San Francisco Bay. The high degree of genetic variability in the exotic species may explain the vigor of its hybrids.

**PRESENTATIONS**


Ecological Society of America 2010. Hiding in Plain Sight: The challenge of detecting and eradicating *Spartina alterniflora* x *S. foliosa* cryptic hybrids.


**CONTACT**

Laura Feinstein
Graduate student
Department of Evolution and Ecology UC Davis
T. (530) 204-8325
E. lfeinstein@ucdavis.edu

**RESEARCH MENTOR**

Donald Strong, Department of Evolution and Ecology, UC Davis

**COMMUNITY MENTOR**

Peggy Olofson, Invasive Spartina Project