

Comparison of three different genotypes of Giant Reed (*Arundo donax*) in a common garden experiment along a Texas climate gradient

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Abstract

Giant reed (*Arundo donax* L.) is a tall (6m), perennial woody grass native to Mediterranean Europe, and has aggressively invaded agricultural and natural areas in the southwestern US. A prolific water user, giant reed threatens agricultural security, and by displacing native vegetation interrupts the integrity of natural riparian areas. In light of dire climate change predictions for the arid southwest where giant reed is pervasive, an effective management program of this aggressive weed requires a deep understanding of the plant's ecology and phenology. Using a common-garden experiment, three different invasive genotypes of giant reed (matched by a previous study to three different environments in the native range— southern Spain, central France, and Afghanistan) were simultaneously planted in four locations along a climate gradient in Texas: Bushland TX (a northern, cold climate with 3 months of subfreezing temperatures), Austin TX and Del Rio TX (central Texas with yearly mild frost and moderate precipitation), and Weslaco TX in the south (subtropical climate, high rainfall with no frost). To test the hypothesis that giant reed genotypes would perform best when matched to similar climates in its native range, samples were destructively collected annually over three years, and processed for biomass allocation and total biomass. Preliminary data suggest a rejection of our original hypothesis, where instead we found one genotype (Spain) perform best at all locations, regardless of climate. This finding suggests that management for this weed (such as a classical biological control program) needs to account for the fact that climate is a weak filter in terms of the realized niche of this giant reed.

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