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Utilizing Species-Specific Gene Regulation Technologies to Control Phragmites and Other Invasive Species in Natural Environments

Invasive species establish stable populations and expand their ranges either due to their superior competitive abilities compared to native species or due to their occupation of empty ecological niches for which there are no native competitors. Competitive superiority is by definition the disproportionate acquisition and control of a limiting resource, and is mediated by rates of growth or biomass, vegetative reproduction, sexual reproduction, and/or propagule dispersion. Methods for the control of populations of invasive species that do not address the core components leading to species-specific success have limited long-term impacts on natural communities. Our goal is to develop tools that can be applied to natural communities that will target the components of competitive success of invasive *Phragmites*, in particular, and invasive species, in general, in a species-specific manner. Our aim is not to kill the invasive plants directly but to generate conditions in which native species can recolonize and reestablish native communities. We will present our conceptual approaches, our experimental results to date, specifically our transcriptome analysis and silencing of photosynthesis genes, and our future management plans and concerns.