

SIZE MATTERS: GENOME SIZE INFLUENCES PLANT TOLERANCE OF ABIOTIC STRESS IN NATIVE VERSUS INVASIVE PLANTS

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Study Description

In a reciprocal common garden experiment at Louisiana State University (LSU) and the University of Rhode Island (URI), we used native and invasive lineages of the wetland plant *Phragmites australis* to experimentally test the role of genome size in plant tolerance to stress. We predicted that plants with large genomes would have a lower tolerance to stress and be less plastic than those with small genomes. We found mixed support for our prediction but found for the first time found that genome size is associated with plasticity, a trait widely regarded as important to invasion success. Further research is necessary!



Photo 1. Standardizing *Phragmites australis* rhizomes before planting at the University of Rhode Island (URI). Small pieces (7–10 g) of rhizome were measured for weight, width, and total number of nodes. Photo credit: Laura A. Meyerson.

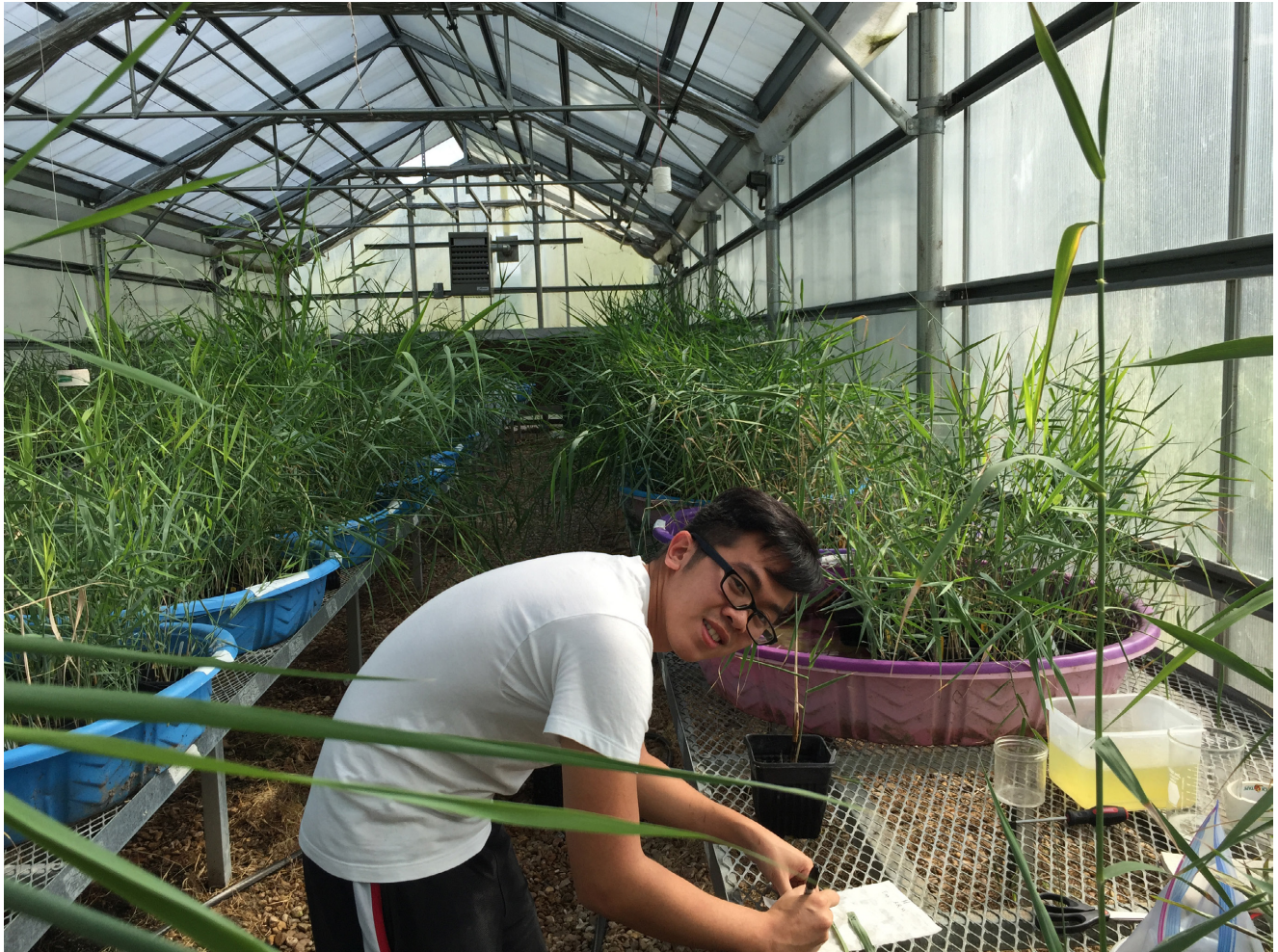


Photo 2. Undergraduate Cao-Tri Tran at the Louisiana State University (LSU) greenhouse during the experiment. Identical clones with a range of ploidy levels, genome sizes, and latitudinal origins of both the native and invasive lineages of *P. australis* were planted in sand at both LSU and URI in either 0, 10, or 20 ppt salinity. Photo credit: James T. Cronin.



Photo 3. Aboveground biomass for 0, 10, and 20 ppt salinity of a native *P. australis* genotype collected from Naushon Island, MA, just off the coast at Woods Hole, MA. Photo credit: Laura A. Meyerson.



Photo 4. Sorting *P. australis* rhizomes at LSU at the end of the experiment. *Phragmites australis* is known for its prodigious production of belowground biomass. Photo credit: James T. Cronin.

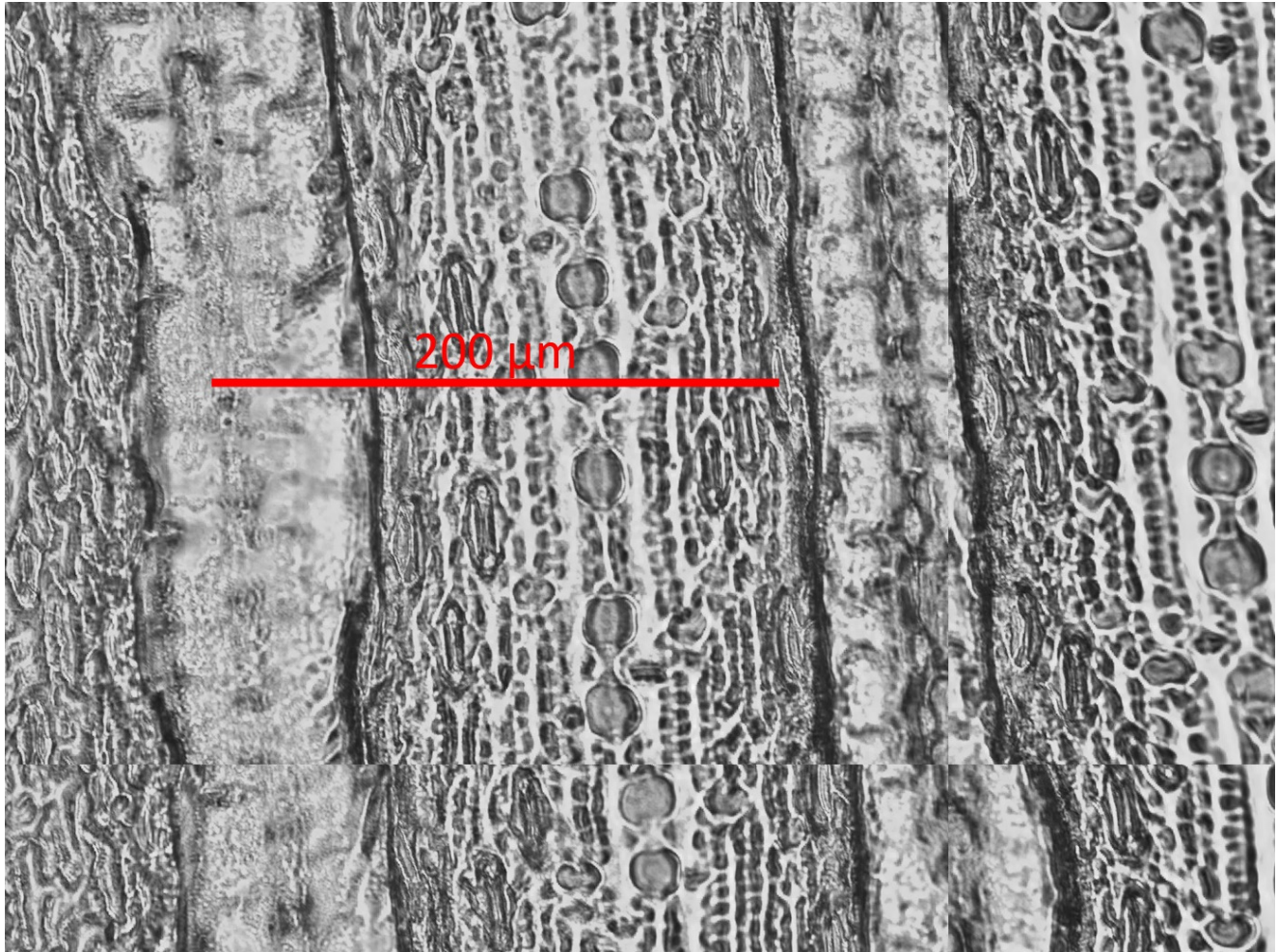


Photo 5. We measured stomate size and density for both the native and introduced lineages of *P. australis* at all treatment levels. Plants grown in the southern LSU greenhouse had higher stomate density and greater stomatal conductance than those grown in the northern greenhouse at URI. Photo credit: Sara Wigginton.

These photographs illustrate the article “Plant genome size influences stress tolerance of invasive and native plants via plasticity” by Laura A Meyerson, Petr Pyšek, Magdalena Lučanová, Sara Wigginton, Cao-Tri Tran, and James T. Cronin published in *Ecosphere*. <https://doi.org/10.1002/ecs2.3145>