Going with the flow: Trait-dependent dispersal in coastal wetlands

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Current work on state transitions from bare to vegetated coastal wetlands focuses strongly on the effects of environmental stressors (e.g. hydrodynamic disturbances) on plant establishment, assuming that propagules availability is unlimited. Yet, interspecific variation in seed dispersal has been observed in mangrove and tidal marsh plants, and has the potential to influence population, community and landscape dynamics. By focusing solely on characteristics of the environment, complex spatial and temporal dynamics arising from dispersal-related plant traits may be overlooked. Therefore, increased efforts are needed to quantify species-specific dispersal traits and explicitly account for this variation in predictive models for propagule dispersal and resulting vegetation development. In this study, we quantify dispersal-related traits (morphology and buoyancy) for floating propagules from different coastal wetland plant species, representative of different successional stages and propagule morphologies. Using 3-D printed propagule mimics and a racetrack flume with wind-generator, we quantify the interactive effects between these traits on wind-facilitated hydrochorous dispersal. Results enhance our understanding of the interaction between physical (wind and water) and biological (propagule traits) factors and offer a framework aimed at optimization and integration of propagule dispersal in coastal vegetation development models.

Keywords
Tidal Marshes; Mangroves; Hydrochorous Dispersal; Species-specific Traits