

Assessing Plant Performance of ‘Cape’ American Beachgrass, *Ammophila breviligulata*, Against Local Beachgrass Ecotypes - R/6010-0030

Dr. Michael Peek
William Paterson University
973-720-2247
peekm@wpunj.edu

Research Summary

American Beachgrass (*Ammophila breviligulata*) is a vital component of New Jersey’s coastal environment. As the initial plant species used to colonize the dune system, American Beachgrass initiates an important process by intercepting wind-blown sand and stabilizing it with below-ground structures promoting the development of maritime forest. Despite the stabilization properties of dune grasses, coastal systems are highly dynamic and undergo alternating periods of accretion and depletion. In addition, there is increased human demand on these systems for residential and recreational purposes. As a result, society requires these systems remain in place to protect the multi-billion dollar infrastructure built on many barrier islands, and millions of dollars are spent on beach nourishment projects and dune restoration for this purpose.

In New Jersey, beach renourishment often occurs by pumping sand from offshore to create an artificial fore-dune, then subsequently planting American Beachgrass. Often these plantings are of a single species and in particular a single genotype, ‘Cape’ American Beachgrass. In 1970, the USDA Natural Resources Conservation Service released the ‘Cape’ variety of American Beachgrass specifically for these restoration projects. Since the 1970s numerous restored dune systems were planted with this variety along the eastern U.S. and in New Jersey particularly, primarily in clonally propagated monoculture. In these restoration projects the single genotype planting of the ‘Cape’ variety assumes that this single genotype will perform better (e.g. ecosystem functioning; successional progression; resistance to disease, etc.) than a genetically diverse planting of Beachgrass and will result in the desired successional progression to healthy dune development. But, success has been mixed. For example, the town of Avalon, New Jersey conducted a beach renourishment project in the early 1990s and is now seeing a return of maritime forest. It is estimated that a restoration effort in Atlantic City in 1997 has seen nearly 100% plant mortality in a ‘Cape’ variety planting.

The underlying principle addressed in this project is that a single genotype present in a population cannot function in a wide range of



American Beachgrass (*Ammophila breviligulata*)

microhabitats, or adapt to changing climatic and other environmental pressures. Therefore genetic monocultures are less likely to persist through time than would a genetically diverse population. This project will compare the ‘Cape’ genotype to five New Jersey American Beachgrass ecotypes under commonly encountered abiotic stress conditions in a greenhouse setting. The researchers hope to highlight the potential importance of genetic diversity in *A. breviligulata* populations since coastal dune systems are prone to disturbance and sensitive to climate change. Education and resource material developed during the project will be distributed to the community to allow for a more complete understanding and appreciation of coastal dune communities.