

LSU AgCenter Coastal Plants Program Plant Variety Development



LSU AgCenter Program Using Variety of Techniques

The LSU AgCenter's Coastal Plants Breeding Program is the only Coastal Plants Breeding Program in the nation developing improved native plant varieties for coastal restoration.

Improved coastal plant restoration techniques, such as variety development, are needed to protect coastal communities from coastal erosion. The LSU AgCenter is using plant breeding, genomic and plant biotechnology techniques to develop improved plant varieties for coastal restoration.

Traditional plant breeding techniques have been used for hundreds of years to improve crops, fruits, vegetables and ornamental plants. Genomics and plant biotechnology techniques, which enhance traditional plant breeding, have advanced tremendously in the past several decades. In the late 1990s, the LSU AgCenter recognized that these techniques could be applied to native plants to reduce coastal restoration.

Every traditional plant breeding program, regardless of plant species, follows three steps: collection of plant material, evaluation of plant material and selection of plant material with desirable characteristics. The LSU AgCenter partnered with the U.S. Department of Agriculture's Natural Resources Conservation Service to collect plant material of smooth cordgrass (*Spartina alterniflora*), sea oats (*Uniola paniculata*) and California bulrush (*Schoenoplectus californicus*). The USDA collected smooth cordgrass seeds from Louisiana, sea oats seeds from across the United States and California bulrush plants from areas in Louisiana with elevated salt levels.

The LSU AgCenter's Coastal Plants Breeding Program has evaluated all three species using traditional plant breeding techniques in natural environments and plant production environments to ensure the plant material will perform well in natural environments.

Genomic approaches were used to verify that acceptable levels of genetic diversity were maintained in the breeding program. Plant biotechnology, such as in vitro selection, cellular mutation and tissue culture, was used to evaluate genotypes for increased salt tolerance. Genomic and plant biotechnology techniques can enhance the



efficiency of plant evaluations, because these methods quickly evaluate millions of genotypes in a laboratory. Evaluating the same number of genotypes in natural environments using traditional plant breeding is not feasible because of the required labor and expense, as well as the logistics. Therefore, combining traditional plant breeding with genomics and plant biotechnology allow for the development of coastal plant varieties in less time than if only one technique was used.

Selections of all three species have been made based upon plant breeding, genomic and plant biotechnology evaluations. Clonal cultivars of all three species have been developed. Three smooth cordgrass cultivars were released in 2012, and three smooth cordgrass and sea oats cultivars and six California bulrush cultivars will be released in 2013. Seed varieties of all three species also are being developed. Using plant breeding and genomic techniques, genetically different clones of each plant species were selected for superior plant performance. Selected clones were placed into a Polycross breeding nursery to allow open pollination. Seeds were harvested and are being evaluated for performance in natural and production environments.

The LSU AgCenter is the only organization in the nation that has assembled and is supporting a plant breeding program to develop clonal and seed varieties of native plants for use in coastal restoration projects. Current breeding efforts are focused on three species, but additional native plant species will be added to the program. This will contribute to the advancement of coastal plant restoration techniques that enable natural, functioning ecosystems to develop at restored sites.

Anyone interested in potential partnerships, collaborative agreements or other participation in the LSU AgCenter Coastal Plants Program may contact Dr. Carrie Knott (cknott@agcenter.lsu.edu) or Dr. Herry Utomo at (hutomo@agcenter.lsu.edu).



For more information, visit our website: LSUAgCenter.com/CoastalPlants

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