UF research improves production of sea oats essential to beach survival

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(PhysOrg.com) -- It might be easy for the casual beachgoer to write off sea oats as mere weeds. However, the lanky grass holds the soil of beach dunes, making it a keystone of the natural barrier between land and water?and University of Florida researchers are using cutting-edge techniques to keep that barrier in place.

“The 2004 hurricane season showed us exactly how important it is to have effective ways of rebuilding our coastal dunes,” said Mike Kane, a UF environmental horticulture professor. “Plants are an essential part of that rebuilding.”

The researchers from UF’s Institute of Food and Agricultural Sciences are not only developing new ways to grow the plants under laboratory and greenhouse conditions, but are building a cryogenically stored library of genetically varied sea oats samples.

Four major hurricanes and a tropical storm damaged more than 800 miles of Florida shoreline in 2004, leaving 360 miles of beach critically eroded. Nearly $200 million in state and federal funding was allocated to rebuild.

Planting sea oats along reconstructed beaches isn’t easy or cheap. The 22,000 sea oats plants required to populate one mile of rebuilt beach cost more than $40,000.

One of the biggest hurdles is producing enough plants that will thrive in

the area being rebuilt. Many of the natural sea oats populations that serve as seed sources were damaged or destroyed during the 2004-2005 hurricane seasons, leaving researchers looking for ways to produce sea oats other than by seed.

Using a process known as micropropagation, small samples in the form of shoot buds are grown in nutrient-rich gels that contain plant-derived chemicals to spur rapid development. They are then moved to a greenhouse, where they continue to grow in preparation for their final move to the beach.

However, some variations of these delicate plants “crash” when they are moved to the greenhouse, said Sandra Wilson, a researcher at the UF/IFAS Indian River Research and Education Center in Fort Pierce.

Kane, Wilson and other UF researchers have worked for years to refine the process — fine-tuning conditions such as humidity, temperature, growth promoters and food sources.

In this month’s issue of Plant Growth Regulation, they report that research led by former UF doctoral student Carmen Valero-Aracama showed that using the growth promoter meta-topolin can cut the number of sea oats that crash in half for some difficult-to-grow varieties.
“Sea oats are extraordinarily genetically diverse,” Kane said. “This is an important finding in that it could really help improve production for almost all genotypes. Before this discovery was made, often what worked for one type of sea oat might kill another.”

In fact, this diversity poses another major problem when it comes to re-establishing the plants. Beaches can have very different conditions, and it’s important to try to plant the kinds of sea oats best adapted to local conditions.

Kane will begin next month using a $140,000 grant to develop methods to cryogenically freeze thousands of sea oats samples from all major populations along Florida's coasts. The collection will be used to give plant micropropagation laboratories types of sea oats native to specific areas. The funds come from Florida Sea Grant, which works to enhance practical use and conservation of coastal and marine resources to create a sustainable economy and environment.

"There is a need for millions of these plants, and this is the sort of work that is going to allow us to fill that need," said Gary Hennen, president of Oglesby Plants International, an Altha, Fla.-based business that uses micropropagation to commercially produce plants. The company hopes to be one of many that put the UF research to good use. "That's not only going to be good for our beaches, but it's potentially a major boon for a lot of businesses, as well."

Provided by University of Florida