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Large-scale Production Promising For Louisiana Smooth Cordgrass

Highly fertile lines might be appropriate for a broad range of brackish environments

By Herry S. Utomo, Michael D. Materne, Steve A. Harrison and Ida Wenefrida

ative to salt marshes along the eastern U.S. seaboard and the Gulf coast, smooth cordgrass (Spartina alterniflora Loisel.) can also be found in the estuarine around Europe, Australia, New Zealand and Asia. Because it is the predominant plant species in coastal salt marshes, a current practice in coastal erosion control and habitat restoration involves the use of S. alterniflora. Spartina alterniflora possesses an extensive root system and can tolerate fluctuating water levels and grows well across a large range of soil types, from sandy to clay with pH ranging from 3.7 to 7.9. In addition to tolerating fluctuating water depths, it grows well in salinities ranging from 0 to 35 parts per thousand salinity (Fig. 1). Spartina alterniflora is an effective wave and tidal energy buffer, trapping suspended sediments and providing shoreline protection from erosion.

Louisiana coastal marshes are being rapidly converted into open water at rates estimated at 65 square kilometers (km²) to 91 km² annually (Bourne, 2000). Coastal marsh loss in Louisiana represents 80 percent of the coastal wetland loss nationally. Wetland loss is generally attributed to a combination of natural and human causes, including subsidence, sea level rise, hydrologic modification, ditching, dredging and herbivory (Day et al., 2001). If loss persists at the current rate, it will have devastating effects because the coastal marshes play a pivotal role in the ecology and economic well being of Louisiana. Because S. alterniflora is the predominant plant species in Louisiana's intertidal saline marshes, it plays a major role in determining estuarine structural and ecological function in these regions (Proffitt et al., 2003). Consequently, wetland restoration planners and

practitioners rely heavily on S. alterniflora to offset Louisiana's coastal wetland losses.

A number of sediment enhancement techniques - such as beneficial-use dredge sediments and bay bottom terraces — are promising, and the technology for large-scale marsh creation is accelerating (Reed, 2004), resulting in significantly large acreage of wetland restoration. Major limitations, such as inaccessibility to many of these interior marsh sites and the significantly high per-unit cost associated with clonal plantings, will continue to limit the use of plant materials on large restoration projects. Developing rapid and successful vegetative restoration technology is critical to the acceptance of vegetation as part of large-scale restoration projects and for the large areas of degrading wetlands.

Challenges

The released cultivar Vermilion is the only available commercial variety of S. alterniflora in Louisiana. It has demonstrated superior growth characteristics, has performed well on newly created, enhanced or in highly disturbed salt marsh, and is often specified as the species of choice by many federal and state conservation agencies when issuing vegetative restoration contracts. However, it has a low seed set (20.6 percent) and low germination (35 percent). Current clonal planting practices in restoration projects are both labor-intensive and costly. Labor requirements for planting sprigs, plugs or container plants range from 25 hours per acre to 125 hours per acre. Manual digging and separating of the plants require 25 hours per acre to 65 hours per acre. Mechanized digging, such as using adapted small agricultural tractors for separating and planting, requires about half the time. Estimated direct and indirect costs of replanting salt marshes could easily reach \$3,500 per acre, depending on location. The seed-based propagation technique will



QUICK TIP

Whether your irrigation rotor nozzles are brass or plastic, typical water quality at most golf course facilities will wear and distort rotor nozzles over time. Performing a simple irrigation rotor audit will determine the nozzles' uniformity and effectiveness for even distribution across the entire radius of throw. For more information on conducting an irrigation audit, contact your local John Deere Golf distributor or sales representative.

only require a fraction of the cost. Hundreds of acres potentially can be planted in a day with aerial seeding.

Seed-based propagation

A seed-based S. alterniflora propagation method can expedite the establishment of vegetation over a large area quickly and economically. An aerial seeding can reach marsh interior marshes most affected by erosion not only to restore coastal marshes but also maintain the entire salt marsh systems. Through aerial seeding, hundreds of acres can be planted in a day at a fraction of the cost of current planting practices. A large production of S. alterniflora seed under a managed environment will provide a steady supply of S. alterniflora seed.

A total of 13 genetically diverse, superior and high seed-producing lines were developed by the Louisiana State University AgCenter. These lines - VRES-1, VRES-2, VRES-3, VRES-4. VRES-5, VRES-6, VRES-7, VRES-8, VRES-9. VRES-10, VRES-11, VRES-12 and VRES-13 — were space planted randomly to produce synthetic or blend seed. Spartina alterniflora seed does not mature at the same time. Once it matures, the seed shatters. Seed was hand harvested around mid-November by cutting the panicles before the seed shatters. To obtain maximum harvest, the panicles were stored under room temperature in plastic bags to provide 100 percent humidity for one month to allow all seed to mature and shatter. Specialized harvesters, such as the Flail-Vac harvester, may be used to mechanically harvest the seed as it matures. The average seed set of the blend population was 56.5 percent with an average germination rate of 82.2 percent. Cold stratification at 2 degrees Celsius (2 C) in 100 percent humidity for one month was applied to break seed dormancy. Seed was stored in air-tight sealed containers in a wet condition with a temperature set to 2C (1 degree variability). Vitavax solution (5 milligrams per liter) was applied to minimize fungus contamination during storage.

Stratified, non-dormant seed produced visible shoots after 10 hours at 27 C. Initial root germination was visible at least 15 hours later. Time for 50 percent visible shoot germination was 20 hours to 25 hours at three



Spartina alterniflora cultivated under a freshwater environment at the LSU AgCenter Rice Research Station, Crowley, La.



Germination of S. alterniflora seed from cv. Vermilion (left) and a polycross/blend population of 13 highly fertile breeding lines (right).

temperature regimes of 27 C, 32 C, and 37 C. Time for 50 percent visible root germination was 30 hours at 27 C and 32 C but was not observed until after 80 hours at 37 C. After approximately one month of cold stratification, seed started to germinate in the cold storage (2C). Seedling viability of blend seed remains highly viable in a six-month period. However, its viability becomes rapidly deteriorated thereafter.

The average yield of S. alterniflora synthetic population was 347.2 pounds per acre, which is equivalent to approximately 16.9 million viable seeds.

Continued on page 76



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A total of 13 genetically diverse, superior and high seed-producing lines were developed by the Louisiana State University AgCenter.

Continued from page 73

As comparison, a total of 106.3 million seed is produced from an acre of rice (5,800 pounds per acre). Rice seed produced in an acre can be used to plant 48.3 acres (at a seeding rate of 2.2 million seeds per acre). Using an equivalent seeding rate, S. alterniflora seed produced from an acre can be used to plant 7.7 acres. Therefore, relative efficiency of seed production in S. alterniflora was a little less than one sixth of the rice.

Bayer Environmental Science

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For fast diseasecontrol efficacy at very low rates, use Compass® fungicide to control brown patch, anthracnose, leaf spot and gray leaf spot, among other turf diseases. A broad-spectrum strobilurin fungicide, Compass has a mesostemic mode of action that delivers the value of a contact with the power of a systemic.

Potential cultivation

Spartina alterniflora could be an alternative in some areas. This plant has the ability to tolerate a range of salinities, from sea strength to freshwater. Populations of S. alterniflora have been cultivated and maintained under freshwater conditions at several research institutions for years and have performed consistently well.

Since S. alterniflora can be cultivated in a broad range of salinity environments, largescale commercial seed production is highly probable and could be an adjunct to aquatic crops, such as rice, with little modification to existing equipment or land. Due to increasing salt contamination of inland groundwater, many areas historically used for rice production have been abandoned, thus providing opportunity for S. alterniflora production as an alternative crop.

This project is funded in part by the Louisiana Sea Grant and USDA CSREES Special Grant.

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TURFGRASS TRENDS

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Color Does Matter

Kentucky bluegrass. Gray Leaf Spot. "Why do my greens have brown patch?"

There is no industry more closely tied to color than the golf course industry. Yet, sometimes, color appears to go unnoticed and even taken for granted.

Just as color impacts many of our day-to-day decisions, color is a significant aspect in distinguishing two very unique nitrogen sources. Dark blue is said to be the color of truth and moderation. Research also confirms surrounding yourself with purple promotes good judgment and peace of mind. It also is



the distinguishing characteristics of Lebanon Turf's exclusive fertilizer technology, MESA and Expo.

MESA offers a cost-effective alternative to coated urea products. MESA combines fast green-up with long-lasting results. University tests have shown that MESA sustains a very high quality turf while producing less flush growth than other sources of slow release nitrogen. While the deep blue symbolizes truth and moderation, basic agronomy teaches us there's truth in moderating nitrogen levels. To better understand the benefits of MESA, it helps to take a closer look at the two components.

The MESA granule is made by combining sulfate of ammonia crystals into our exclusive Meth Ex methylene urea complex. The result is a homogeneous granule that combines the benefits of Meth Ex and ammonium sulfate in a single particle. Like all methylene ureas, Meth Ex offers long feeding by relying on soil microbes to release nitrogen slowly, only when moisture and temperature are ideal. Meth Ex is a very efficient nitrogen source because almost all of the applied nitrogen is available to the plant in the season of application.

Ammonium sulfate is an excellent economical source of ammoniacal nitrogen and soluble sulfur. It also responds very quickly. Ammonium sulfate supplies soluble sulfur. Sulfur is the fourth-most used nutrient behind nitrogen, phosphorus and potassium in turf plants. As important as sulfur is, it is often overlooked. Sulfur deficiency is often referred to as a "hidden hunger" because symptoms are not easily distinguishable. Ammonical nitrogen provides almost immediate response, and in combination with sulfur, produces a very deep green color.

Perhaps the most blatant advantage when comparing MESA with coated products is noting its clipping yields. An Iowa State University study compared MESA and SCU side by side. While SCU produced 24.2 yd3, MESA yielded only 13.4 yd3. Consider also the surge growth typical of SCU, unneeded stress on the turf increasing the likelihood of insect and disease pressure.

The Power of Purple

Expo, available exclusively from LebanonTurf, supplies controlled-release potassium sulfate and a highly efficient controlled-release nitrogen. Although its potash release characteristics are what make Expo unique, it is a homogeneous product that delivers consistent performance in either SGN 145 or SGN 195 sizing.



When compared with coated products, there is simply no comparison. One pound of N/MSF on cool season grasses provides 10-12 weeks of response. Two 1-pound of N/MSF applications provide more consistency than spoon feeding with coated products. Expo also delivers an attribute often claimed by organics, less disease and healthy vigorous turf that recovers readily from damage and stress. Leaching studies have demonstrated that potash in Expo requires significantly more water to be completely leached than SOP.

Expo is available as 20-0-25 homogeneous granules. You can also find it in selected grades within Lebanon Turf's NX-Pro and Par Ex product lines.

The next time you have to make a decision that impacts the color of your turf, remember the blue color of MESA or the purple color of Expo and rest assured you've made the right choice.

For more information about LebanonTurf products, visit Lebanon-Turf.com

Mike Sisti is Marketing Manager for LebanonTurf. He can be reached at msisti@lebsea.com.

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LebanonTurf Improving the Way Professionals Care for Turf

Au Courant Accessories

Manufacturers offer myriad items

here are several new accessories on the market, from items to dress up the course to tools that superintendents and their crews can use to make their jobs easier. Golfdom checked in with accessory manufacturers recently and asked them what they had cooking on the new-product front.

Easy does it



Standard Golf says its Easy-Mark System makes it easy to place temporary flagsticks almost anywhere around the golf course without having to a cut a cup hole.

"The EasyMark System allows flagsticks to be placed around the course more freely," said Matt Hurley,

Standard Golf's vice president. "Flagsticks can be set for different chip-shot scenarios on practice greens or at a driving range."

A course also can use the EasyMark System to set flagsticks lining a path to direct guests or to help add a golfer's touch in decorating a special event, Hurley says.

The system includes a Tap-In Flagstick Anchor and a 3-inch spotter ring that allows flagsticks to be placed virtually anywhere in a matter of seconds, according to the company.

Standard Golf also offers its Custom Golf Flagstick program to give golf courses new options for using flagsticks as a communication and marketing medium on the golf course. Custom Golf Flagsticks leverage the flagsticks' position in the unsaturated media environment on the golf course to capture golfers attention, according to Standard Golf. Courses can add

their own message, logo or advertisements. Standard Golf's Custom Golf Flagsticks are available in several different styles.

A real-wood look

Eagle One Golf Products latest product line is made of 100 percent recycled fiber and polymer and looks more like real wood. The



Greenwood product line's real-wood feel requires little if any maintenance, according to Eagle One.

Greenwood products have a "rough sawn" finish that is commonly associated with many lumbers. The product line includes water-cooler enclosures, trash and divot mix containers, benches and more.

The material does not require any preservative treatments or water sealing.

Plug away

Par Aide offers the new Accuform Turf Plugger and Accuform Ball Mark Plugger.

The Turf Plugger allows users to easily replace worn, damaged areas with healthy turf. It can be used on greens, tees, fairways and ends of cart paths. The Turf Plugger removes plugs 2-3/8-inch wide by 2-1/2-inch deep. It features a replaceable cutter blade made from case hardened steel and

a hollow handle that can hold up to 12 plugs.

The Ball Mark Plugger helps users remove ball marks on greens quickly and easily. It also works on *Poa annua* and goosegrass. It removes plugs 1-1/2 inch-wide by 2-1/2-deep and comes with

three rubber washers that allow for shallow plug extraction. The hollow handle can hold up to 12 plugs.

Par Aide also offers the Accuform Profile Sampler, which makes extracting soil samples easy. Users get an undisturbed soil profile 6-inches deep, 3-inches deep and a half-inch-thick.

The easy-to-use hinge allows users to easily view the root zone and thatch clearly, with no screws or bolts to get in the way.

Par Aide says its Accuform Moisture Sensor takes the guessing out of how much moisture is in soil.

The Moisture Sensor is ideal for measuring differences in soil conditions throughout the course, according to the company.

Goodbye geese

From Tee to Green offers AwayWith-Geese, a pond float that effectively eliminates problems of droppings, aggressive behavior and damage brought on by nesting geese, according to the company.

Working on the principle that Canada Geese are generally lazy and like to sleep undisturbed at night, Away With Geese is a simple, compact and maintenance-free geese deterrent for lakes and ponds. The patented device is a flashing light, charged by photocells and automatically activated with a light sensor for nighttime use. This LED light is mounted to an enclosed weatherproof float that is positioned in the center of the afflicted pond or lake. The light flashes once per second at night to discourage the geese from foraging and nesting.

The compact device is harmless to the environment and ecosystem of the pond and is visually innocuous, measuring only 15 inches wide and 12 inches above the water line. A land-based unit is also available.

Golfdom

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graphic novels

n April 21, 1954, the U.S. Senate Subcommittee on Juvenile Delinquency, a unit of the Judiciary Committee, turned its attention to comic books. Yes, comic books. Over three days of heated testimony, one would have assumed that kids' desire for comics was ruining the country, sending crime rates through the roof. Your tax dollars at work.

The nation's youth were at risk, the committee reported, and it blamed the comic industry, with its focus on crime and perversion. One pamphlet introduced at the hearings called the industry "racketeers of rot" and continued, "It is hard to know what satisfaction they find in exposing millions of children to the moral poison which is the formula of a great many comics." The comic industry, under fire, responded with a draconian comic code of self-censoring that was even more restrictive than the infamous Hayes Code established for motion pictures in 1930.

I had never heard any of this until recently, with the publication of David Hadju's The Ten-Cent Plague, an examination of the paranoia surrounding comics in the mid-1950s. But it got me to thinking of how far I have come since I devoured Archie comics back in the late 1970s. While you can still buy single issues of DC or Marvel comics

EVEN THE LITERARY SNOB IN ME GREW TO ENJOY AND ADMIRE THESE

UNCONVENTIONAL WORKS OF ART

BY MARK LUCE



of your favorite superheroes, there have been creations the last 20 years that are more literary, more experimental and more geared toward adults — graphic novels. At first, the snobby book critic in me was irritated by the whole notion of "graphic" novels. And then I read one. And then another ... and another.

It wasn't the kids' stuff I had imagined, several of these books were exceedingly well written and exquisitely drawn. It didn't take long for me to get hooked, and my admiration for the works progressed to the point where I teach graphic novels in both high school and college English classes.

So, to re-awaken that flashlightunder-the-covers feeling of being just a little naughty, I am providing you with a few titles to remember just how fun it is to read books with pictures.

"The Watchmen" by Alan Moore. Arguably the greatest graphic novel, this book examines a world where authority has gone mad, and superheroes have been banned. Amazingly rich in structure with questions of authority and power, the novel simply blew me away.

"V for Vendetta" by Alan Moore.

The film was OK, but the novel will impress you with its vibrant characters, lush literary allusions and flat-out rollicking plot, which involves a charming vigilante taking on a repressive government.

"Sin City" by Frank Miller. About as dark as it gets, it's a seven-volume series filled with vice of all stripes. Absolutely a treat to read the hard-boiled prose, and the film version sticks surprisingly close to the original. However, it's not for the weak of heart.

"Dark Knight Returns" by Frank Miller. This Batman might be older and more vulnerable, but his dark side in this gem got rid of the dorky associations of Adam West and returned to Batman's complicated, isolated ways. Deliciously nasty.

Happy reading.

Mark Luce lives in Kansas City, Mo., where he reads old Batman comics to his sons.

GOLFDOM (ISSN 1526-4270) is published monthly (12 issues per year) by Questex Media Group, Inc., 306 W Michigan Street, Suite 200, Duluth, MN 55802. Corporate office: 275 Grove St., Suite 2-130, Newton, MA 02466. Accounting, Advertising, Production and Circulation offices: 306 W. Michigan St., Suite 200 Duluth, MN 55802-1610. Subscription rates: One year \$39 (U.S. and possessions), \$59 (Canada and Mexico) and \$89 (all other countries). Air expedited service is available in countries outside the U.S. and Canada for an additional \$75 per year. Current issue single copies (prepaid only) \$5 (U.S. and possessions), \$7 (Canada and Mexico) and \$8 (all other countries). Back issues (if available, prepaid only) \$10 (U.S. and possessions), \$14 (Canada and Mexico) and \$16 (all other countries); add \$6.50 per order shipping and handling for both current and back issue purchases. Periodicals postage paid at Duluth MN 55806 and additional mailing offices.

POSTMASTER: Please send address changes to GOLFDOM, P.O. Box 1268, Skokie, IL 60076-8268. Canadian G.S.T. Number: 840033278RT0001, Publications Mail Agreement number 4001759. Printed in the U.S.A.

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