

**NOVEMBER 2000 USGA ANNUAL REPORT**

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**USGA FUNDED PROJECTS:**

GENETIC ENHANCEMENT OF PASPALUM FOR RECREATIONAL TURF: \$25,000  
DEVELOPMENT OF MINIMAL INPUT BEST MANAGEMENT PRACTICES FOR PASPALUM:  
\$25,000

**Supplemental Funding:**

Georgia Turfgrass Foundation Trust: \$5,000 Seashore Paspalum Breeding  
UGA Research Foundation: \$37,000 Instrumentation for Reduced Light Intensity Studies

**Collaborators:**

- B.J. Johnson : Herbicidal control of encroachment problems between paspalum and bermudagrass
  - Kris Braman: Insect screening among paspalum ecotypes
  - R.N. Carrow: field drought response, acid soil response, traffic tolerance under stress, low light intensity
  - Tim Murphy: Primo effects/timing of application/rates
  - Domy Adriano (Savannah River Nuclear Plant in Aiken, SC) and Jim Camberato (Clemson University):  
bioremediation studies with paspalum
  - Jimmy Golden (Clemson University): nematode assays in paspalum
  - Bingru Huang (Kansas State University/now Rutgers): Drought tolerance in paspalum
  - L.M. Shuman/Keith Ingram (UGA): Drought/fertility interactions (Using rainout shelter with Sea Isle 1)
- PhD Student (Geungjoo Lee): Salinity Tolerance Assessment and Mechanisms in Seashore Paspalum

**Collection:**

Three accessions were released from quarantine in Maryland.

- Q40388 from South Africa (Durban CC)--possible greens type
- Q40480 from Bahamas (E1)--possible fairway type
- Q40522 from Belize/Caye Chapel--possible fairway type

I do not know when I will be able to bring any more ecotypes into the US. The quarantine facility has essentially shut the door on any further introductions, at least in the immediate future. Only 78 total slots are now available for vegetative introductions (including all ornamentals and trees) and the officials at Beltsville will not provide us with dedicated slots for grasses. The Grass Germplasm Committee will be discussing this issue in Minneapolis at the ASA meeting during early November.

**US ecotypes added to the collection:**

- Sullivan 1 and 2 from Sullivan Island in Charleston, South Carolina
- Taylor 1 and 2 from the coastal lowlands and outer banks in North Carolina
- Selections from Kauai, including from Wailua GC
- Spence from Louisiana (coarse type similar to common bermudagrass in texture)

## **BREEDING:**

Several ecotypes have been identified for additional field increase and subsequent evaluation:

561-79 (multiple insect resistance)// fairway-tee-rough type

HI 33, HI 26, HI 36, HI 10, HI 101 for improved abiotic stress tolerance (fairway-tee-rough types)

Temple 1 for improved lawn/landscape performance (fairway type)

Hyb 5 for improved sports/low light intensity tolerance use (fairway type)

I am still searching for another greens-type in the super-dwarf category. Sea Isle 2000 currently would be ranked somewhere between TifDwarf and the superdwarf bermudas in texture and canopy density at 1/8<sup>th</sup>-inch mowing height.

### **Seeded hybrids**

Working very closely with Turf Seed in Hubbard OR and with Seed Research in Corvallis/Medford, OR on compatible paired-parent crosses. We have identified one hybrid (Hyb 7 x Q36313) that nicks well and appears to produce a good amount of seed. We increased the size of the plot this summer and will be harvesting seed this fall and possibly next Spring. In a preliminary study using seed produced during the fall 1999, we germinated the seed in petri dishes and transplanted into small pots for retransplantation to the field during early August. Approximately 2500 hybrids were transplanted, all grouped according to cross combination in order to evaluate the families in side-by-side comparisons. About 400 plants of the hybrid (Hyb 7 x Q36313) were planted. We will put them under a reel mower next summer to see how they perform and how uniform the hybrid is within the plot. Additional hybrids will be planted again next summer depending on availability of seed. Preliminary trials indicate between 700-900 lbs/A potential seed production from the better hybrids. (NOT IN THE ORIGINAL 5 YEAR GRANT OBJECTIVES)

Seed germination was researched over the winter 1999/2000. Half-strength ocean water (about 17,000 ppm salt) was effective in breaking dormancy in the seed and accomplishing over 90% germination efficiency. The only other means of breaking seed dormancy that was successful was cold storage for 3 months at 0 F. This technology will eventually be incorporated into the seed coating or pre-germination preparation for seeded paspalums. (NOT IN THE ORIGINAL 5 YEAR GRANT OBJECTIVES)

### **Nurseries**

Several mother nurseries have been sprayed out and will be reestablished during 2001. We are concentrating on best potential ecotypes in the program. A larger area of breeder stock Sea Isle 2000 (greens type) has been established and is almost grow-in.

Sea Isle 1 and Sea Isle 2000 breeder material was supplied to the Georgia Seed Development Commission (Earl Elsner), with foundation stock fields established in Marshallville, GA (south and west of Perry, GA in the middle of the state) and Poteet, TX (south of San Antonio) during the early summer and late summer, respectively.

### **SEA ISLE 1/2000**

The status of these two releases:

Sea Isle 1 has been licensed to 24 growers in 9 states (8 in GA, 7 in FL, 5 in TX, 2 in SC, 2 in AZ, 1 in AL, 1 in CA, 1 in NM, 1 in NC) for a total of 33 grower sites. We are licensing internationally through a broker—John Manderley out of Canada ([jhope@manderley.com](mailto:jhope@manderley.com) or [maleka@manderley.com](mailto:maleka@manderley.com)). I do not have a listing of the international sites yet. A complete list of the Sea Isle 1 growers is enclosed and can be found on the paspalum website: [www.georgiaturf.com](http://www.georgiaturf.com), click on 'paspalum' and then on 'growers'. Or go to: [www.griffin.peachnet.edu/cssci/turf/paspalum/paspalum.htm](http://www.griffin.peachnet.edu/cssci/turf/paspalum/paspalum.htm)

Sea Isle 1 will be available in sufficient quantities to plant golf courses by mid-summer 2001. The growers are receiving their vegetative stock in September/October, 2000. The same growers for Sea Isle 1 will also have the license for Sea Isle 2000. They will come as a package so that quality control can be maintained in the production fields.

Sea Isle 2000 is still under litigation and there is no telling when this matter will be resolved now that the lawyers have control. It is a real mess. I am being represented by the Assistant Attorney General for the State of Georgia and an appointed lawyer in St. Petersburg, FL. Motions have been filed to remove me from the suit since the UGA Research Foundation owns the grass. Unfortunately, the saga continues. I will keep you posted on any developments since the greens type cannot be licensed out until the legalities have been resolved. AS A POINT OF REFERENCE, ALL PASPALUM CULTIVARS CURRENTLY ON THE MARKET WORLDWIDE ORIGINATED ON GOLF COURSES. THE SUPERINTENDANT WHO FILED THE LAWSUIT HAS 3 PASPALUMS ON THE MARKET IN FLORIDA: SEAWAY (FAIRWAY TYPE), SEAGREEN (GREENS TYPE) AND SEADWARF (SUPER DWARF TYPE). I HAVE SEEN NONE OF THESE CULTIVARS. NO RESEARCH HAS BEEN DONE ON THEM.

#### **TISSUE-CULTURE-REGENERATED LINES**

After thoroughly evaluating the 5000+ lines that were planted several years ago and having them under mowing stress for several years, I have not found any regenerants that were superior to their parents nor have I found any that performed exceptionally better than Sea Isle 1 and Sea Isle 2000. TCR1 and TCR6 were evaluated more than the other selections and they had some favorable traits such as very good salinity tolerance, but were slow to grow-in both in sod production and in establishment in plots. They were not acceptable overall for any potential future release. They may be used for potential hybridization in the future.

#### **MANAGEMENT STUDIES**

##### Paspalum suppression in bermudagrass-B.J. Johnson

MSMA in combination with Confront (triclopyr + clopyralid) applied at a total rate of 2.7 kg/ha in each of 3 applications (total cumulative 8.1 kg/ha) effectively suppressed (>70%) Sea Isle 1 and Sea Isle 2000 for 13 weeks in TifEagle, Tifway, and common bermudagrass stands. Injury to the bermudagrass cultivars from herbicide treatments was not a problem, with minor injury recovery within 1-2 weeks following treatment.

##### Bermudagrass suppression in paspalum-B.J. Johnson

Applications of Prograss (ethofumesate) + Cutless (flurprimidol) in combination with iron and nitrogen were investigated in 4 studies over a 2 year period involving rates and timing strategies. Three applications at 2X, 2X, and 1X rates effectively suppressed bermudagrass (>85%) in the paspalum when applied in June and July. However, paspalum injury was generally greater than 50% when the chemicals were applied in two or more applications, especially when the air temperature exceeded 85 F. We will be incorporating Poast and Primo rates/timing into this strategy in 2001 to see if we can get more effective control with minimal damage to the paspalum. Sod production problems have occurred with contaminated bermuda: the strategy right now is a light MSMA application which turns the paspalum yellow for 2-3 weeks while the bermuda stays greens and can be identified and sprayed with Roundup. Another strategy could involve Poast applications to take out the bermuda with minimal injury to the paspalum---rates and timing of application will be the key to success and will require more research.

##### Primo response in paspalum

One study was initiated with Tim Murphy in July involving fairway height Sea Isle 1. The study is still ongoing and greenup data will be collected next Spring. A similar study was initiated in Pensacola FL with Steve Davis (Aventis) on Sea Isle 2000 and Salam involving bermudagrass suppression in paspalum. No data are available at this time. (NOT IN THE ORIGINAL 5 YEAR GRANT OBJECTIVES)

#### Low light intensity studies

A morning shade/afternoon sun and morning sun/afternoon shade study was initiated on Sea Isle 1 in June. Plywood boards 5' tall x 8' long were set up. The shade effect devices will remain in place for one year before data will be collected, including traffic and recovery studies in order to better manage paspalum under these conditions. In a preliminary study involving 39 paspalum ecotypes conducted in a large rainout shelter at about 100 foot candles light regimen, Sea Isle 1 and Hyb 5 were the top performers among all entries for quality, color, recoverability potential parameters. Additional shade studies, including tree shade, will be investigated in the future. We need to learn how to manage this grass better under partial tree shade situations. (NOT ORIGINALLY IN THE 5 YEAR GRANT OBJECTIVES)

#### Insect resistance research

Kris Braman has identified one ecotype from Argentina---561-79 as being resistant to most of the insects (fall armyworm, mole crickets, white grubs, spittle bugs) that she has screened. This ecotype is a fairway/tee/rough type and will be increased for additional evaluation in 2001. Studies were conducted on white grubs and armyworm in 2000. 561-79 was sent to Exuma, Bahamas for field trials where they have been plagued with armyworm invasion at Emerald Bay (Greg Norman course planted with Durban CC ecotype out of South Africa).

#### **Other management observations**

- 1) Seashore paspalum apparently has a propensity for magnesium. Since it evolved on sand dunes exposed to ocean water which is high in Mg, it has a higher requirement for this element than most other nutrients. Additional supplementation may be needed for long term management.
- 2) In nonsalt-affected sites, both Na and Cl will be needed to supplement the fertility program. Na is apparently needed as a micronutrient while Cl is needed as a macronutrient to help drive some of the biochemistry/physiology in growth and development.
- 3) Diseases that have shown up in production fields on golf courses this year: Acremonium (take all), fusarium blight, pythium blight, anthracnose, dollar spot, helminthosporium/curvularia complex. The first line of defense should be maintaining a high K availability followed by fungicide treatment for the leaf spot diseases and spoon-feeding N for dollar spot, supplemented with fungicides..

#### **Sites for additional evaluations in 2000**

- 1) Sea Isle 2000 greens and tees at Old Collier GC, Naples, FL (entire golf course)
- 2) Practice green at the Bear Club in West Palm Beach, FL area
- 3) GC evaluations in Phoenix, Las Vegas, Virginia Beach, Rancho Santa Fe, CA, and Charleston, WV areas
- 4) Pete Dye river course planted with Sea Isle 1 and Sea Isle 2000 at La Romano, Dominican Republic
- 5) Sea Isle 1 on problem area in Punta Gorda, FL (St. Andrews South GC)
- 6) Research green (6500 sq.ft.) at Jay, FL with Bryan Unruh (IFAS)
- 7) Additional research plots with Laurie Trenholm, Gainesville, FL with some emphasis on lawn/landscape usage
- 8) 561-79 insect resistant ecotype is being evaluated on the new Greg Norman course (Emerald Bay) in Exuma, Bahamas.

### **2001 Proposed Research Schedule**

- 1) I hope to travel up to the Norfolk/Virginia Beach beach area to collect paspalums in that area. Since this area was the first port for slave boats, there is a good likelihood that some ecotypes have survived since the 1800s. Right now, I have no plans to bring in any other ecotypes from other countries because of the quarantine regulations.
- 2) Emphasize about 6-7 promising ecotypes for evaluation and larger plot establishment. Possible preliminary evaluations on golf courses. The new accessions in the collection will receive additional research focus.
- 3) Continue insect screening with Kris Braman, herbicide controlled encroachment issues (including Primo in conjunction with Prograss and Poast to take out bermuda) with B.J. Johnson, and Primo effects with Tim Murphy. Nematode screening with Jimmy Golden in Florence SC, and bioremediation/biodrainage with Domy Adriano and Jim Camberato in SC. Strong collaboration with Bob Carrow in several areas, mainly dealing with water issues.
- 4) Seeded hybrid work will continue. We are at least 5 years away from having anything that could possibly be marketed.
- 5) Revamp my mother nurseries.
- 6) Begin to focus on shade/reduced light management protocols
- 7) Will probably be expanding the research on paspalum usage in lawns/landscapes especially in coastal areas, and with studies for cleaning up the environment/environmentally sensitive areas and wetland transitioning.
- 8) More research emphasis on water quantity and quality issues. Plans call for book co-authorship with Bob Carrow on WATER CONSERVATION STRATEGIES IN TURFGRASS

### **PRESENTATIONS ON SEASHORE PASPALUM DURING 2000**

Argentine Golf Association in Buenos Aires April 11th  
USGA Regional meeting in Spartanburg, SC March 21st  
USGA Regional meeting in Atlanta, GA April 24<sup>th</sup>  
Everglades GCSA, Naples, FL April 26th  
SE Turf Conference in Tifton, GA May 2<sup>nd</sup>  
IFAS Field day at Jay, FL (Pensacola area) June 21<sup>st</sup>  
1-day GCSAA workshop (Seashore Paspalum Management on Golf Courses) in Honolulu September 14<sup>th</sup>  
GlenEagles GC/Palm Beach GCSAA in Delray Beach, FL October 11<sup>th</sup>

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- 2) R.R. Duncan. 2000. *Seashore paspalum*: the turfgrass for tomorrow. *Diversity* 16 (1-2): 45-46.
- 3) R.R. Duncan and R.N. Carrow. 2000. Soon on golf courses: new seashore paspalums. *Golf Course Management* (May): 65-67.
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- 7) G.J. Lee, R.R. Duncan, and R.N. Carrow. 2001. Salinity tolerance of seashore paspalum ecotypes: physiological responses of shoot growth. *Crop Sci.* (in review)
- 8) G.J. Lee, R.N. Carrow, and R.R. Duncan. 2001. Salinity tolerance of seashore paspalum ecotypes: Responses of root, crown, and total growth. *Crop Sci.* (in review).
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- 13) G.J. Lee, R.R. Duncan, R.N. Carrow, M.A. Eiteman, and M.W. Rieger. 2001. Organic solutes in salinity tolerance of seashore paspalum turfgrass. *Crop Sci.* (submitted).
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- 15) Duncan, R.R. 2000. Plant tolerance to acid soil constraints: genetic resources, breeding methodology, and plant improvement. p.1-38. In R.E. Wilkinson (ed). *Plant-Environment Interactions*. 2<sup>nd</sup> ed. Marcel Dekker, Inc. New York.
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- 17) M. Huck, R.N. Carrow, and R.R. Duncan. 2000. Effluent water: nightmare or dream come true? USGA Green Section Record 38 (2):15-29.
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- 19) R.N. Carrow, M. Huck, and R.R. Duncan. 2000. Leaching for salinity management on turfgrass sites. USGA Green Section Record 38(6): in press.
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- 26) L.E. Trenholm, R.N. Carrow, and R.R. Duncan. 2000. Wear tolerance and mechanisms of seashore paspalums and bermudagrass. GTA Today 15 (1): 4-5.
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*Proposed in 2001: R.N. Carrow and R.R. Duncan 2001. Water conservation strategies in turfgrass. Ann Arbor Press.*

*R.N. Carrow and R.R. Duncan 2002. Second edition. Salt-Affected Turfgrass Sites: Assessment and Management. Ann Arbor Press.*

## EXECUTIVE SUMMARY

2000 USGA Annual Report

R.R. Duncan  
University of Georgia—Griffin

Projects: *GENETIC ENHANCEMENT OF PASPALUM FOR RECREATIONAL TURF*  
*DEVELOPMENT OF MINIMAL INPUT BEST MANAGEMENT PRACTICES FOR*  
*PASPALUM*

Three accessions were released from quarantine: one from South Africa, one from the Bahamas, and one from Belize. An additional 7 ecotypes were collected during the year and are being increased in the greenhouse over the winter months for subsequent field evaluations in 2001. Research is continuing on producing a seeded hybrid paspalum and collaboration continues with private seed companies in Oregon. Sea Isle 1 has been licensed to 24 growers in 9 states with production at 33 sites in the US. The grass will be licensed internationally through an international broker working out of Canada.

Management studies on encroachment issues (paspalum into bermuda—Confront + MSMA) is providing 70% suppression of paspalum with minimal injury to the bermuda, but multiple applications will be needed to completely take out the paspalum. Bermuda encroachment into paspalum is more difficult, but Progress + Cutless has provided >85% bermuda suppression in paspalum; however, multiple applications are needed and paspalum injury has exceeded 50% especially when air temperatures >85 F. Additional studies will be implemented with Primo at reduced rates in conjunction with Progress and using Poast alone to see if the paspalum injury problem can be reduced.

Insect resistance evaluation studies have revealed an experimental 561-79, a selection out of Argentina, that has broad-based resistance to most of the insect problems: mole crickets, armyworm, white grubs, spittle bugs). Outbreaks of fusarium blight, pythium blight, dollar spot, anthracnose (when <77 F), and helminthosporium/curvularia have been reported on the grass in field/golf course situations. Potassium is a key defense strategy and should be maintained at high levels or spoon-fed on a regular basis. Soluble N can be supplied in a prescription format (fertigation, small amounts put on frequently) to combat the dollar spot, with supplementation using fungicides. Sea Isle 2000 gets very little dollar spot and Sea Isle 1 gets less dollar spot than Salam (Southern Turf proprietary cultivar).

The paspalum website ([www.georgiaturf.com](http://www.georgiaturf.com)) is on line. The book SEASHORE PASPALUM – THE ENVIRONMENTAL TURFGRASS became available from Ann Arbor Press in June 2000. A 1-day GCSAA-sponsored workshop has been developed: SEASHORE PASPALUM MANAGEMENT ON GOLF COURSES. These were probably the biggest accomplishments for 2000 to come out of the project.

Salinity tolerance assessments revealed that several ecotypes have excellent salinity tolerance and are true halophytes: HI 26, HI 36, HI 101, HI 10, HI 33, HI 14, and HI 8 were in the top grouping statistically. These ecotypes have the capability to function at 50 dS/m salt (ocean water is 54 dS/m). Salinity tolerance mechanisms were related to maintenance of total water potential and shoot K content, escalated proline synthesis, and inorganic ion uptake (K, Na, Cl). Multiple salt resistance mechanisms in this halophytic grass are functioning at higher salinity stress levels. Na is required as a micronutrient and Cl is required as a macronutrient to drive some of the biochemistry/physiology involved in growth and development.



**In summary, we have a pretty good handle on relative level of salinity tolerance, with several cultivars being able to withstand ocean-level salt ( $EC_w=54$  dS/m or  $SAR= 57$  dS/m) as long as proper management protocols are followed. We now know the mechanisms involved in traffic tolerance in paspalum compared to bermudagrass. We have been able to ascertain the mechanisms of salinity tolerance for this halophytic grass. We have found parallel abiotic stress tolerances for salinity, drought, acid soils, and low light intensity among several cultivars. Management protocols are being taylorred to water/soil/environmental interactions, with salt level as a primary determining factor. We will be on a significant learning curve over the next few years as more and more of this grass is planted on golf courses, sports fields, and lawn/landscape venues, but we can at least put people in the ballpark on general management guidelines. The book will be a vital reference source. The website will provide the bullet management points and new things coming through the research program. Practical experience supplements will be added to the website as needed to update overall management protocols.**

# SEA ISLE 1/2000

## PASPALUM GROWERS

<u>NAME</u>	<u>MAILING ADDRESS</u>	<u>FARM ADDRESS</u>	<u>STATES APPLIED</u>
<b><u>Blade Runner Farms</u></b> Phone: 888 717-4455 Email: <a href="mailto:info.bladrunnerfarm.com">info.bladrunnerfarm.com</a>	802 Howard Road Poteet, TX 78065	Jourdanton, TX	Texas
<b><u>Diamond Turf, LLC</u></b> Phone: 912 741-6000 Fax: 912 742-0750	850 Walnut St. Macon, GA 31201	713 18 <sup>th</sup> Avenue, East Cordele, GA 31015	Georgia Texas
<b><u>Gardner Turfgrass, Inc.</u></b> Phone: 303 252-1900 Fax: 303 252-1900	Gardner Turfgrass, Inc. 1333 W. 1220 <sup>th</sup> Ave. Suite 111 Westminster, CO 80234	500 N. 56 <sup>th</sup> Street Suite 18 Chandler, AZ 85226-2507	Arizona
	5590 Mcnutt Road P.O. Box 18 Santa Teresa, NM 88008	same	New Mexico
	440 N. Hwy 377 P.O. Box 440  Tioga, TX 76271	same	Texas
<b><u>Mason's Master Turf, Inc.</u></b>	905 Sand Bar Ferry Road Beech Island, SC 29841		South Carolina

<b>Modern Turf, Inc.</b>	5340 Sunbury Lane  Charlotte, NC 28211	8 miles south of Interstate 20 off Highway 521 (Camden, SC)	South Carolina
<b>Owl's Head Farm, L.L.C.</b>	115 Deer Street Brewton, AL 36426	11275 Hwy 331 Freeport, FL 32439	Florida
<b>Phillip Jennings Turf Farms, LLC</b> Phone: 912 668-3729 Fax: 912 668-3597 Email: <a href="mailto:turfman@pineland.net">turfman@pineland.net</a>	P.O. Box 708  Soperton, GA 30457		Georgia
<b><u>Pike Creek Turf, Inc.</u></b> Phone: 912 896-7584 Fax: 912 896-7584 Email: <a href="mailto:hpirkle@pikecreekturf.com">hpirkle@pikecreekturf.com</a>	Route 2, Box 376-A Adel, GA 31620	From I-75, Go west on Hwy 37 for approx. 6 miles to Nell Purvis Road. Turn left. Farm is approx. 1.5 miles on right.	Georgia
<b><u>Rapid Turf, Inc.</u></b> Phone: 912 826-2454 Fax: 912 826-2882 Email: <a href="mailto:info@rapidturf.com">info@rapidturf.com</a>		101 Goshen Road Ext. Rincon, GA 31326	Georgia
<b>Schroeder-Manatee Ranch, Inc.</b>	4715 Lorraine Road Bradenton, FL 34202	4 miles East of I-75 on SR70 to Lorraine Road, then 2.5 miles North on Lorraine Road	Florida

<b>Southern Turf Nurseries</b> Phone: 800 841-6413 Fax: 912 382-5301 Email: <a href="mailto:wdillard@surfsouth.com">wdillard@surfsouth.com</a>	U.S. Hwy 82 East Brookfield, GA 31727	2 miles East of Brookfield on U.S. Hwy 82 - Look for sign.	Georgia
		43510 Neal Road Punta Gorda, FL 33982	Florida
South Florida Grassing Phone: 561 546-4191 Fax: 561 546-3482	P.O. Box 725  Hobe Sound, FL 33455	4580 SE Bridge Road Hobe Sound, FL 33455	Florida
<b>South Florida Sod, Inc.</b> <b>Emerald Island Turf</b> Phone: 941 637-4770 Fax: 941 637-0196 Email: <a href="mailto:emeraldsod@sunline.net">emeraldsod@sunline.net</a>	46470 Farabee Road  Punta Gorda, FL 33982		Florida
<b>Supreme Sod, LLC</b>	1091 New Castle Lane Oviedo, FL 32765	1411 Maytown Road Osteen, FL 32764	Florida
<b>Tifton Turf, Inc.</b> Phone: 912-386-8061 Fax: 912 386-1207 Email: <a href="mailto:mspinks@surfsouth.com">mspinks@surfsouth.com</a>	P.O. Box 9	4051 GA Hwy 112 E. Ashburn, GA 31714	Georgia
<b>Thomas Bros. Grass, Ltd.</b> Phone: 888 639-4727 (Toll Free) Email: <a href="mailto:info@thomasbos.com">info@thomasbos.com</a>	P.O. Box 1268 Granbury, TX 76048	4600 FM 2504 Poteet, TX 78065	Texas
		6681 Wire Grass Road Camilla, GA 31730	Georgia

		<b>Elsberry Greenhouse Tampa Farm</b>	<b>Florida</b>
		<b>TBA</b>	<b>North Carolina</b>
		<b>TBA</b>	<b>Arizona</b>
<b>Thomas Family Turfgrass</b>	<b>3931 Old Caney Road Wharton, TX 77488</b>	<b>County Road 154 Wharton/Bay City</b>	<b>Texas</b>
<b>The Turfgrass Group, Inc.</b>	<b>329 Stiles Road Cartersville, GA</b>	<b>Marshallville Farm (1 mile east of town)</b>	<b>Georgia</b>
<b><u>West Coast Turf</u> Phone: 760 346-TURF Email: 760 360-5616 Email: <u>DMarma@aol.com</u></b>	<b>P.O. Box 4563 Palm Desert, CA 92261</b>	<b>41-255 Burr St. Indio, CA 92203</b>	<b>California</b>
<b><u>Woerner Turf</u> Phone: 800 541-6483 Email: <u>tthrash@woerner.com</u></b>	<b>P.O. Drawer 850 Elberta, AL 36530</b>	<b>5126 U.S. Hwy 78E Anniston, AL 36207</b>	<b>Alabama</b>