

Suggestions for the Care of Seashore Paspalum



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Environmental Turf

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SUGGESTIONS FOR THE CARE OF SEASHORE PASPALUM

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PART ONE: Introduction

A Brief History of Seashore Paspalum

Seashore Paspalum, (species name *Paspalum vaginatum*), has been in existence for thousands of years. It is thought to have been brought to the United States as bedding on slave ships, with the grass itself originating in Asia or Africa.

A warm-season turfgrass, Seashore Paspalum can be used on golf courses, athletic fields, and commercial and residential lawns.

Seashore Paspalum provides excellent tolerance to the high salt levels found in reclaimed water, effluent, salt spray and seawater. Tolerances to high levels of salt may vary from variety to variety.

Seashore Paspalum takes dramatically less fertilizer and needs dramatically less irrigation than many other turfgrasses. It also tolerates a wide range in soil pH levels, has minimal pesticide requirements, exhibits excellent wear tolerance, heals quickly, has excellent cold tolerance retaining its color in moderate temperatures, has good insect and disease tolerance, and is fairly shade tolerant.

Specifics of SeaDwarf™ and Aloha™ Seashore Paspalum

Environmental Turf is proud to offer two extraordinary varieties of Seashore Paspalum.

SeaDwarf™ Seashore Paspalum is the only dwarf variety of Seashore Paspalum. This unique dwarf quality allows SeaDwarf™ to be mowed at heights ranging from about 1/8-inch to about 4-inches, giving it an unparalleled versatility for golf courses. SeaDwarf™ has been used on golf courses around the world offering the ability to use a turfgrass wall-to-wall, delivering fast green speeds and dazzling natural striping. SeaDwarf™ Seashore Paspalum has also been used with great success on athletic fields

and for lawn use.

Aloha™ Seashore Paspalum is a hearty variety of Seashore Paspalum with a rich, luxurious color. A slightly wider leaf blade than SeaDwarf™, Aloha™ Seashore Paspalum makes for excellent home and commercial lawns, sports field applications and can be used wall-to-wall on golf courses where overly fast ball speed is not a requirement. Aloha™ Seashore Paspalum offers a wide range of applications previously not seen in a Seashore Paspalum.

Purpose of this book

This publication is in no way the definitive book on the care and maintenance of Seashore Paspalum. Research and interaction with Seashore Paspalum continues in laboratories, on golf courses and residential lawns worldwide.

But it is our hope that this document will offer you a guide in your journey with Seashore Paspalum. The information gathered inside this book uses real-world anecdotes and experiences of experts, industry authorities and professional people who are growing and maintaining this grass on a daily basis.

PART TWO: Suggestions for installation

FUMIGATION AND GROUND PREP

After shaping but prior to bringing in any sprigs or sod at Hammock Bay Golf & Country Club near Marco Island, Florida, the construction crew fumigated the soil with Methylbromide and covered it with plastic sheeting to kill any Common Bermuda or other noxious weeds. The process creates a clean surface in which to plant new turfgrass. Remove plastic sheeting before introducing new plant material.

Tim Daniel, golf course superintendent at Crown Colony Golf & Country Club in Fort Myers, Florida, said in prepping the golf course the developers of his property did not fumigate the raw soil and fill dirt. Daniel said fumigating was not in the developer's budget. He said that instead the developer did a pre-plant using an application of Ronstar as a preventative against crabgrass, goosegrass and various broadleaves.

Whether using Methylbromide, Ronstar or any other chemical, it is important to prepare the soil properly before planting new turf.

Tip: Starting with a clean slate – fumigated soil – is the best first step.

BENEFITS OF SANDY SOIL

Many of the facilities planted with varieties of Seashore Paspalum will be using water of lesser quality for irrigation. Though the grass can handle the saltier water levels, it is important to properly prepare the soil that the grass will be growing in so that the soil tolerates the salt just as well as the plant material.

Todd Lowe of the USGA Green Section said Seashore Paspalum will tolerate a wide range of soil pH. Information from

the University of Georgia suggests that Seashore Paspalum can tolerate pH levels in the range of 3.6 to 10.2 pH.

Tim Daniel, golf course superintendent at Crown Colony Golf & Country Club in Fort Myers, Florida, offers some suggestions for using sandy soil in high salt situations.

“If you’re in a situation where you only have a saline irrigation source, it’s important to build a golf course knowing that,” Daniel said. “What you’ll find key is you’re going to have to flush your soils, whether through rainfall or through extra irrigation, to keep the salts moving through the soil. And your fill dirt material is going to have to reflect that.”

The best way to move the salt through the soil is by using sand, Daniel said.

“It is paramount, under high salinity irrigation, that a high sand content fill material be used,” Daniel said. “You’re not going to flush the salts as readily through your clays as you would your sand.”

So, for example, if a developer is building a golf course in Georgia on clay soil, would he need to put sandy fill dirt on top?

“I think your water quality would dictate that,” Daniel said. “I can’t quantify but as your salinity values increase your sand content should follow.”

At Hammock Bay Golf & Country Club near Marco Island, Florida, much of the prep soil was a heavy muck. Superintendent Rodney Whisman said he is trying to remediate his soil after-the-fact by using frequent aerification and topdressing the cored areas with sand.

“Some holes that we know of for sure that have heavier soils,” Whisman said, “when we aerify we need to put sand down in there to remediate the heavy soils because it holds the salt more.”

Tip: Use sandy soil when possible for proper drainage and flushing of salts.

INSTALLATION

Seashore Paspalum may be installed as sod, sprigs, plugs, or sod-to-sprigs. Plugs are the least desirable as plugs have been trained to grow in a confined space and are less aggressive at grow-in, said Stewart T. Bennett, CGCS, superintendent at Alden Pines Country Club in Bokeelia, Florida.

Sod and sprigs are both beneficial methods of installation. Sod comes in rolls or as flat slabs delivered on pallets. Sprigs are cut at the sod farm into pieces with live roots attached and are spread out on the soil at the project site.

A new method of installation called sod-to-sprigs is gaining popularity. This method takes live sod and cuts it into sprigs on the project site. It is believed that the sod-to-sprigs method delivers more live material at the site. Once the sod material is chopped into individual sprigs, it is spread onto the soil, cut into the soil and then watered.

The University of Florida suggests that sprigging rates should range from 5-10 bushels per 1,000 square feet. The best time for establishment is during periods of most active growth, when temperatures exceed 70-degrees.

Tip: Sod and sprigs are good. Sod-to-sprigs are ideal. Plugs are less desirable.

PART THREE: Suggestions for grow-in of Seashore Paspalum

Care of Seashore Paspalum is different during grow-in than once it is fully established. During this period, Seashore Paspalum may need more irrigation and more fertilizer than it will need once the plant is mature, said Tim Daniel, superintendent at Crown Colony Golf & Country Club in Fort Myers, Florida.

However, because Seashore Paspalum grows in faster than some other grasses, such as Bermudagrass, this period is relatively short.

HOW LONG UNTIL ESTABLISHMENT?

Jim Hardy, who designed the golf course at Hammock Bay Golf & Country Club near Marco Island, Florida, with his partner PGA Tour Player Peter Jacobsen, said the SeaDwarf™ Seashore Paspalum used on his course has “grown in very, very fast.”

Tim Daniel, golf course superintendent at Crown Colony Golf & Country Club in Fort Myers, Florida, agreed.

Daniel, who had grown-in several Bermudagrass golf courses prior to growing-in Crown Colony with Seashore Paspalum, compared Seashore Paspalum to Bermudagrass.

“As far as getting a dense stand of turf, where you can walk on it, drive on it, where it supports itself and the weight of machinery, I would say it was a few weeks faster for grow-in than Bermudagrass.”

Daniel continued, “We were fully established at about 12 weeks into it. Compared to Bermuda, well, I think my history with Bermuda is I like to get 15 weeks into it before we open for play. The Seashore Paspalum trimmed about 3 weeks off. After we sprigged the back nine greens we were open for play nine weeks

later. That was pushing it and the surfaces weren't ideal but people understood that we just had a grow-in and it was playable.”

Stewart T. Bennett, CGCS, superintendent at Alden Pines Country Club in Bokeelia, Florida, said he expects Seashore Paspalum to be 90 percent grown-in within six months. But that estimate may be conservative.

“Coverage can be quicker,” Bennett said. “I’ve seen Paspalums grow in extremely fast with ideal conditions. SeaDwarf™ in particular has some very rapid coverage.”

Rodney Whisman, superintendent at Hammock Bay Golf & Country Club near Marco Island, Florida, has seen evidence of even faster results. Using a heavy fertilization schedule (outlined below, see section on Grow-in Fertilization), Whisman said he was able to achieve “about 50 percent” coverage of a fairway planted sod-to-sprigs with SeaDwarf™ Seashore Paspalum in just five weeks.

The very nature of how the grass grows lends itself to a quicker grow-in. It grows from both rhizomes and stolons.

“First of all, I noticed the Paspalum propagates primarily from rhizomes. It doesn't (only) creep or fill like the Bermudagrass where you can see the stolons,” Daniel said. “It would pop up from underneath, but that in itself would give the soil more support, where Bermuda tends to creep and then it drops a root, and then that root has to develop in the soil. It takes a while to stabilize the soil when Bermuda is growing. The Paspalum creeps from underneath (as well as from above) so you're already getting that soil stabilization from underneath and then it sends out new shoots.”

Why is this a benefit?

“Less potential for erosion and obviously the costs associated with that,” Daniel said. “You can open the course earlier for play because it grows in quicker.”

Tip: Under ideal conditions, Seashore Paspalum will grow-in significantly faster than Bermudagrass.

GROW-IN IRRIGATION

Water Quantity

It is important to remember that Seashore Paspalum takes significantly more water during establishment than it does for general maintenance.

“During the grow-in process we would irrigate the greens every hour on the hour for 5 minutes and then slowly wean them back as it’s growing in,” said Whisman. “Now they are run basically every 4th night for about 10 minutes.”

His fairways, which have a heavier soil, would be irrigated every other hour during establishment.

Whisman said that during grow-in, irrigation is crucial.

“It just depends on the water,” Whisman said. Standing on his 5th hole, which was more than half grown-in, he pointed to a bare spot near the tee complex.

“This doesn’t get even coverage because its got a smaller irrigation head, so it hasn’t grown in as well,” he said. “But you see the tee up here? It’s more grown-in. The more water the better in the beginning. Be sure to get even coverage.”

Tim Daniel said irrigation was also very important as he grew-in Crown Colony.

“The first few weeks we obviously irrigated, syringed it every two-to-three hours like you would Bermuda, just very light to keep the canopy and first inch or so moist. It was two or three times a day in first couple of weeks, light syringes. After the first three weeks, I backed off to irrigate twice a day for another two weeks, which puts us five weeks into it. Once we got past five weeks, we were on nightly irrigations.”

For home lawns, establishment of sod during periods of hot, dry weather will require frequent light irrigation until new roots are established in the native soil. Normally, 1 to 2 irrigations or rainfall with a total application of .1 to .3 inches per day are adequate

during the first couple of weeks. Cloudy and/or cool weather will require less water and less frequent irrigation than hot, dry weather.

Irrigation frequency should be reduced after roots become established in the native soil. Root establishment can be determined by lifting a corner of the sod and observing the root formation or the degree to which the roots have attached the sod to the underlying soil.

TIP: Seashore Paspalum takes more frequent irrigation during establishment than in general maintenance.

Water Quality

It has been suggested that the better the quality of the water used to irrigate Seashore Paspalum during establishment, the quicker the grass will grow in. Does this mean that you can't grow in Seashore Paspalum with salty water? No. However, if you are looking for a particularly fast grow in, it might be helpful to irrigate with the best quality water available.

Stewart T. Bennett explained that there are many levels of water quality. For our purposes, we will strictly be concerned with salt levels. Bennett offered a general scale by which to measure water salinity:

- Freshwater = anything less than 500 ppm (parts per million)
- Brackish water = 500 to 5,000 ppm range
- Highly brackish = 5,000 to 15,000 ppm
- Saline = 15,000 to 30,000 ppm
- Seawater = 30,000 to 40,000 ppm
- Brine = 40,000 to 300,000 ppm

Tim Daniel grew his course in with reclaimed water from his local municipality. Though some reclaimed water can be high in

salt, Daniel's experience was with water that was only slightly salty at about 1,200 ppm (parts per million.) The course was grown-in and maintained using the same water.

Rodney Whisman grew in his course at Hammock Bay Golf & Country Club near Marco Island, Florida, using effluent. His salinity levels were at about 700 ppm.

A golf course in Mallorca, Spain, both grew-in and irrigates with water at 34,500 ppm—seawater salt levels. Though the grow-in process was substantially longer than it would have been if the turf had been grown-in using freshwater, the grow-in was successful.

“The Paspalum liked the water growing in,” Whisman said. “You could almost flood it to the point of where it doesn't erode and it loves it.”

Whisman's actual irrigation process was as follows: irrigate the greens every hour on the hour for five minutes. As the greens mature, gradually wean them back. At the point where the greens were fairly well knitted together, Whisman said he had cut back his irrigation to “basically every fourth night for about 10 minutes.”

Dr. Lee Berndt, professor and program coordinator of the golf course operations program at Edison Community College in Fort Myers, Florida, has done research on the effects of salinity on Seashore Paspalum, specifically SeaDwarf™ Seashore Paspalum.

“A public perception problem with Paspalum in general is that most people feel that salt does not effect it and that's not true,” Dr. Berndt said. “Salt does effect it, just not quite as much as it might effect Bermudagrass or some of the other grasses. There is that perception out there and I think that needs to be dispelled.”

Dr. Berndt said his studies showed that while some amounts of salt seemed to have little or no effect on the Seashore Paspalum, higher concentrations of salt could slow down growth of the grass.

“We actually had to put quite a bit of salt on it to get a negative effect,” Dr. Berndt said. “In fact, where we had our 4:1 blend,

where we did four parts freshwater to one part seawater, that was about our best dilution where we saw it had the best quality and some of the other parameters we measured.”

How much was too much for grow-in?

“Salinity changes the growth habit of this turf. About 15,000 ppm (saline) is where it stunts the growth,” Dr. Berndt said. “When we applied salinity, it curtailed stolon production in this turf.”

However, Dr. Berndt said some salt actually had a beneficial effect on the SeaDwarf™ tested, pushing the grass to a finer blade texture.

“You do want it to be as fine textured as possible, yes, so some salt would be indicated in your management to help decrease the width of the leaf blades and increase the fineness component of that. The salt really has a growth regulating property to it,” Dr. Berndt said, adding that he noticed a “constant decrease in the texture of the leaf blades in relation to increasing salinity.” He said the grass also “maintained pretty good color with salt.”

Bennett also recommends growing in Seashore Paspalum with a lower salinity level, if possible.

“During establishment, the fresher the better,” Bennett said. “To be safe, 2,000 ppm and below. As your salinity increases, your growth rate or establishment rate is slower up to about 15,000 ppm. As you go from 2,000 to 15,000, your establishment rate will lengthen in time, it will get incrementally slower. At 2,000 ppm, you could probably grow in Paspalum in say about two months. At 15,000 ppm, I’d say about 8 months, maybe longer. At 2000 ppm, you’re not going to notice any difference (from freshwater.) I’ve established Paspalum in two months with 5,000 ppm, that’s eight weeks, that’s my personal experience. I had really good soils, it was perfect growing time of year, I had adequate nutrients available. As the salinities increase, the length of time for grow-in will increase.”

TIP: To achieve the fastest grow-in, irrigate Paspalum with as low salinity water as is available.

GROW-IN FERTILIZATION

As with irrigation, the fertilization regimen for Seashore Paspalum is slightly different than the regimen for the turfgrass once it's established.

Tim Daniel compared his grow-in experience with Seashore Paspalum at Crown Colony Golf & Country Club in Fort Myers, Florida, with that of growing in a Bermudagrass golf course.

"It's pretty much standard on Bermuda once you get through the first week or so where you've got root development you start pushing the top growth. It's been common to put out about a pound per thousand of nitrogen per week during the grow-in," Daniel said. "I can tell you, we were running between 1/2 and 3/4 of a pound of nitrogen a week with the Paspalum here. That's how we managed the grow-in. It's roughly half the amount of nitrogen, even less than that once it's mature."

Rodney Whisman said he found the use of fertigation during a grow-in, especially in heavier soils, to be very helpful.

"The majority of what I've been putting out is calcium nitrate, it just kind-of varies," Whisman said. "We put in say 25 percent anytime we would water, because you've got to water the sprigs in during the day. Then at night when we're watering the turf we would crank it up to about 50 percent. I've been having problems with my calcium levels, trying to get them up, it's really low in this soil and I'm just trying to keep the calcium levels up."

Whisman also had some luck in pushing his final hole to be grassed, the 5th hole at Hammock Bay Golf & Country Club near Marco Island, Florida, to grow-in a bit more aggressively than he did with the other 17 holes on his course.

"I've upped the fertility on it, going out twice a week with a foliar, using one application of Seaweed Extract and Carbolyte," Whisman said.

Seaweed Extract and Carbolyte are liquid foliars commonly

used in agriculture to promote root growth. In fact, Whisman said he gets these fertilizers through an agricultural distributor, Southeast Ag. While Seaweed Extract is an organic fertilizer, Carbolyte, Whisman said, helps with mineralization and availability in the root zone. It is an excellent food for soil microbes. Carbolyte can help lower soil pH and increase nutrient availability.

“Between the Seaweed extract and the Carbolyte, they enhance root growth, and root growth is going to enhance top growth. When you do a foliar, the leaves will take it in and translocate it down through the roots. That’s one application,” Whisman said. “Then the other application we’re going out with Calcium Nitrate, instead of just doing it with the fertigation. So we’ll go out with 10 pounds of Calcium Nitrate per acre and spray it once a week just to help it along.”

Whisman further explained his fertilizer regimen.

“Our granulars, we use a 10-10-20 with minors every other week. The weeks in between that I’m doing 21-0-0, so I’m really pushing this fairway hard while I’ve got warm weather,” Whisman said. “It’s starting to help now. At five weeks it’s about 50 percent so that’s pretty good.”

Nitrogen also plays a big part in grow-in.

“For Seadwarf™ probably anything over 4 to 6 pounds of nitrogen per thousand square feet per year (once established) is excessive. I would call that excessive for Paspalum. However, when you are stabilizing or growing in, you exceed that. Make it close to a Bermuda grow-in rate and, in general, you’ll be safe,” Bennett said. “The guys who are growing it in need to know their soils, they need to know their irrigation water. I thought it was just Paspalum that was getting more complicated but it’s not, it’s all turfs in general. Soils have a big effect on how long the fertilizer stays in there.”

Todd Lowe, Agronomist for the USGA Green Section's Florida Region suggested that fertilization during establishment should include 1 lb of Nitrogen per 1,000 square feet at four weeks, and then every two to three weeks. Apply higher P and K fertilizer plus micronutrients Calcium and Magnesium. An aggressive program, similar to how one might grow in Bermudagrass, will increase establishment. He also suggested periodic verticutting through establishment.

TIP: Seashore Paspalum requires more fertilization during grow-in than once established.

GROW-IN MOWING PRACTICES

In a home lawn laid with Seashore Paspalum sod, mowing heights can be .5 to 2-inch. Reel mowers should be used when maintaining turf below 3/4-inch. Rotary mowers with sharp blades are adequate for turf above the 3/4-inch mowing height.

Mowing should begin on Seashore Paspalum sod as soon as possible, at least within one week after sod is laid. Mowing should be continued on a regular schedule determined by growth conditions, commonly once per week. The initial mowing height on sod in a home lawn should be maintained at the height similar to the height that it arrived from the sod farm.

Mowing of Seashore Paspalum used on a golf course is much different.

About two months before he planned on opening Hammock Bay Golf & Country Club for play, Rodney Whisman began to reduce the heights of cut down on his new greens and fairways. He said the process was gradual, easing them down as he went.

A suggested regimen for taking down mowing heights on Seashore Paspalum golf courses is as follows: Move from .25 to .19 to .15 to .125 over seven to 10 day intervals. Topdressing can be helpful when making the mowing height transition downward as it

can promote a dense and consistent surface.

About a month before open, Whisman was mowing his tees at .250; fairways, collars and approaches at .400; roughs at 3/4-inch; and greens at .125. Even though he had no set day to mow fairways or roughs, he said he was mowing the greens daily to get them used to frequent cutting, and mowing fairways two-or-three times a week.

As the greens began to mature, Whisman said he was rolling his greens daily to smooth out the playing surface.

Whisman said he found that one way to promote lateral growth was once the turf had approximately 75 percent coverage on a green, “roll it, mow it down to .300-inch, and then topdress it with a Metermatic topdresser.” A Metermatic topdresser is a type of topdressing machine that applies a heavier layer of sand than your typical spinner topdress machine.

“Once you roll it, mow it down to .300, and then topdress it,” Whisman said. “The sand acts like a blanket for all of the stolons and rhizomes and the turf just takes off.”

For fairways, this is a practice you may want to attempt at about 50 percent coverage, when feasible, in order to start promoting growth. If possible, Whisman said, keep the turfgrass cut short to encourage growth.

In addition, Whisman said during the grow-in he was verticutting greens every seven to 10 days, with a light sandy topdressing.

TIP: Take mowing heights down gradually.

PART FOUR:

Suggestions for General Maintenance of Seashore Paspalum Once Established

Once established, Seashore Paspalum needs significantly less fertilizer, less water, and can tolerate higher salts and lesser quality water than many other grasses. Seashore Paspalum can also be fairly shade tolerant, fairly cold tolerant, holds its color better than many other warm-season grasses in the winter months, and in the event it does go off-color in colder weather it is often quicker to recover than other grasses.

IRRIGATION

Amount Needed

In general, Seashore Paspalum needs less than 50 percent of the amount of water needed to irrigate Bermudagrass.

Stewart Bennett tracked the irrigation amounts of the Seashore Paspalum at his 18-hole Alden Pines Country Club in Bokeelia, Florida, over a nine-year period. Although his facility is allocated 9.6 million gallons of water for irrigation each month, in actuality Bennett only used about 3 million gallons per month, or 1/3 of the amount of water allowed.

“With ideal circumstances, you can achieve up to 50 percent less water use after full establishment,” Bennett said.

When he does irrigate, Hammock Bay’s Whisman said he’ll do a “cycle soak.” By this he means he’ll irrigate for a total of 10 minutes but not all at once. He suggests you run the irrigation for 5 minutes, sit for a half hour, run 5 minutes again.

“The Paspalum has got excellent roots and you just don’t need to water it so much,” Whisman said. He offered an example: “We’ve had high winds for three days at 26 mph and I haven’t watered it. If it was Bermuda and you had these winds, you’d see

brown everywhere just because the winds dry out the tops and there's not as much root depth. Not with the SeaDwarf™.”

For home lawns, once established and in the absence of natural rainfall, irrigation can be scheduled on a weekly or semiweekly basis where the soil is wetted to a depth of 6 to 8 inches. Usually this will be about 1-inch of water per application. It is best to schedule the irrigation shortly before daylight. At this time there will be less evaporation and since the plant leaves are already wet from dew the irrigation will not promote disease development. However, it is best to under water Seashore Paspalum than over water it. Over watering predisposes the plant to diseases that are usually not a problem under drier conditions.

One way to determine if a lawn needs water is to look for an indication of transient wilting in the late afternoon. Under these conditions the leaves become less turgid, there is a slight change in leaf color and footprints are evident after walking across the lawn.

Syringing

If blade tops do begin to dry out from wind, Whisman advises syringing, or doing a quick three minute watering to wet the blade tips and “cool off” the turf.

Water Quality

Seashore Paspalum can, in general, tolerate higher salt levels and poorer water quality than many other warm season grasses.

“Seashore Paspalum has a lot of multiple stress tolerances,” said Dr. Lee Berndt. “It tolerates the salt. It seems to tolerate some poor environmental conditions.”

There are conflicting schools of thought as to how much salt Seashore Paspalum can tolerate. Some research has shown that Seashore Paspalum can be watered with seawater. In fact, a golf course in Mallorca, Spain, both grew in and irrigates with water at

34,500 ppm-seawater salt levels—and though their grow-in was substantially longer than it would have been if the turf had been grown-in using freshwater, the turf on a daily basis continues to thrive.

Todd Lowe of the USGA Green Section said he feels that Seashore Paspalum can tolerate a salinity of 34,500 ppm, but that at those levels the soils must be flushed.

But Stewart Bennett approaches the issue with caution.

“I wouldn’t attempt to irrigate it or grow it in with seawater in a high traffic sports turf environment,” Bennett said. “I’ve never tried it because I’ve seen failure rates at 20,000 and above. I think that the cost of maintenance would just outweigh what you save. If you’ve got some freshwater, you just take straight seawater and dilute it with 2:1 and come with 10,000 or 15,0000 ppm and you’re all set.”

Dr. Lee Berndt agreed, but not because of any limitations of the grass.

“It’s not so much the grass that gets effected but the soil that supports it that gets effected by all the salt,” Dr. Berndt said.

Proper maintenance of the soils, then, especially at higher salt levels, is imperative.

Flushing

As described in the previous section, it’s not so much that the turf has problems with the salt, because it appears to tolerate salt at high levels. Instead, it appears that the soil itself may need to be specially maintained to manage higher salt levels. However, different soils will require different management practices. Sandy soils may tend to filter the salts naturally. Heavier soils may need some extra help. One way to accomplish this is by flushing.

“With correct soils, the term flushing, as defined as purposing salts out of the root zones with a fresher amount of water, I don’t

believe is as necessary as many claim it to be, that is again with the proper soil,” Bennett said. “The proper soil is medium to coarse sand with good positive drainage.”

Not everyone using Seashore Paspalum needs to think about flushing.

“Let’s say I’m a landscape company, I’m maintaining a high-end residential home, and I’m irrigating with effluent or potable. I don’t need to worry about flushing,” Bennett said. “You need to worry about flushing when you get into the 15,000 ppm and above range but it is just so dependent on soils.”

The following relates to the ideal sandy/course soils only, in general. In denser soils or clay, the numbers would be much lower:

“Depending on rainfall, and your amount of irrigation—there’s a lot of calculations you have to go through. Depending on the parts per million you can calculate how many pounds of salts you’ve put into the soil. You take your rainfall into account and your soil particle size and bulk density and calculate your leaching factor and know how much water you have to apply to move the water 12 inches through the soil. There’s multiple calculations to do.

“If you were up to 15,000 ppm you’d be monitoring the soils at least quarterly. If you get soil salinity readings above 15,000 ppm, then you need to flush. Flush at 15,000 ppm or more in the soil sample. If we’re irrigating with 15,000 ppm, our soil is going to be at least 15,000 ppm or higher. What we need to monitor is the electric conductivity of the soil. If that number starts to get up higher than 15,000 ppm, that means our soil is drying out and the more it dries, the higher the salinity is going to get. The higher the salinity gets in the soil, the quicker you’re going to start having turfgrass loss.”

How do you know when it’s time to flush? Bennett said if you wait for visual indications, “it could be too late because your turf could start dying if the salts got built up in the soil.”

Instead, he recommends vigilance and soil tests.

TIP: Flush in heavier soils or when irrigating with water over 15,000 ppm in coarse sandy soils.

DROUGHT TOLERANCE

Bennett said Seashore Paspalum's drought tolerance is "better than Bermudagrass. If it's managed correctly, Paspalum will take 50 percent less water. But, if you irrigate Paspalum like Bermudagrass, it's going to need water like Bermudagrass. If you give it surplus water, it's going to get spoiled and it won't be drought tolerant and the roots won't be deep. That's almost true for any grass variety.

"But if you lean it and keep it mean, you can get away with less irrigations," Bennett said. "But again, that depends on your soils and your irrigation source. If we get into highly brackish water, throw that idea out because we need to keep the soils moist all of the time. Highly brackish, 5,000 to 15,000 ppm, it may be that you need more water. It's very possible because you might come into a leaching (flushing) factor when you get into the higher levels and that equates to more water."

Todd Lowe of the USGA Green Section said Seashore Paspalum has an "excellent drought tolerance" which is "50 percent of the water needed for hybrid Bermudagrass."

TIP: Seashore Paspalum, when managed correctly, can take less than 50 percent the amount of water needed to irrigate Bermudagrass.

FERTILIZATION

Amounts

In general, Seashore Paspalum may take up to 50 percent less fertilizer and up to 75 percent less Nitrogen than Bermudagrass.

“Our final fertilizer that we end up with that we’re going out with wall-to-wall is a 4-12-22, low N and high pot ash that we need,” Whisman said. “With my fertility program that I figured out for my greens for a year between foliar, granular and fertigation, I’m probably about 5 pounds of N per year. It could be less than that. From the way everything’s going right now it will be about 5 pounds of N per year. If it was a Bermuda course, the lowest I’ve heard about anybody going is about 8 pounds of N per year, and this is just greens, but the norm would be about 12 pounds of N per year.”

Whisman’s fertilizer regimen looks like this:

4-12-22 fairways

2-1-26 greens at 3/4 of a pound of K

Tim Daniel has also experienced a lower need for fertilizer at Crown Colony in Fort Myers, Florida.

As for Nitrogen on his SeaDwarf™ greens, Daniel said, “We’re tweaking our way down to a pound and a quarter per year to a pound and a half per year per thousand square feet. It’s at least 50 percent less than on a Bermuda course. I feel comfortable putting out anywhere from a .10 of a pound of Nitrogen per month to .15 of a pound per month of Nitrogen.”

His fertilizer regimen on his SeaDwarf™ greens looks like this: for granular Nitrogen, with fertilizer ratios of 2-1-26 at two applications per month at 5 lbs. each, with resulting monthly N levels of 0.2 lbs. He also supplements this with liquid foliar applications at 0.024 lbs. N per week (1.24 lbs per year).

“That is still roughly 3.5 lbs. N per year total,” Daniel said.

“Sand based greens require slightly more N than fairway applications.”

His fertilizer regimen on his SeaIsle-1 fairways looks like this: 3-1-20, put out at five pounds per thousand sq. ft. per month, where 3=nitrogen, 1=phosphorous, 20=k (potassium) per month per thousand square feet.

“That would be ideal for fertility on a regular maintenance schedule,” Daniel said. “That alone will give you a pound and a half of nitrogen per square foot per year. But even that, I’m even a little bit leery of putting that amount out. The grass just grows tremendously. As the turf continues to build organics, the N requirements might be reduced even further.”

Time of year, the season, and the amount of rainfall can also influence the amount of fertilizer needed.

“The grass grows more in the summer,” Daniel said. “Obviously nitrogen plays a role in that. I think the reduced nitrogen will eliminate some of the growth that you’re seeing. But in addition to that I think I feel strongly that the high temperatures and the rainfall contribute as much as the Nitrogen does to the growth.

“See, the Paspalum is a littoral plant, it really likes water. We get these rainfalls like we do in the summer, it’s tough to slow it down. There’s nothing much you can do about rainfall but obviously irrigation plays a role. If you can manage your irrigation, not over water it, I think it will play a role in managing the growth.

“Keeping the nitrogen levels very low, a 10th of a pound a month is pretty low in itself. I wouldn’t be afraid to go less than that during the summer to try to reduce the growth.”

How far down?

“I’d drop that in half at least. Thinking of midsummer, dropping my fairway analysis 2-3-30, of course I’m only putting it out every eight weeks and I’m using a slow-release, much different than a

homeowner situation. They probably put it out a little more frequently and do not use a slow release.

“I think all of it could be slow release and all of it could be organic, as far as a homeowner situation is concerned. I think it responds very well. The higher nutrients, the iron is beneficial to the Paspalum. It really responds to iron as far as color. I always have a minor mix in my fertilizer, I throw out some iron. Occasionally I’ll spray straight iron sulfate on it to keep the color up in winter or summer,” Daniel said.

Todd Lowe, Agronomist for the USGA Green Section’s Florida Region, suggests a fertility program of 2 to 4 lbs. of Nitrogen per 1,000 square feet per year, or 3 to 6 lbs. of N in areas with longer growing seasons on fairways and tees. He said greens may take 5 to 8 lbs. of N in the longer growing season.

Dr. Laurie Trenholm of the University of Florida has also studied Seashore Paspalum. Trenholm suggests the “best way” to fertilize Paspalum is to “apply frequent, small doses throughout the year,” and indicates 3 to 6 applications. She said you should apply up to .5 lb. of nitrogen per 1,000 square feet of turfgrass per each application. Total applications, Dr. Trenholm said, should equal the rate of 3 to 4 lbs. of nitrogen per square feet annually. She said it would also be helpful to look for a fertilizer with high potassium, for example, 15-2-15 or 15-2-22.

Dr. Trenholm said Seashore Paspalum has a “very efficient K uptake.” She suggests an N:K (Nitrogen to Potassium) fertility ratio of 1:1 or 1:2.

For home lawns, it is suggested you fertilize Seashore Paspalum three times the first year, and four times (quarterly) per year in subsequent years. Lesco Super TriKote 16-4-8 slow release applied at 1-1/2 lbs. per 1,000 square feet will deliver the Nitrogen, Phosphorous and Potassium recommended in the 4:1:2 ratio for home lawns. If the lawn is subjected to severe stress from disease,

drought or traffic, the rates may be increased up to no more than double. One or two applications may be substituted with 2 to 3 lbs. per 1,000 square feet of Lesco 12-12-12, alternated with Lesco 15-0-15 or similar products to provide extra Potassium. But remember that Seashore Paspalum has a tendency to become thatchy and puffy with excess Nitrogen applications. Total N applications per year should not exceed 2 lbs. of N per 1,000 square feet for home lawns.

Seashore Paspalum in home lawns will respond to minor element fertilizer applications under some conditions but these applications are usually not necessary. However, in very high rainfall areas or when irrigating with potable water, Seashore Paspalum may respond to Sodium or Chlorine applications. Applications of soluble Iron will normally enhance the green color of Seashore Paspalum without the negative effects of extra growth caused by excess Nitrogen applications.

TIP: Paspalum generally takes less Nitrogen, less fertilizer than Bermudagrass.

MOWING

Mower Type

Ideally, it is recommended that Seashore Paspalum be mowed with a reel mower. However, said Stewart Bennett, “If your rotary motor will go low enough, that’s fine. You’ve got to keep the blade sharp regardless if it’s a rotary or reel.”

Heights of Cut

SeaDwarf™ Seashore Paspalum, the only dwarf Seashore Paspalum on the market, can be used tee to green, which means that the turf can tolerate a variety of mowing heights.

On fairways and tees, Stewart Bennett said SeaDwarf™ mowed

at “about 1/2-inch would perform well.” Greens, he said, can be mowed down to 1/8th-of-an-inch.

It is suggested that SeaDwarf™ Seashore Paspalum roughs can be mowed from 1-1/2-inch up to about four inches. Other varieties of Seashore Paspalum can be mowed at significantly higher heights of cut. For SeaDwarf™ roughs mowed at four inches, “the ball will sit up and the turf will look tufted,” Bennett said.

At Crown Colony, Tim Daniel mows his SeaIsle-1 roughs at 1.3-inches. He said he lets his roughs get as high as 1.5-inches in the summer. Daniel said he prefers lower roughs because of the special characteristics of Seashore Paspalum.

“The lower you mow it, the denser the turf is, the less weeds you’re going to have naturally,” Daniel said. “The reason I did experiment with growing it higher is there are golf members that would like us to let the roughs grow up a little higher because it will stop their golf balls from rolling off the fairways into the lakes. But I don’t think long-term that’s something I want to do. I think its important to keep your heights under 1.5, preferably down closer to an inch. Even in a homeowner situation I think lower heights are more desirable.”

Bennett added, “If you get SeaDwarf™ up to three inches it will get open and spindly, and then you’ve got a place for sunlight to get down to the soil and germinate weeds. And the higher Paspalum is cut the longer the internodes get. When you start to mow it down it gets denser and tighter and closer and it has a tight knit turf so you can’t get weed seeds germinating and you just get a better appearance. As you mow it closer, the internodes get shorter. The best defense against weeds is healthy turf.”

For home lawns grassed with Seashore Paspalum, Dr. Laurie Trenholm of the University of Florida, suggests a mowing height of 2-inches. However, some research shows that a height of cut at about 1.5-inches for home lawns is “ideal.”

“Remember that mowing height and fertility interact to influence stress tolerance of Seashore Paspalum,” Dr. Trenholm said. “More fertility means more mowing and more potential for scalping ... lower mowing heights mean more frequent mowing is better. You don’t want to remove too much tissue at any mowing event.”

TIP: Heights of cut vary according to use and variety.

Mowing Schedule

As with many golf courses, Seashore Paspalum greens should be mowed daily. Fairways and tees should be mowed two-to-three days a week. Roughs can be mowed once a week, perhaps every other week, depending on the growth rate and height of cut desired. Tim Daniel said he mows his roughs once a week, sometimes twice a week, to avoid scalping issues, especially in wet summer months. (See Scalping for more information.)

Todd Lowe of the USGA Greens Section also suggests verticutting 2 to 4 times per year, depending on the traffic on fairways and tees. Verticutting on greens can be as often as monthly to biweekly to maintain turf.

Residential lawns using Seashore Paspalum should also be mowed at least once each week, being careful not to take more than 1/3 of the plant material off at a time. If in a wet season, (such as Florida’s summer rainy season), it may be necessary to mow the grass more than once a week to avoid scalping. However, growth may be slowed with a reduction of fertilizer or applications of growth regulators, which may help avoid scalping issues. (See Scalping for more information.)

GREEN SPEED

SeaDwarf™ Seashore Paspalum greens may achieve

tournament speeds with attentive grooming.

Two months before opening Hammock Bay Golf & Country Club near Marco Island, Florida, Superintendent Rodney Whisman said his greens were already rolling an 8 on the stimp meter. “I can’t see why they can’t be rolling a 10” on a daily basis, Whisman said.

Tim Daniel also has SeaDwarf™ on his greens. He said tournament speed conditions can be achieved on SeaDwarf™ greens.

“I feel that if you were to set a Bermuda TifEagle green next to a SeaDwarf™ green and you were mowing them with the same mower, same mowing frequency, same height, I think probably the TifEagle probably will roll a little bit faster on a normal basis. But what does speed really mean? What is too slow? Right now I’m rolling about a 9.5 right now. I think that’s enough,” Daniel said. “For an event, they like to get it up to an 11 if they can. On day in and day out conditions, I don’t think that could be achieved. However, between the use of growth regulators and rolling your greens, I think it can be achieved for events, which is important. It’s less important having them roll an 11 day in and day out. To slow the growth rate on it, Primo will help. It also helps tighten it up and make it a little denser too. It could be done.”

On opening day at Hammock Bay, the green speed was documented at 10.5 on the stimp meter.

Aloha™ Seashore Paspalum, which is also suggested for use on golf course greens, will most likely roll slightly slower than SeaDwarf™ greens because of the width of the leaf blade. But for the average golfer, the consensus is that the difference would be negligible.

COLOR

Perhaps one of the strongest benefits of a Seashore Paspalum golf course, sports field or lawn is the color that the grass provides.

“The overall visual look of the grass, there is no comparison,” said Tim Daniel. “I’ve been with it for two years now so I’m a little bit spoiled. If I go play a Bermuda golf course... the turfgrass is visually night and day, it looks better than Bermuda esthetically in density and consistency I would say. I think Bermuda is a little intolerant to certain conditions. The Paspalum is a little bit more able to withstand diverse soil situations. The color, I mean color! As far as playability, the golfers that come through here will tell you that they just can’t get a bad lie out there. It is superior.”

Golf course designer Jim Hardy, and his partner PGA Tour Player Peter Jacobsen, who have used Seashore Paspalum on courses in Texas and Florida, echoed Tim Daniel’s sentiments.

“The color is fantastic,” Hardy said.

Jacobsen added, “It really pops.”

So how do you maintain that color year-round?

“We have our darkest color in the fall and spring naturally,” Daniel said. “During winter, however, we maintain very good color ... superior when compared to Bermuda. Liquid iron is very beneficial during winter months.”

Stewart Bennett suggested: “Possibly granular iron and/or liquid for good color without the growth, Nitrogen gives growth and color. The nice thing about iron is it gives great color and doesn’t increase the growth.”

And unlike Bermudagrass, there should be no need to overseed Seashore Paspalum to keep it looking good.

“I do see that in the springtime that when the Bermuda has been beaten back by winter traffic, the Paspalum appeared to be healthy and upright and looked really good,” said Dr. Lee Berndt. “You do not need to overseed the SeaDwarf™. I think it’s a huge benefit for golf courses. If they can avoid overseeding, there’s a money issue that they’re saving money, there’s time to do the overseeding which is a couple of weeks and that slows up play, and there’s time for the

transition which is a month after the season and that hurts the Bermudagrass ... I don't see anybody doing that on Seashore Paspalum, mainly because it's going to hold its winter color very well."

TIP: Iron for color. Overseeding not necessary.

SHADE TOLERANCE

Paspalums in general are more shade tolerant than Bermudagrass but the level of shade tolerance varies slightly between cultivars, said Stewart Bennett. However, Paspalums in general are not as shade tolerant as Zoysia.

"I've read a few articles claiming that it's not shade tolerant, but I have some cultivars of Paspalum that I have found to be shade tolerant, so it's cultivar dependent," Bennett said. "It's not for a shady course, necessarily, but if you have a few palm trees, it's not a big deal. If you have a big oak tree, you shouldn't plant grass underneath in a heavy shaded area—any grass. Moderate shade is no problem. Heavy dense shade is a problem for any grass. Paspalum has a good tolerance to low level light intensities. If it gets four hours of really bright sun or 10 hours of cloudy weather, it's the same thing to Paspalum."

PART FIVE:

Suggestions for preventative maintenance of Seashore Paspalum

HERBICIDES

One of the many benefits of Seashore Paspalum is that its tight knit tends to keep out weeds. Using a grass like SeaDwarf™ will all-but eliminate any encroachment worries. However, if you do have a problem, some of the following suggestions may be helpful. Remember to use herbicides labeled for Seashore Paspalum.

According to Stewart T. Bennett, there are three weed species that are a problem in all grasses, Paspalum included. They are the sedges, broadleaves and the grasses.

Sedges

In Paspalum, Bennett said Sedges are easily controlled with sedge herbicides like MANAGE and BASAGRAN.

Broadleaf Weeds

Bennett said Broadleaf Weeds are easily controlled with herbicides labeled for broadleaf weeds.

Daniel added some personal experience:

“I have general weeds out there, dollar weed, sedges, torpedo grass but broadleaf control is pretty painless,” Daniel said. “You can spray the 2,4-D on the broadleaf, Quicksilver brand or Speed Zone by Gordon, it’s got carfentrazone as the active ingredient in Quicksilver. The Speed Zone product is much like your three-way blends where you’ve got various products mixed together for more broad control. Speed Zone Southern (formerly known as Green Label) works very well on Seashore Paspalum. It is labeled for Seashore Paspalum. That is one to hang your hat on, the Speed

Zone for the Paspalum. You can't use the Red Label of Speed Zone for Paspalum. But the Speed Zone Southern (Green Label) works very well."

However, Daniel added, "Because of the hotter Ester formulation of 2,4-D in Speed Zone, it is safer to use during cooler weather. During summer, we abandon Speed Zone and use a safer Amine formulation of 2,4-D."

Bennett offered a little insight into reading broadleaf herbicide labels for Paspalum.

"At this point I wouldn't rely on looking for labels that list Paspalum. There's probably two or three labels that are labeled for Paspalum. For right now we really need to look at the weed we're trying to kill. Most herbicides for Sedges and Broadleaves in general are safe for Paspalum. So if we have a sedge in Paspalum, we can kill it. If we have a broadleaf in Paspalum, we can kill it. Look for a label that says this will kill broadleaf weeds," Bennett said.

If you're still not sure when looking at labels that don't list Paspalum, consider this: Anything that's labeled for Bahiagrass, (*Paspalum notatum*, which is the same genus but different species from *Paspalum vaginatum*), should be okay for Paspalum.

Grassy Weeds, Overview

"The grassy weeds is where we start to get in trouble," Bennett said. "Paspalum is in the Poaceae family just like crabgrass, goosegrass and signal grass weeds. They are all classified in the grass family. Now Bermudagrass is in the grass family, too, but there are so many acres and such a call for chemicals to kill grassy weeds in Bermudagrass that chemical companies don't mind spending millions of dollars to develop a herbicide to kill it. Ten years from now that will change. When we start trying to separate specific grasses out of grass species it's a lot more complex. We don't have too many herbicides to kill grassy weeds in Paspalum."

Daniel and Whisman had some suggestions.

Goosegrass

“We’re trying different things for Goosegrass,” said Rodney Whisman, superintendent at Hammock Bay Golf & Country Club near Marco Island, Florida. “We’re actually hand pulling them now. Once you pull them out, when the Paspalum grows back in, the goosegrass doesn’t come back. So a weak strand of turf is where we would get it.”

Crabgrass/Torpedo Grass

“We’re doing a lot of trials from salt water to DRIVE on the crabgrass,” Whisman said. “But the crabgrass and goosegrass is a minor problem.”

Tim Daniel added, “Another product that works very good for various grassy weeds, torpedo grass and crab grass, is DRIVE. DRIVE works very well.”

Other Grassy Weeds

“I have a couple of grassy weeds,” Daniel said, “like crowfoot grass, and I’ve not found anything to take that out without injuring the Paspalum. I have experimented with Revolver, it’s a new product. I can significantly injure the crowfoot grass but I’ll discolor the Paspalum to a degree.”

Common Bermuda

“The biggest thing we’re trying to figure out right now is how we’re going to get rid of the Bermuda. We’ve got a little contamination here and there,” Whisman said. “We fumigated out here, but we do have some Bermuda. We’re trying to figure out how to eradicate the Bermuda without hurting the Paspalum. Now, we’ve used TUPERSSAN, which is something another

superintendent up north recommended. We've tried PROGRASS. We've tried combinations of them. The jury's still out. We've begun SALT WATER trials. The jury is still out on that one, too."

"But the Common, it's not that bad at all," Whisman said. "You don't see it except in the morning. The Bermuda, because the leaves have hairs on them, it holds the dew. Paspalum doesn't hold dew. So if you go out there in the morning and you see a little patch, you know it's Bermuda. It doesn't effect anything but visual first thing in the morning."

During grow-in, Daniel said he did not see many weeds as he put a preplant fertilizer in with Ronstar. But he did not fumigate. Perhaps, as a result, he has also seen some Common.

"We're spraying a little Round-Up and ripping it out. We're also experimenting," Daniel said. "We're spraying Prograss, experimenting with Tuperissan. Not the two together. Spraying in experiments. Tuperissan is a wettable powder. Prograss is a liquid. We don't think we can kill the Common but we think we can substantially injure and suppress the Common. It's early to say with Tuperissan. I'm comfortable spraying the Prograss with the Paspalum, within the label rates it will not injure the Paspalum. I'm thinking it's about six ounces per thousand with the Prograss. It does a reasonable job in suppressing the Bermuda."

LIST OF SAFE & PHYTOTOXIC HERBICIDES

Source: Todd Lowe, USGA Green Section

SAFE HERBICIDES FOR SEASHORE PASPALUM

Preemergence

bensulide	Betasan
pronamide	Kerb
benefin	Balan
DCPA	Dacthal
pendimethalin	Pre-M
oxidiazon	Ronstar Granular

do not use Ronstar WP

Postemergence

quinclorac	Drive
MCPP + 2,4-D + dicamba	Trimec Southern
dithiopyr	*Dimension
2,4-D = dicamba = dicloprop	Super Trimec
dicamba	Vanquish
halosulfuron	Manage
mecoprop	Mecomee
bentazon	Basagran
** ethofumesate	Prograss

*Use only three to four months after establishment

**Careful as to rate of application, temperature and/or turf maturity.

PHYTOTOXIC OR “UNSAFE” HERBICIDES FOR SEASHORE PASPALUM

Preemergence

oxidiazon	Ronstar WP*
oryzalin	Surflan As
diclofop	Illoxan EC

*Although Ronstar Granular is OK.

Postemergence

asulam	Asulox SL
atrazine	Aatrex WP
metribuzin	Sencor DF
MSMA, DSMA	Daconate
6SL/Bueno 6SL	
sethoxydim	Vantage EC
simazine	Princep
WP/Wynstar DF	
imazaquin	Image SL/Scepter
2,4-D + 2,4-DP + dicamba	Trimec ester
2,4-D + MCPP + dicamba + MSMA	Trimec Plus SL
2,4-D + mecoprop + dicamba	Trimec Classic SL
2,4-D + triclopyr	Turflon ester EC
triclopyr + clopyralid	Confront SL
fenoxaprop	Acclaim EC
diclofop-methyl	Illoxan EC

TIP: Most herbicides labeled for Bahiagrass are safe for Paspalum as they are the same genus.

Salt As Herbicide

“Use table salt, not rock salt,” Bennett said.

Why?

“I’ve done a little bit of research on that. I’ve found all that it does is slightly increase the salinity of the soil. Goose grass, crabgrass, signal grass are a little bit salt tolerant too and if you get rain that salt is just going to flush out.”

He offered a little trick of his own as how to best apply the salt:

“I’ve used a spray bottle and it’s the middle of the day and the plant leaves are dry. Squirt the weed with the spray bottle (full of water) to dampen it so that the salt will stick to it. You do it by hand,” Bennett said.

Or, he said, “in the morning if you have dew on the plants you could go out with a larger spreader and apply the salt. The dew will stick to Bermudagrass and grassy weeds but it won’t stick to Paspalum because the Paspalum leaves are so waxy. The reason you need the dew is so that the salt sticks to the weed leaf. Spot treat or put it in a fertilizer spreader as long as you have a lot of dew on the grass, or with a spray bottle to dampen the leaf blade. Put the salt crystal on that leaf blade and that leaf blade has to suck that in. It kills it pretty quick, in 24 hours. It may not completely kill it but will really set it back, depending on the weed. Do it until the weeds are dead.”

Bennett has also applied salt using a high brine solution with good results.

“At Alden Pines, I have a brine well at the pump house which is 45,000 ppm, or 1.5 times the level of seawater,” Bennett said. “I have a designated spray rig that I load with brine, drive across my weed areas, and spray that very salty water out there. In the middle of the day with that sunshine, it cooks them.”

He said he’s not worried about salt water intrusion as these applications are so small and infrequent.

“I may be putting out 150 gallons of very salty water over an acre or two, four or five times a year,” Bennett said. “That is entirely different than applying (that on a constant basis for irrigation.) The use of that is a weed killing treatment. We’re not using that to irrigate the soils and sustain plant life.”

Daniel has also used salt as an herbicide with some success.

“Table salt, fine salt that is the consistency of sand, it does not go out through a spreader very easily. I have thrown salt handfuls on weeds, grasses, crabgrass. We can fry crabgrass and other weeds, burn them right up,” Daniel said.

“Finding the right balance there is key,” he said. “We can injure the Paspalum as well. One thing with the salt is, the more salt in the soil the slower it grows, you’re going to reduce the recoverability of the Paspalum as well once you introduce salt or sodium into the soil. But I haven’t done it much because it wasn’t very practical ... Now, if I had a lawn that was 3,000 square feet, it would be worth going out there with a salt shaker. But with a 100 acre golf course, it’s not very practical.”

TIP: Salt can be used as a herbicide.

INSECTICIDES

Although Seashore Paspalum is fairly insect tolerant, some insects do attack it. Perhaps the biggest insect to watch for is the sod web worm.

Sod Web Worms

“In sod web worms, monitoring is extremely important,” Bennett said. “One needs to know the life cycle of a sod web worm. They are the least damaging and easiest killed in the very small larval state, as in a couple, three days old. Monitoring is very important for all pests, especially insects and disease ... if I see

birds on the putting green, I go out on my hands and knees and look. I do a soap flush. If I see birds on the putting green and don't do anything about it, three days later that green is eaten."

Daniel has also faced down web worms.

"Watch the worms. I can't overemphasize the worms. They will literally in a couple of nights do significant damage," Daniel said. "The birds are a good indicator. If you start seeing birds in your turf, they're there for a reason. I'll say this to anybody, if you see birds feeding in your turf, they're not there looking for food, they're there eating food. So that's a good indication that within the next week after you're seeing birds, you should really pay attention and be prepared to treat, for insects, or treat for worms. I'm not saying treat at the first sign of birds feeding in your lawn, but I'm suggesting be prepared to treat. Because literally in a few nights, where you get several days of rain, they'll get you in a hurry and do significant damage."

To clarify this point, Daniel said, "if you have a two-three day rainy period, therefore restricting your ability to treat when needed, you can have substantial turf loss before the weather clears."

How to treat web worms?

Daniel said: "I'm using the basics, Orthene, Dursban and Dipel which is a biological. But you can use any of the products out there that are available."

For sod web worms and cut worms Daniel is particularly happy with Dipel.

"As a biological control, they ingest it," Daniel said. "You spray it on the grass blade plant. The worm comes along and eats it and there's some chemical reactions. It forms a toxin in their stomach and kills them from within. I've been pleased the first few times I've sprayed it. It worked as well as Orthene and Dursban, and it's very comparable in cost. Dursban I can spray at \$20 to the acre, and Dipel is \$20 to the acre. So they're very comparable in

price. Usually a biological will be cost prohibitive but it's not."

Bennett added, "There are many good chemical controls for sod web worms. Sod web worms tend to like young grass, freshly planted sod and sprigs. Personally, I use Orthene. I like to use Orthene whenever I can, whenever it's applicable, because it has a very quick degradation. It is very environmentally-friendly. It's one of the more safer insecticides that we can use. Very low rates of Orthene will kill sod web worms. The law is the label."

Whisman also has killed his share of worms.

"I spray Acephate for the worms," Whisman said. "It's working wonderfully. I go about three pounds to the acre and it takes care of them."

Hunting Bill Bugs

"There are several good chemical controls on the market. See the label. You can use the same chemical for hunting bill bugs on Paspalum as you would on Bermuda," Bennett said.

Mole Crickets

"Mole crickets come up towards the full moon, so spray at midnight when they're up to the surface," Bennett said. "There are many pesticides labeled. Know the life cycle of the mole cricket."

Whisman also recommends treating for mole crickets at the full moon.

"With full moon they get more active," Whisman said. "We spray with Acephate or Liquid Talstar, which worked fairly well. Then we applied Dursban bait at a rate of 1.2 lbs. per thousand. In addition, we applied Top Choice at a rate of 2 lbs. per thousand. The Top Choice remains available longer on the turfgrass. It seemed like the combination of the two worked best."

"I actually treated this year for the first time for mole crickets on a small scale spot spraying, just the high activity areas where

they laid eggs,” Daniel said. “I use the same products as for Bermuda, spot spraying with things like Talstar, Orthene. I use far more baits as the mole crickets mature.”

Aphids

The University of Florida is currently conducting a study on aphid damage in Seashore Paspalum. Preliminary research found the following chemicals to be effective: Scimitar, Orthene, Merit and most synthetic pyrethroids. Soaps were also found to be somewhat successful with multiple applications.

FUNGICIDES

Fungus is not usually a problem with healthy Seashore Paspalum. However, here are a few ideas in case you experience some fungus challenges:

Dollar Spot

“I’ve had a very few instances of Dollar Spot due to a lack of Nitrogen,” Bennett said. “My Nitrogen rates are low which induces Dollar Spot. It’s not really low for Paspalum. It can be easily cured with a liquid application of Nitrogen at a very low rate. If they’re at 4-6 pounds of N per thousand per year, they shouldn’t have a problem with Dollar Spot. If they get below that, it may.”

Brown Patch

Whisman said he has used Chipco 26GT for Brown Patch.

Bennett added that there are “many fungicides available on the market. Just like insects, though, if things are maintained well, if thatch levels are kept to a minimum and you’re well aerified and your turf is healthy with proper levels of nutrients, you shouldn’t be getting diseases. Paspalum is a lot more disease resistant than any other grass I’ve ever seen. Over fertilization is bad and will promote

disease. It's going to grow so fast and disease is going to love it and the sod web worms are going to increase."

THATCH

As with most turfgrasses, *Paspalum* needs to be maintained and monitored to avoid thatch buildup. Thatch can generally be avoided with a consistent regimen of aeration and verticutting.

"I'm not worried about thatch," Daniel said. "We're managing it, monitoring. If I see indications that I've got bad health, then I'll pull the trigger. Generally speaking I'm trying to remove 15 percent of the surface over the course of the summer."

Daniel suggests the following:

"You should probably take measures to turn over the soil. Core aeration and dethatching it is certainly beneficial."

On his course he's aerifying fairways twice a year and greens four times a year.

"We aerified three times with the 1/4-inch hollow tines two inches deep. We removed 2-1/2 percent each of those three times," Daniel said. "And then in September we did 1/2-inch hollow tine and removed 6.5 percent. That may not be my next year's schedule. I'm going to look at the data, pull samples this fall, see how we influenced the organic content on the greens and base next year's management on those."

Testing is one way to monitor thatch levels.

"We tested for organic matter," Daniel said, "and one of our greens where we had the highest content of organic matter in that top inch we had probably 2-1/2 percent organic matter. I think 3 percent or under is what I want ... I'm monitoring the soil physical analysis, monitoring organic content to see how much is there. I'm also looking for water infiltration rates. That gives me a good indication of the air exchange, how much oxygen we can get down into the soil, down into the root zone. Right now there have been no

guidelines established.”

Bennett added some thoughts on thatch.

“Compared to other grasses, I think Paspalum produces a lot less thatch than the Bermuda ultra dwarfs. It does produce thatch like all other stoloniferous grasses but not at excessive rates. But again, it depends on the correct fertility and maintenance programs,” Bennett said.

To keep back thatch, Bennett said, it’s important to not have an excessive use of fertilizer, and especially Nitrogen.

“Nitrogen is the biggest producer of thatch,” Bennett said. “Stay within 4-6 pounds per 1,000 sq. ft. per year.”

Verticutting can help reduce thatch, he said.

“If you’re in the 4-6 pound range and you have general soil conditions and let’s say freshwater, you can probably get away with verticutting or vertical mowing 4-6 times per year during the growing season. Tim Daniel verticuts about that but he uses turf groomers an awful lot, too,” Bennett said. “Turf groomers are like miniature verticutters. Verticutters are vertical knives that go through and slice the stolons and take out some of the thatch layering there. Turf groomers are on the greens mower. Behind the front roller there’s a little miniature verticutter. It doesn’t go down like verticutters do but it just tickles. It manicures the turf. If somebody uses those turf groomers once or twice a week, you can really cut back on your verticutting. The superintendents need to know that they need to tweak their programs to their own site. Turf groomers are very beneficial on SeaDwarf™ for weekly manicuring.” (Turf groomers should be available on most greens mowers.)

Aerification also reduces thatch.

“A good aerification program, both of core aerifications where a hollow long slender tube pulls a core out and throws it on top, and solid tine where it just punches a hole and doesn’t pull a core out”

are beneficial. Bennett said, “You’re creating areas for air, water, nutrients to get in. Aerification also helps in your thatch because you’re bringing soil up to the surface and you’ll topdress it in usually. Aerification helps control thatch.”

How often?

“With SeaDwarf™ you aerify the same amount of times as other greens grade grasses,” Bennett. “Approximately two times a year, depending on the site, how much play the golf course gets, the type of water they have. The higher traffic you have, the more compaction, the more you need to aerify, but no more than under the same conditions for a Bermuda green.”

One note on topdressing after aerification from Stewart Bennett:

“The rule of thumb is to use a topdress that closely matches your parent soil material. For a green you should topdress with the same material that the green was constructed of. Use the same greens mix.”

When core or punch hole aerification would disturb play, hydrojecting may be another method of combatting thatch.

Dr. Lee Berndt explains hydrojecting as “soil cultivation by water. It injects water into the green.”

He said he would not hydroject to flush the soil, “but I think using a hydroject, which is a method of aerifying your soil, is a very, very beneficial practice for the SeaDwarf™, same as any other grasses. It provides relief from compaction and the accumulation of organic matter in void spaces. Hydroject (in conjunction with aerification), is a member-friendly practice. It’s not disruptive. You go through and you do it and you don’t see it an hour later and there’s no tie up of golf traffic or anything like that. Whereas, if you do a core aerification you’re punching holes in greens and golfers don’t like that. It’s dirty and member unfriendly. You need to stick to the tried and true cultural practices and core aerification is

certainly one of them. Hydroject is less disruptive and nobody will know you're doing it. Hydroject in (busy season), aerify in (the off season). I'm thinking every couple, three weeks through the season, especially on the perimeters where you get a lot of wear and tear."

Whisman said superintendents who are used to maintaining Bermudagrass should be especially aware that you can't combat thatch on Paspalum the way you might on Bermuda. For example, Whisman said, "you can't take the heights down and circle cut Paspalum as you might Bermuda because Paspalum doesn't recover as well from scalping. We find that a regular verticutting program combined with low N and plant growth regulators will help us to control thatch."

TIP: Verticutting, aerification and hydroject are tools to combat thatch.

SCALPING

It has been suggested that in climates with wet summer seasons, some Seashore Paspalum golf courses and residential lawns could require more frequent mowing than once a week. In these climates, it is important to monitor the growth of the turfgrass in order to avoid scalping or taking off too much of the leaf blade while mowing. Scalping is evidenced by no green foliage on top and a brown stem.

"If the grass grows faster and you're cutting more than one-third of the leaf blade off, you will have damage," Stewart Bennett said. "Paspalum hates to be scalped. Its recuperation from a scalping is a lot slower than other grass."

However, Bennett said scalping is avoidable.

"The cause of scalping would be: not frequent enough mowing; overuse of fertilizer especially N; too much thatch or not enough verticutting. I'm afraid Paspalum home yards are going to need

some verticutting once or twice a year. In summer (during rainy season) you may need a lawn company to come more than once a week.”

Daniel said he doesn’t see scalping as a major problem with Seashore Paspalum.

“Generally it’s only a problem here in areas where we do encounter unusually high growth, for example, low areas without drains where water accumulates. The water may pool, accumulate and take more nutrients down in those areas and that pushes a little extra top growth,” Daniel said. “Those areas tend to get scarring or scalping when we have it. Even mowing weekly we still get a little bit of that. That’s why I say it’s really important to manage your fertility.”

If scalping occurs, Daniel said, “I go back in and throw a little extra (fertility) to try to encourage a little extra top growth. In a scalped area, throw a little extra N, with 1/4 pound of Nitrogen per 1,000 sq. ft. to try to recover. Temperature may effect recovery time, warmer will help it to grow faster. Ideally you don’t want to be in that situation in the fall. Do not scalp it in the fall. It’s not as much an issue around here, (in Fort Myers, Florida), but definitely an issue further north.”

Frequent mowing may be the best defense against scalping.

“What I’ve noticed is, if I mow it continuously I’ll always see new shoots coming up when I pull the turf back, to sustain itself,” Daniel said. “Once I get the heights real high I’ll notice an absence of new shoots coming up. I think mowing heights is a big issue with SeaIsle1, I don’t know about the SeaDwarf™ because I only have it on the greens.”

DIVOT REPAIR

While scalping may be an issue, divot repair is not.

“Seashore Paspalum regenerates faster from a divot” than other grasses, Daniel said. “From a divot it will regenerate quick from a rhizome, which is like an underground stolon.”

PART SIX: Summary

While there is no “perfect grass,” Seashore Paspalum provides a versatility, utility and beauty not common to other turfgrasses. With correct care, it can be an excellent addition or solution to many turfgrass situations.

SeaDwarf™ Seashore Paspalum and Aloha™ Seashore Paspalum are grown by a select network of superior sod growers who are all members of the SeaDwarf™ and Aloha™ Seashore Paspalum Licensed Grower Associations, organizations dedicated to the purity and quality of these distinctive turfgrasses.

SeaDwarf™ Seashore Paspalum and Aloha™ Seashore Paspalum are marketed internationally by Environmental Turf, a premier name in the turfgrass business.

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GLOSSARY OF TERMS:

Aerification: A method of relieving compaction, especially on a golf green, whereas holes are punched into the soil to let in air and relieve pressure in the soil. Core aerification pulls out small amounts of soil with each hole punched.

Aphids: An insect also known as a greenbug that feeds on and causes damage to turfgrass.

Brown Patch: A fungus that attacks turfgrass and creates circular patterns of dead grass.

Cultivar: A CULTIVated VARIety. It is a form of a turfgrass plant that has been identified as special or superior and purposely selected for propagation and production.

Divot repair: On a golf course, when a golfer takes a divot he takes out a chunk of turfgrass and soil with his stroke, usually in the fairway. Golf course superintendents are often concerned with repairing these divots, or scars, left by golfers.

Drought Tolerance: A plant that uses less water than traditional plants and can go for some time without irrigation.

Dollar Spot: A disease of turfgrass caused by a fungus. On fine textured and close-cut turf, the disease appears as round, brown to straw-colored and somewhat sunken

spots approximately the size of a silver dollar.

Established: The point at which newly planted turfgrass begins to produce new growth as an indication that the roots have recovered from transplant shock and have begun to grow and spread.

Fertilization: The act of applying a product, such as an organic material like manure, to promote plant growth.

Flushing: Applying water to a golf green in quantities that will push salts or other particulate matter through the green and out.

Fungicides: A chemical product used to kill fungus.

Green Speed: A measurement of how fast a golf ball will roll across a golf green.

Grow-in: The process of installing and nurturing turfgrass to maturity.

Herbicides: A product, either a chemical, or in the case of Seashore Paspalum it could be salt, used to kill weeds in turfgrass.

Hunting Bill Bugs: A species of insect that kills turfgrass.

Hydroject: A machine that provides high velocity water injection into a golf green to improve percolation and gas exchange and to relieve compaction. It is a form of

aerification that does not require punching holes in the golf green surface.

Insecticides: A chemical or biological agent used to kill insects.

Installation: The act of preparing the soil and introducing turfgrass to a property.

Maintenance: The act of taking care of something as in irrigating, fertilizing and mowing, in this case, turfgrass.

Metermatic: A method of topdressing with a heavier than typical layer of sand. It uses a drop method versus a spinner.

Mole Crickets: A burrowing insect that attacks turfgrass.

Mowing: The act of trimming turfgrass at a specific height.

pH: A measurement of the relative acidity (low pH) or alkalinity (high pH) of soil or water based on a scale of 1 to 14, with 7 being neutral. Individual plants have a pH range in which they grow best.

Rhizome: A stem structure that lies horizontally in the soil with roots emerging from its lower surface.

Scalping: Damage caused when turfgrass is cut too low removing all of the leaves. When this occurs, the turf

usually turns brown and takes quite a while to recover.

Sod Web Worms: Sod web worms are the larval or caterpillar stage of a small, tan moth often seen flying over turfgrass in early evening from May through mid-summer. Sod web worms feed on the grass blades just above the soil line. The feeding defoliates the lawn where the sod web worms chew off the grass.

Stolon: A jointed, above-ground, creeping stem that can produce roots and shoots at each node.

Thatch: An accumulation of dead and living plant material (stems, roots, and shoots) that develops between the soil surface and the green leaves of the turf.

Turf Groomer: A lawn mower with an attachment that gently cuts lateral grass runners just below the surface. This vertical cutting technology is said to promote new growth, remove thatch and open the soil to provide better pathways for water, oxygen and nutrients.

Verticutter: A piece of equipment that makes deep, vertical cuts into the thatch layer.

Water Quality: A measurement of the cleanliness, salt levels, and purity of water used for irrigation.



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