

Progress in warm season turf management

by Wendy Gelernter, Ph.D. and Larry J. Stowell, Ph.D.

Bottom line: Expectations for high performance fairways are always increasing – a trend that has triggered the development of new turf varieties and management practices. Two years ago, we initiated a long-term study to determine which practices best promote consistently performing, high quality fairway turf, and we reported our preliminary observations to you last December. In this issue of *PACE Insights*, our findings are updated and expanded to include the influence of water quality, turf variety, renovation procedures, overseeding practices, drought, disease incidence and herbicide sensitivity on warm season turf quality.

Factors that influence turf quality

1) Water quality: The effect of three different types of irrigation water (good, medium and poor quality) on turf quality was evaluated. The characteristics of these water types are detailed in Table 1.

Table 1. Water sources used. The medium quality water used in this experiment was created by irrigating plots with equal volumes of the poor and good quality water detailed in Table 1. EC = electrical conductivity, measured in decisiemens/meter; SAR = sodium absorption ratio. The symbol "<" means "less than".

WATER SOURCE

	WELL (poor quality)	DOMESTIC (good quality)	Desired values
EC	2.97 dS/m	0.84 dS/m	< 1.2
SAR _{adj}	10.09	3.72	< 11
Boron	0.9 ppm	0.15 ppm	< 0.5

2) Turf variety: 3 warm season varieties were tested:

- Excalibur seashore paspalum (an older, unimproved variety with coarse leaves and an open growth habit)
- Sea Isle I paspalum (a new, improved variety developed by Dr. Ron Duncan, Univ. Georgia)
- Tifway II bermudagrass (one of the most commonly used warm season fairway turfs)

3) Renovation procedure: Prior to overseeding, three different renovation procedures were conducted on each of the warm season turf varieties:

- Light (2 passes w/McClane mower)
- Heavy (Ryan Ren-O-Thin + scalping with McClane)
- No renovation procedure

4) overseeding: plots were either overseeded with 400 lbs/A "PhD" perennial ryegrass or were not overseeded.

5) other factors monitored: Effect of soil moisture on turf quality, susceptibility of different varieties to disease, herbicide sensitivity

NOTES:

1. The results below were generated in the coastal Southern California climate of Fairbanks Ranch CC, but can serve as a general guideline for most other regions with warm season fairways. However, your specific climate will influence how broadly applicable this data is in your location.
2. In the graphs below, turf quality readings are represented as numbers ranging from 0-750. These are readings taken with the Spectrum Field Scout

chlorophyll meter, which measures the intensity of the color green. A higher meter reading is indicative of higher quality turf.

Performance of warm season turf varieties

Bottom line: Tifway II bermudagrass and Sea Isle I paspalum were vastly superior in all respects to the non-improved variety, Excalibur paspalum. When Sea Isle I and Tifway II were compared, the Sea Isle paspalum outperformed Tifway II bermudagrass in visual appearance, especially during the summer months (Figures 2, 5). However, the Sea Isle established more slowly (especially when irrigated with poor quality water; Figure 3), had somewhat increased sensitivity to diseases such as brown patch (Figure 4), and had poorer winter color retention than Tifway II bermudagrass (Figure 1) in the coastal, low-light environment in which we tested it (different color retention results have been reported from other warmer, higher light intensity locations). Overall, Tifway II appears to be a more robust and easier-to-manage turf, but Sea Isle I is more attractive in appearance.

Figure 1. Winter color retention. During the winter, Sea Isle paspalum lost color more rapidly than Tifway II bermudagrass (top photo), and was also slower to regain its color in the early spring (bottom photo).

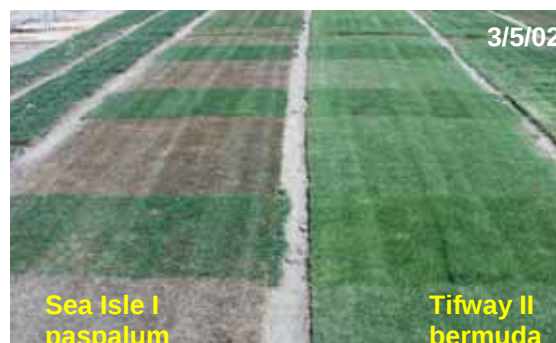
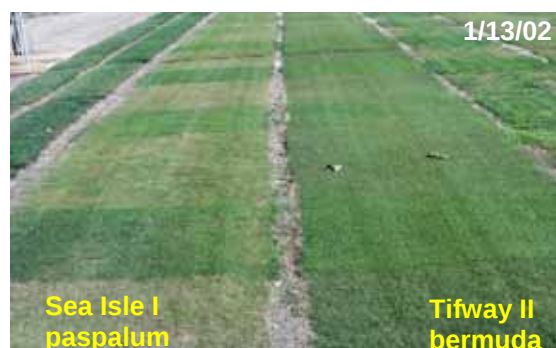


Figure 2. Overall, Sea Isle I paspalum outperformed Tifway II bermudagrass in terms of visual appearance, especially during the spring and summer months. (The darker green, horizontal strips of turf below are areas that were overseeded with perennial ryegrass as part of the overseeding evaluation described below).



Figure 3. Turf establishment. On March 8, 2001 (6 months after sprigging), both Tifway II and Sea Isle had only sparse cover in the plots irrigated with poor quality water. However, the Sea Isle I paspalum was more severely affected by poor quality water, and took 3 months longer than the Tifway II bermudagrass to achieve full cover.

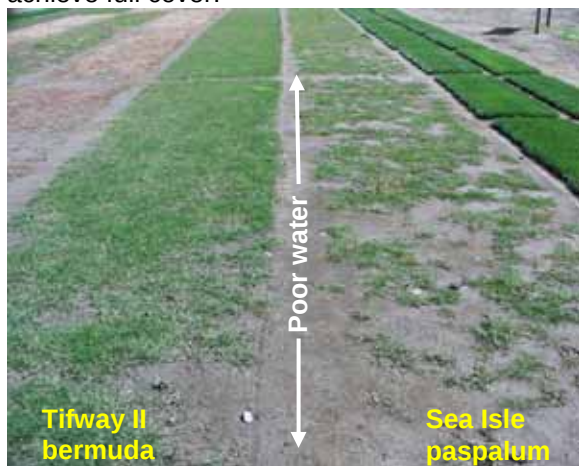
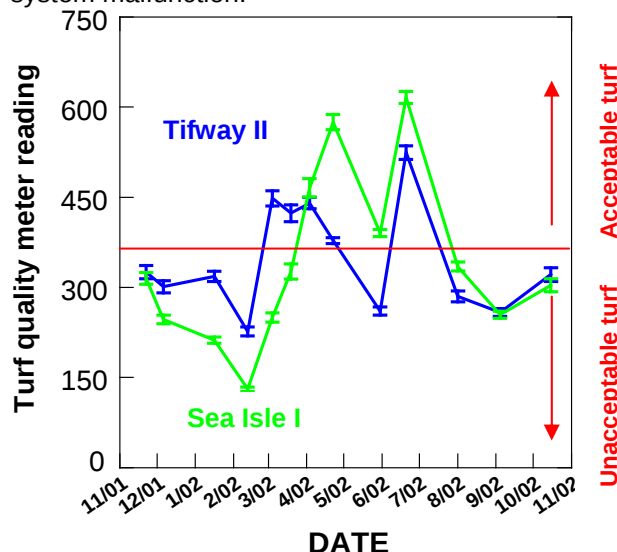


Figure 4. Brown patch on Sea Isle I paspalum. Note that disease symptoms are masked in the overseeded strip. This is because ryegrass is more tolerant of the disease than paspalum.



Figure 5. Quality of non-overseeded Tifway II bermudagrass vs. Sea Isle I paspalum over a 12-month period. The paspalum had good turf quality for 21 weeks during the year (40% of the time) while Tifway II bermudagrass had acceptable quality for 17 weeks (33% of the time). Decreases in turf quality were due to loss of color during the winter, as well as a drought-induced dip in quality in June, due to an irrigation system malfunction.



Disease sensitivity

Bottom line: Bermudagrass and paspalum are both susceptible to attack by a variety of diseases, including brown patch (*Rhizoctonia*) and *Gaeumannomyces* decline. In this trial, we saw significant brown patch damage on both varieties. However, the paspalum showed symptoms of disease a full 4 weeks before the bermudagrass did (Figure 4).

Influence of renovation practices on turf quality

Bottom line: As expected, renovation was necessary for optimal quality overseeded turf. The turf varieties differed slightly in their response to renovation procedure, however. For the Sea Isle I paspalum, heavy renovation produced a higher quality overseeded turf than light renovation procedures (Figure 6). For the Tifway II bermudagrass, both the heavy and light renovation procedures produced overseeded turf of comparable quality (Figure 7).

Influence of overseeding on turf quality

Bottom line: Predictably, overseeding resulted in higher quality turf during the winter when warm season turf loses its color. The question of whether overseeding practices will damage the warm season base turf over time, can only be partially answered at this point. With both paspalum and bermudagrass, we saw a small, but significant, decrease in the quality of overseeded turf during the summer months (Figures 9 and 10). A firmer conclusion will be drawn after a second year of testing.

Figure 6 Effect of renovation on overseeded Sea Isle I paspalum. Heavy renovation resulted in better quality of overseeded turf than light or no renovation. The type of renovation procedure used had no effect on turf quality during the summer transition, however.

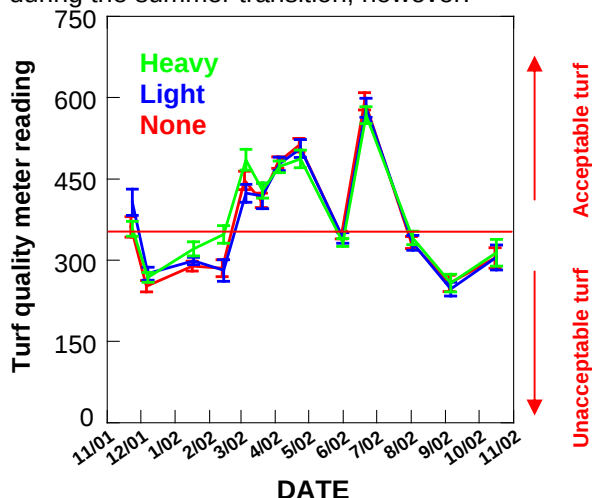


Figure 7. Effect of renovation on overseeded Tifway II bermudagrass. Both heavy and light renovation were superior to no renovation during the winter months. The type of renovation procedure used had no effect on turf quality during the summer transition.

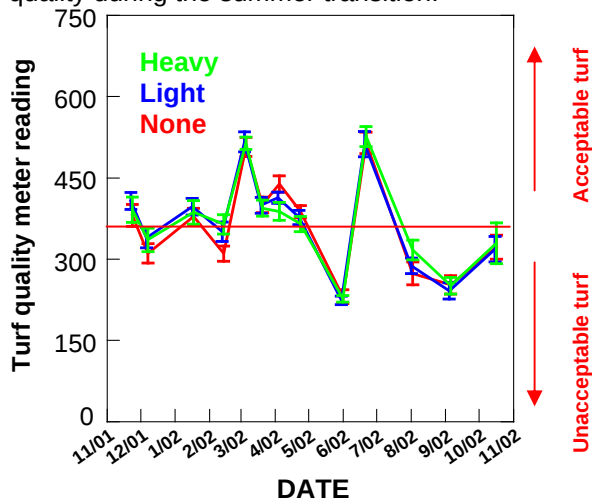


Figure 8. Benefits of overseeding. After several weeks of cool weather, paspalum and bermudagrass were off-color. However, overseeded areas had consistently higher turf quality ratings.



Figure 9. Effects of overseeding on quality of Sea Isle I paspalum. Overseeding provided an additional 4 weeks of acceptable quality turf during February and March. Overseeding had a small negative impact on the summertime transition, probably due to competition between the rye and paspalum.

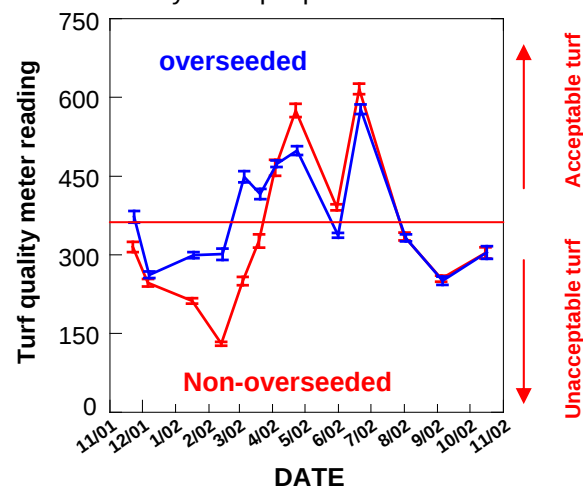
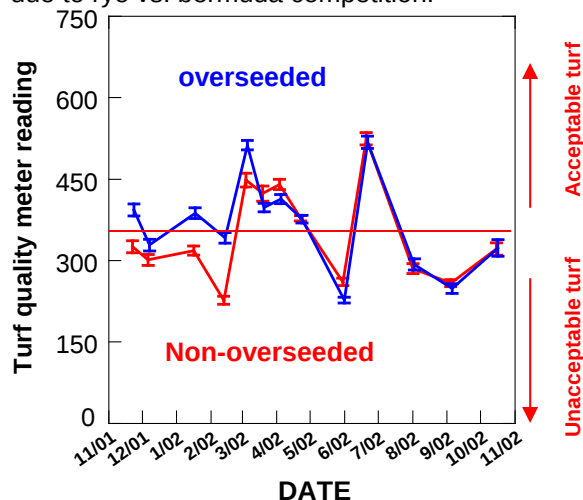


Figure 10. Effects of overseeding on quality of Tifway II bermudagrass. Overseeding provided an additional 6 weeks of acceptable quality turf during February and March. Overseeding had a small negative impact on the summertime transition, probably due to rye vs. bermuda competition.

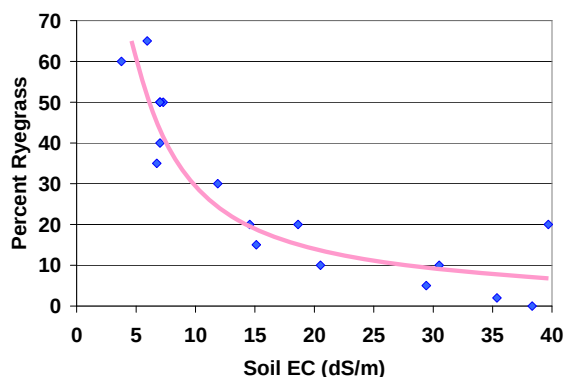


Influence of soil salinity on turf performance

Bottom line: High soil salinity negatively affected:

- Establishment of warm season turf (see Figure 3)
- Establishment of overseeded rye: soil EC levels need to be maintained below 6 dS/m for optimal establishment of overseeded ryegrass (Figure 11)
- Year-round performance of warm season turf: although paspalum and bermudagrass are more tolerant of soil salinity than most turf varieties, their performance was negatively affected as soil ECs increased above 6 dS/m. In other words, although they can tolerate high salts, the soils of warm season turfs still need to be monitored for salinity.

Figure 11. Effect of soil salinity on overseeded rye establishment. For rapid establishment of perennial ryegrass, soil ECs should be below 6.0 dS/m. EC = electrical conductivity, a measure of soil salinity. Data taken 11/2/01, 4 weeks after overseeding.



Influence of soil moisture on turf performance

Bottom line: Although bermudagrass and paspalum are more tolerant of drought than many turf types, a lack of soil moisture can work in combination with other stressors – such as the stress of competition from overseeded turf -- to reduce turf quality.

Figure 12. Effect of moisture on quality of non-overseeded bermudagrass and paspalum. Low moisture resulted in unacceptable quality (below 330 on the graph to the right). Measurements taken April 4, 2002 with a Dynamax Thetaprobe MLX2.

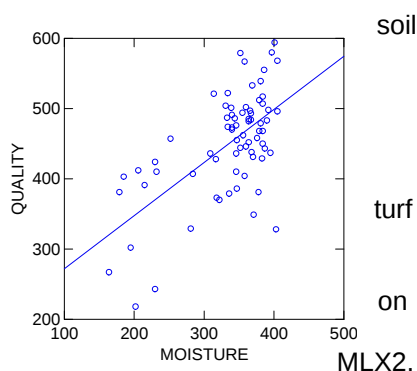


Figure 13. Effect of drought on turf quality. The quality of overseeded areas (arrows) of paspalum and bermudagrass was greatly decreased in plots that suffered from drought induced by tree roots. However, non-overseeded areas showed few signs of stress. Apparently, the combination of drought and competition from overseeded turf produced the decrease in turf quality observed below. Photo taken 10/16/02.



Follow up studies

The experiments described above will be repeated during 2002/2003 for further confirmation of our findings. In addition, the variety, renovation and overseeding treatments will be tested on an in-play area of the golf course in an effort to assess performance under realistic conditions (Figure 14). Our final results, along with management guidelines based on them, will be presented at the end of 2003.

Figure 14. In-play testing: Comparison of Tifway II bermudagrass (foreground) and Sea Isle I paspalum (background) on in-play fairway area. 11/26/02, approximately 3 months after sod installation.



Herbicide sensitivity

Data generated by Dr. Barry Brecke (University of Florida) and others indicates that paspalum is more sensitive to herbicide injury than bermudagrass. While most herbicides that are safe for use on bermudagrass are also safe on paspalum, the products listed below have caused damage on paspalum. Always consult product labels prior to use to confirm that all health, safety and environmental restrictions are being implemented.

PRODUCT	PASPALUM	BERMUDA
Surflan	Damage possible	OK for use
Gallery	Damage	OK
MSMA	Damage	OK
Monument	Damage	OK
Revolver	Damage	OK
TranXit	Damage	OK

Acknowledgements

Financial support for this study has been provided by: Fairbanks Ranch Country Club, California Golf Course Superintendent's Association (GCSA), Hi-Lo Desert GCSA, San Diego GCSA, GCSA of Southern California. In-kind support has been provided by: Mesa Verde Country Club, Turf-Seed, Inc., University of Georgia, West Coast Sod.