Optimizing Fairway and Rough Performance Under Low Quality Irrigation Water Conditions: Results Update

Cooperators:

- Fairbanks Ranch Country Club
- San Diego Golf Course Superintendents Association
- Golf Course Superintendents Association of Southern California
- University of Georgia
- Turf-Seed, Inc.
- West Coast Sod

Background:

The use of poor quality irrigation water on golf courses is a growing trend in the arid southwest, where sources of high quality water are becoming more limited. Unfortunately, poor quality water, with it high levels of dissolved salts, has an adverse effect on the quality of most turfgrass varieties, causing lack of vigor, poor appearance and the inability to combat diseases, insects and weeds. As a result, golf courses across the region are raising these questions:

- Is it possible to grow high quality, uniform turf on a year-round basis when it is irrigated with poor quality water?
- If so, what changes in management practices will be necessary?
- If changes in management practices are not sufficient to produce the desired levels of quality and uniformity, should alternate sources of higher quality water be investigated, and what is the minimum water quality needed to achieve success?

This three year field study will address these questions by:

- Identifying warm season fairway turf varieties that will produce a uniform playing surface and will either respond well to overseeding or exhibit minimal dormancy during the winter at Fairbanks Ranch.
- Identifying cool season turf varieties for roughs that will result in uniform and high quality turf on a year-round basis.
- For each turf variety, identifying the relationship between turf quality and water quality, so that if necessary, appropriate alternate water sources can be specified.
- Identifying overseeding strategies (timing, renovation procedures, varieties) that will perform optimally at Fairbanks Ranch with the turf varieties and management practices that are identified in this study.

Design:

A water quality gradient irrigation system was designed and installed in the 50' X 150' test area. The system delivers irrigation water to the test plots in a salinity gradient that ranges from poor quality well water to good quality domestic water (see Figure 1). Nine turf varieties (4 standard varieties and 5 experimental varieties) have been planted so that four replicates of each are subjected to three different quality levels of irrigation water. In years 2 and 3 of the study, warm season plots will be divided into sub-plots to allow evaluation of different renovation and overseeding strategies.

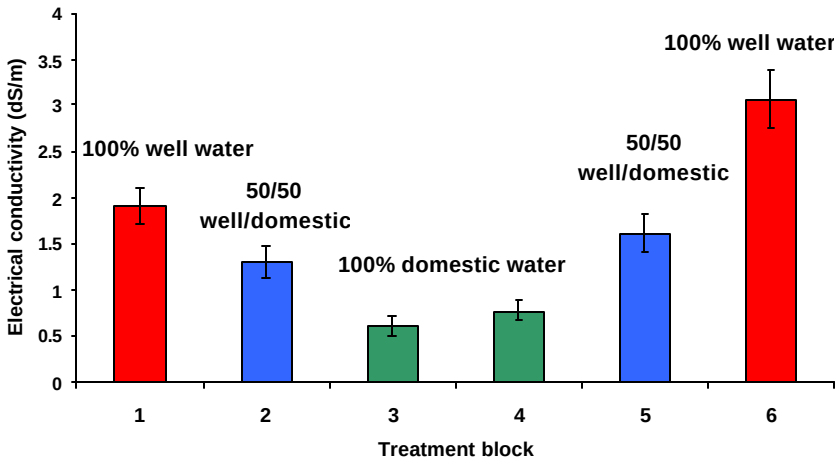
Progress to Date:

- Turf varieties were planted on 9/16/00, and establishment of all varieties was well underway by 10/30/00.
- A public information website for the Fairbanks Ranch Research Project was established: **(www.pace-ptri.com/fairbanks/fairbanks.htm)**.
- Supplemental funding for Year 2 (7/01 - 7/02) of the study has been provided by the San Diego Golf Course Superintendent's Association ($1,500) and the Golf Course Superintendents Association of Southern California ($3,000). Funding decisions from two other GCSA chapters will occur during June, 2001.

blocks. May 25, 2001

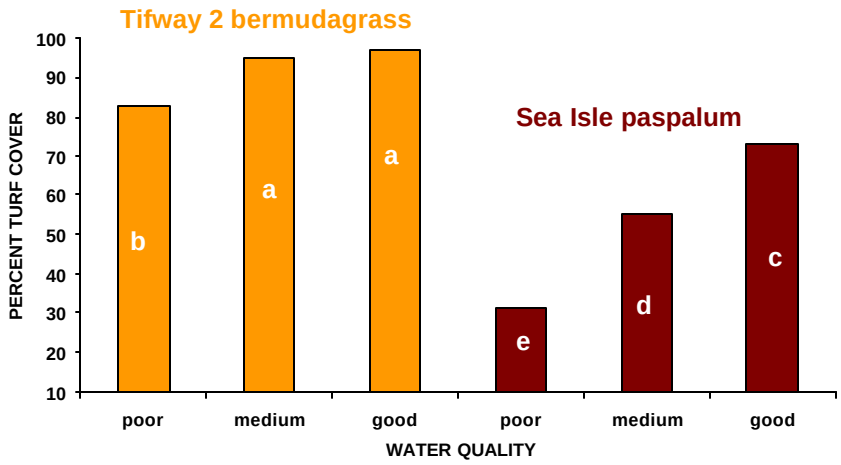
Results as of 5/31/01

The gradient irrigation system is functioning well, and a salinity gradient has been established (see graph to right) following the winter/spring rains. We expect salinity values to increase significantly in all treatment blocks as the summer progresses.



Salinity (due to poor quality irrigation water) has had a significant negative effect on the establishment of warm season turf varieties, particularly the Sea Isle paspalum (graph to right). This was an unexpected result, but has been since confirmed by University of Georgia researchers, sod growers and superintendents who have worked with this particular variety. Apparently, once the paspalum is established, it can withstand very high salt levels -- time will tell. (In the graph, percent turf cover values associated with different letters are significantly different from one another)

Water quality vs. establishment of warm season turf varieties
Averaged over 8 rating dates, November 2000 - May, 2001



Salinity has had less of an effect on cool season turf quality (figure 3), although we expect this to change as soil salinity levels increase this summer. The most dramatic effect at this point is that of variety -- with the tall fescues performing more consistently and significantly better than any of the perennial ryegrass varieties tested. The new, salt tolerant fescue varieties Tomahawk and 5TOR are especially impressive.

Effect of water quality on quality of cool season turf varieties.
Averaged over 8 rating dates, November 2000 - May, 2001