

Seashore Paspalum Ecotype Tolerance to Root Limiting Soil Stresses and Traffic Stresses

Robert N. Carrow
University of Georgia

Objectives:

1. Develop and implement a salinity tolerance screening procedure that (a) provides salinity tolerance of seashore paspalum ecotypes under well-watered and drought stress, (b) allows three salinity tolerance screening protocols to be assessed for efficiency in separating seashore paspalum ecotypes and for establishing a "standard" protocol, and (c) provides detailed data on seashore paspalum ecotype root tolerance data on the edaphic (soil) stresses of salinity, drought, and drought + salinity.
2. Determine seashore paspalum ecotype tolerance to the multiple root stresses in the acid soil complex (soil strength, drought, nutrient deficiencies, element toxicities, high soil/air temperatures) that strongly influence drought resistance via drought avoidance from deep rooting.
3. For nine seashore paspalum ecotypes with the greatest potential for release, determine relative to 'Tifway' bermudagrass overall drought resistance, rooting, shoot performance, and water use (ET)/soil extraction patterns under close-cut fairway conditions.

Start Date: 1998

Project Duration: 3 years

Total Funding: \$75,000

Eighty-four seashore paspalum ecotypes and three control grasses (common bermudagrass, 'Tifway' bermudagrass, and 'Meyer' zoysiagrass) were plugged in June 1998, into two adjacent sites at 4.5 feet centers. Both sites were a Cecil kaolinitic clay soil with 23% clay (A horizon) and 45% (B horizon).

Site A was at pH 4.2 to create the acid soil complex stress which consists of Al/Mn toxicities and potential deficiencies of Mg, K, Ca, and P. Site B was at pH 6.5. Both sites imposed the root stresses of high soil strength in a non-cracking soil, drought stress, and high soil temperatures. This study was completed in July 1999 and results reported in the 1999 USGA report.

Nine seashore paspalum ecotypes and 'Tifway' bermudagrass were established



Dr. Robert Carrow, University of Georgia, performs wear tolerance tests on the new seashore paspalum cultivars.

in July, 1998. Turf coverage, quality, color, and shoot density ratings were initiated in 1999 and continued through 2000. Rooting and water use (ET) data were also recorded. All grasses were subjected to period dry-down periods of seven to 18 days to induce drought stress. Leaf firing was used to assess overall drought resistance.

For the nine seashore paspalums the ranges in shoot performance averaged across both years were: 5.8 to 7.4 for turf quality (9.0 = ideal); 6.1 to 7.5 shoot density; and 6.1 to 7.5 for color. 'Tifway' bermudagrass averaged 7.0, 7.1, and 7.3, respectively.

Out of a total of 34 shoot performance measurements, grasses ranking in the top (best) statistical group the most frequently were: 'Sea Isle 1' (34), 'Temple 1' (31), 'TCR 6' (28), and 'Tifway' bermudagrass, (27), while 'Adalayd' (5) and 'AP 1' (3) ranked lowest.

During dry-down periods, grasses exhibiting the least leaf firing were: 'Temple 1' (2% of leaves). The highest leaf firing occurred on 'Q36313' (33%) and 'Adalayd' (27%).

These data illustrate: a) certain seashore paspalums exhibit similar shoot quality traits to hybrid bermudagrasses; b) some seashore paspalums have equal or better drought resistance than 'Tifway' bermudagrass and c) seashore paspalum can perform at high quality and drought resistance levels on non-salt affected sites.



At the University of Georgia, a rainout shelter is used to provide drought stress on promising seashore paspalum cultivars.

Twenty-nine seashore paspalums, three bermudagrasses ('Tifspout', 'Tifeagle,' 'Tifway'), and 'Meyer' zoysiagrass were stolonized in August, 1999. In 2000, these cultivars were assessed for tolerance to: (a) wear, and (b) wear plus soil compaction.

Summary Points

- Under dry down periods of seven to 18 days, some seashore paspalums exhibit similar shoot quality and drought resistance as 'Tifway' bermudagrass (some were better).
- Seashore paspalum can perform well at non-salt affected sites.
- Eighty-four genotypes were evaluated under acid soil complex stress (pH 4.2 - Al/Mn toxicity).
- Wear and traffic studies are underway on 29 genotypes.
- Thirty-four seashore paspalum genotypes are under greenhouse evaluation for salinity tolerance (high treatment equal to seawater).