TifTuf Bermuda (DT-1)
University of Georgia Tifton Campus

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Plant Responses to Drought

• Avoidance
  – Deeper root extension

• Escape
  – Drought dormancy

• Tolerance
  – Osmatic adjustment, membrane stability, etc.
  – Aka: USING LESS WATER
DT-1 “Selected” in 2001
Short-Term Drought (Atlanta)
Short-Term Drought (Atlanta)

Tifway 419 used 62% more water than DT-1
Short-Term Drought (Atlanta)

DT-1 used 38% less water than Tifway 419
Short-Term Drought (Atlanta)

DT-1 maintained 95% more green cover than Tifway 419
Table 1. Mean non-stressed and stressed turfgrass quality of three bermudagrasses mowed at 2.0” in field trials at seven locations across the United States during 2011, 2012, and 2013.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Turf quality&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Stress turf quality&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>South&lt;sup&gt;4&lt;/sup&gt;</td>
<td>North&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>DT-1</td>
<td>7.3 a&lt;sup&gt;6&lt;/sup&gt;</td>
<td>7.3 a</td>
</tr>
<tr>
<td>Tifway</td>
<td>6.2 b</td>
<td>7.1 a</td>
</tr>
<tr>
<td>Celebration</td>
<td>5.8 b</td>
<td>6.1 b</td>
</tr>
</tbody>
</table>
Short & Long-Term Drought (USA)

Under drought stress, Tifway 419 and Celebration went dormant, while DT-1 remained ACCEPTABLE

Table 1. Mean non-stressed and stressed turfgrass quality of three bermudagrasses mowed at 2.0” in field trials\(^1\) at seven locations across the United States during 2011, 2012, and 2013.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>South(^4)</th>
<th>North(^5)</th>
<th>All(^6)</th>
<th>South(^4)</th>
<th>North(^5)</th>
<th>All(^6)</th>
<th>Visual rating</th>
<th>Stress turf quality(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DT-1</td>
<td>7.3 a(^6)</td>
<td>7.3 a(^6)</td>
<td>7.3 a(^6)</td>
<td>5.9 a(^6)</td>
<td>6.0 a(^6)</td>
<td>5.9 a(^6)</td>
<td>5.9 a(^6)</td>
<td>6.0 a(^6)</td>
</tr>
<tr>
<td>Tifway</td>
<td>5.8 b</td>
<td>6.1 b</td>
<td>5.9 c</td>
<td>3.4 b</td>
<td>4.2 b</td>
<td>3.9 b</td>
<td>4.2 b</td>
<td>3.9 b</td>
</tr>
<tr>
<td>Celebration</td>
<td>6.2 b</td>
<td>7.1 a</td>
<td>6.7 b</td>
<td>4.2 b</td>
<td>4.3 b</td>
<td>4.2 b</td>
<td>4.3 b</td>
<td>4.2 b</td>
</tr>
</tbody>
</table>

\(^1\) Field trials were planted in 2011. All trials were planted again in 2012 to repeat the experiments.

\(^2\) Turf quality was rated on a 1 to 9 scale with 1 = dead, 6 = acceptable, and 9 = excellent prior to the initiation of drought screening during year 2 in both trials.

\(^3\) Stressed turf quality cover was rated on a 1 to 9 scale with 1 = dead, 6 = acceptable, and 9 = excellent after varying days of drought stress, depending on location and soil type, during year 2 in both trials.

\(^4\) Testing locations were in College Station, TX, Gainesville, FL, and Tifton, GA.

\(^5\) Testing locations were in Dallas, TX, Griffin, GA, Raleigh, NC, and Stillwater, OK.

\(^6\) Means within columns followed by the same letter are not significantly different according to Fisher’s LSD (\(P \leq 0.05\)).
2010 USDA Trials

Tifway

Latitude 36

Celebration

DT-1
Table 2. Mean turfgrass quality of three bermudagrasses mowed at 1.5” averaged over four
dates in 2010, 2011, and 2012 after sustained droughty conditions in the Linear Gradient
Irrigation System (LGIS) evaluation at the West Florida Research and Education Center
(WFREC) in Jay, FL¹.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Irrigation level (% ET₀)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>54</td>
<td>37</td>
<td>25</td>
<td>13</td>
<td>3</td>
<td>Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DT-1</td>
<td>6.8⁵ a³</td>
<td>6.6 a</td>
<td>6.4 a</td>
<td>6.3 a</td>
<td>6.3 a</td>
<td>5.8 a</td>
<td>4.7 a</td>
<td>4.6 a</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Celebration</td>
<td>4.7 b</td>
<td>4.5 b</td>
<td>4.3 b</td>
<td>3.9 b</td>
<td>3.7 b</td>
<td>2.8 c</td>
<td>2.1 c</td>
<td>2.2 c</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Princess-77</td>
<td>4.7 b</td>
<td>4.6 b</td>
<td>4.3 b</td>
<td>4.3 b</td>
<td>4.1 b</td>
<td>3.9 b</td>
<td>3.1 b</td>
<td>2.9 b</td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>

¹Field trial planted during 2010.
²Turf quality was rated on a 1 to 9 scale with 1 = dead, 5 = acceptable, and 9 = excellent.
³Means within columns followed by the same letter are not significantly different according to Fisher’s LSD (P≤0.05).
Under severe drought stress, Celebration and Princess-77 failed, while DT-1 remained ACCEPTABLE.
Long-Term Drought (Florida)

- University Drought Trial during 2011 in Florida
Long-Term Drought (Florida)
Wear Trials
Wear Trials
Potential to Scalp?
Potential to Scalp?

DT-1’s genetic mechanism for wear recovery can lead to scalping where there is excess soil moisture and fertility in the ABSENCE of stress.
Table 5. Mean turfgrass cover and color of five bermudagrasses mowed at 1.5” in an irrigated, non-stressed field trial during 2012 and 2013 in Tifton, GA\textsuperscript{1}.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Turf cover\textsuperscript{2}</th>
<th>% green cover</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estab.</td>
<td>Green-up</td>
</tr>
<tr>
<td>DT-1</td>
<td>44 b\textsuperscript{3}</td>
<td>75 a</td>
</tr>
<tr>
<td>Celebration</td>
<td>55 a</td>
<td>62 b</td>
</tr>
</tbody>
</table>
Table 6. Mean turfgrass quality, cover, and color of two bermudagrasses mowed at 1.5” in an irrigated, non-stressed field trial during 2010 and 2011 in Tifton, GA.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Turf quality</th>
<th>Turf cover</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visual rating</td>
<td>% green cover</td>
</tr>
<tr>
<td>DT-1</td>
<td>6.3 a</td>
<td>7.5 a</td>
</tr>
<tr>
<td>Tifway</td>
<td>5.8 a</td>
<td>6.0 a</td>
</tr>
</tbody>
</table>
Shade “Trials”

• Home Lawn Trials during 2013 in Georgia
Shade “Trials”

• Home Lawn Trials during 2014 in Georgia
Shade “Trials”
2014 USDA Shade Test
Daily Light Integral in the Shade Structure
• Bermudagrass – 2015 Tifton (June)
UGA – Offsite Trials

• Jacksonville, FL lawn during 2014
UGA – Offsite Trials

• Austin, TX lawn during 2015
Because DT-1 maintains acceptable quality longer than Tifway during a drought, fewer irrigation “events” will be needed, resulting in greater water savings over time.
**TifTuf Bermuda (DT-1)**

- Superior hybrid cross from (4x) by (2x) parents which has been tested for over 22 years
- More **drought tolerant** than Tifway, Celebration, TifGrand, and Latitude 36
- Better establishment and cover than Tifway
- Superior traffic tolerance than Tifway or Celebration
- Higher sod strength than Tifway in the Spring and Fall
- Faster Spring green-up than Tifway and Celebration
- Greater color retention than Tifway and Celebration during the onset of fall/winter dormancy