

STOP #4c: Drought Tolerant Seeded Cool-Season Turfgrasses for Southern California

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Objectives

Identify species/cultivars with improved tolerance to drought/heat stress. This is an important approach toward sustainability of turfgrasses in the California landscape amidst declining water resources and increasing water use restrictions on lawns and landscapes. Seeded turfgrasses provide a cheaper alternative to more expensive sodding.

Material and Methods

- a. Entries (following pages) were seeded on 10 May 2013.
- b. 4.0 lbs N/M and non-limiting irrigation during establishment.
- c. Plots mowed weekly at 2 and 4 inches since July 2013.
- d. On August 15 2013 irrigation was turned off. Plots were then watered by hand 3X weekly to replace 50% CIMIS ETo until the end of October. During fall and winter irrigation was restored at 100%. On May 30 2014 irrigation was turned off. Plots were then watered by hand 3X weekly to replace 60% CIMIS ETo.
- e. Plots rated every two weeks for drought stress (1-9 scale, 9 = best) and digital image analysis

Results

Higher mowing height caused reduction in turf quality only during the first month of the study. Subsequently no differences in quality were found when grass was mowed at 4 inches.

During the first year, tall fescues PPGTF105, PPGTF142, PPGTF145 and PPGTF156 and Delta Bolero Mix achieved the highest quality and percent green cover. Pearl's Premium showed the highest Dark Green Color Index (DGCI). Conversely, the lowest ratings were collected on bentgrass plots. On Aug 25, and consistently with the other rating dates, no grasses achieved an acceptable quality of 6. However, PPGTF105 and PPGTF142 tall fescues performed better than the other grasses achieving higher quality and percent green cover. Conversely, both bentgrass plots (Delta Native Bentgrass and Stover Native Bentgrass) had the poorest quality and cover, revealing poor adaptability to inland hot, desert environments such as Riverside (Table 1).


UCR Lawn/Native Grass Deficit Irrigation Study

| No. | Product/Species/Variety | Company | Seeding Rate lbs/1000 ft ² |
|-----|---|----------------------------|--|
| 1 | Delta Native Bentgrass ➤ <i>Agrostis pallens</i> | Delta Bluegrass Company | 1.5 |
| 2 | Delta Native Mow Free Mix ➤ <i>Festuca rubra</i> Molate 40% - Red Fescue ➤ <i>Festuca occidentalis</i> 30% - Western Fescue ➤ <i>Festuca idahoensis</i> 30% - Idaho Fescue | Delta Bluegrass Company | 3.0 |
| 3 | Delta Native Biofiltration Mix ➤ <i>Stipa pulchra</i> - Purple Needlegrass ➤ <i>Festuca rubra</i> Molate - Red Fescue ➤ <i>Hordeum californicum</i> - California barley ➤ <i>Hordeum brachyantherum</i> - Meadow barley | Delta Bluegrass Company | 3.0 |
| 4 | Delta Bolero Plus Mix 90/10 | Delta Bluegrass Company | 5.0 |
| 5 | Delta 90/10 Fescue/Blue Mix | Delta Bluegrass Company | 5.0 |
| 6 | MVS Tall Fescue ➤ Spyder LS | Mountain View Seeds | 5.0 |
| 7 | MVS Tall Fescue ➤ PPG-TF105 | Mountain View Seeds | 5.0 |
| 8 | MVS Tall Fescue ➤ Titanium LS | Mountain View Seeds | 5.0 |
| 9 | MVS Tall Fescue ➤ PPG-TF142 | Mountain View Seeds | 3.0 |
| 10 | MVS Tall Fescue ➤ PPG-TF156 | Mountain View Seeds | 3.0 |
| 11 | MVS Tall Fescue ➤ PPG-TF145 | Mountain View Seeds | 3.0 |
| 12 | Stover Native All- Purpose Mix ➤ <i>Bromus carinatus</i> 20% ➤ <i>Nassella (Stipa) pulchra</i> 31% ➤ <i>Festuca rubra</i> Molate 31% ➤ <i>Deschampsia cespitosa</i> var <i>Holciformis</i> 8% ➤ <i>Agrostis pallens (Diegosensis)</i> 6% ➤ <i>Koeleria macrantha</i> 4% | STOVER Seed Company | 1.12 |
| 13 | Stover Native Fine Fescue Mix ➤ <i>Festuca rubra</i> Molate 37% ➤ <i>Festuca occidentalis</i> 37% ➤ <i>Koeleria macrantha</i> 11% ➤ <i>Deschampsia cespitosa</i> var <i>Holciformis</i> 15% | STOVER Seed Company | 0.62 |
| 14 | Stover Native Bentgrass ➤ <i>Agrostis pallens (Diegosensis)</i> Siskiyou thingrass | STOVER Seed Company | 0.69 |

| No. | Product/Species/Variety | Company | Seeding Rate lbs/1000 ft ² |
|-----|---|------------------------|--|
| 15 | Cutting Edge Sun & Shade Mix ➤ Tall Fescue 19.8% ➤ Chewings Fescue 19.8% ➤ Hard Fescue 19.7% ➤ Kentucky Bluegrass 19.4% ➤ Perennial Ryegrass 19.4% | Cutting Edge | 5.0 |
| 16 | Pearl's Premium Ultra Low Maintenance Lawn Seed - Sunny Mix ➤ 'Dakota' Tall Fescue 19.75% ➤ 'Frontier' P. Rye 19.75% ➤ 'Deepblue' Kentucky Bluegrass 19.65% ➤ 'Harpoon' Hard Fescue 19.65% ➤ 'Carmen' Chewings Fescue 19.65% | Pearl's Premium | 5.0 |
| 17 | New Millennia Dwarf Fescue Blend ➤ '2 nd Millennium' Tall Fescue ➤ 'Focus' Tall Fescue ➤ 'Avenger' Tall Fescue | STOVER Seed Company | 5.0 |

| | | | | | | | | | |
|----|--|----|--|----|--|----|--|----|--|
| 17 | | 6 | | 4 | | 14 | | 16 | |
| 8 | | 7 | | 5 | | 2 | | 12 | |
| 4 | | 7 | | 12 | | 6 | | 7 | |
| 6 | | 14 | | 11 | | 12 | | 5 | |
| 1 | | 11 | | 3 | | 15 | | 17 | |
| 16 | | 16 | | 10 | | 13 | | 10 | |
| 9 | | 13 | | 8 | | 3 | | 1 | |
| 3 | | 2 | | 1 | | 10 | | 15 | |
| 14 | | 15 | | 5 | | 9 | | 8 | |
| 2 | | 4 | | 9 | | 11 | | 13 | |

North →

 4-inch mowing height


 2-inch mowing height

Table 1. Lawn/Native grasses quality, cover (%) and Dark Green Color Index (DGCI) on Sep 26 2013.

| Product/Species/Variety | Quality | Cover (%) | DGCI |
|--------------------------------|----------------|------------------|--------------|
| Cutting Edge Sun and Shade Mix | 4.3 AB | 72 ABC | 0.3595 ABC |
| Delta 90/10 Fescue Blue Mix | 4.0 BC | 73 ABC | 0.3480 ABCDE |
| Delta Bolero Plus Mix 90/10 | 4.7 AB | 81 AB | 0.3493 ABCD |
| Delta Native Bentgrass | 3.0 E | 58 EF | 0.3244 EFG |
| Delta Native Biofiltration Mix | 3.3 CDE | 67 CDE | 0.3332 DEF |
| Delta Native Mow Free Mix | 3.2 DE | 58 DEF | 0.3187 FG |
| NewMilleniaDwarfFescueBlend | 4.0 ABCD | 71 ABCD | 0.3400 CDEF |
| PPGTF105 | 4.7 AB | 82 A | 0.3670 AB |
| PPGTF142 | 4.8 A | 75 ABC | 0.3436 BCDE |
| PPGTF145 | 4.8 A | 77 ABC | 0.3513 ABCD |
| PPGTF156 | 4.7 AB | 80 AB | 0.3500 ABCD |
| Pearl's Premium | 4.0 BC | 77 ABC | 0.3707 A |
| Spyder LS | 4.3 AB | 78 AB | 0.3511 ABCD |
| Stover Native All Purpose Mix | 3.2 DE | 57 EF | 0.3278 DEFG |
| Stover Native Bentgrass | 2.8 E | 50 F | 0.3072 G |
| Stover Native Fine Fescue Mix | 3.5 CDE | 68 CDE | 0.3375 CDEF |
| Titanium LS | 4.3 AB | 71 BC | 0.3398 CDEF |

Table 2. Lawn/Native grasses quality, cover (%) and Dark Green Color Index (DGCI) on Aug 25 2014.

| Product/Species/Variety | Quality | Cover (%) | DGCI |
|--------------------------------|----------------|------------------|-------------|
| Cutting Edge Sun and Shade Mix | 4.8 ABCD | 48 ABC | 0.368 ABC |
| Delta 90/10 Fescue Blue Mix | 5.2 ABC | 40 ABC | 0.3692 ABC |
| Delta Bolero Plus Mix 90/10 | 5.0 ABCD | 36 ABC | 0.3665 ABC |
| Delta Native Bentgrass | 2.3 F | 28 BC | 0.3708 ABC |
| Delta Native Biofiltration Mix | 3.7 E | 29 BC | 0.3717 AB |
| Delta Native Mow Free Mix | 4.2 CDE | 33 ABC | 0.3576 BC |
| NewMilleniaDwarfFescueBlend | 4.7 ABCDE | 31 ABC | 0.3664 ABC |
| PPGTF105 | 5.3 AB | 51 A | 0.3739 A |
| PPGTF142 | 5.5 A | 49 AB | 0.3731 A |
| PPGTF145 | 4.8 ABCD | 45 ABC | 0.3697 ABC |
| PPGTF156 | 5.3 AB | 47 ABC | 0.3651 ABC |
| Pearl's Premium | 4.8 ABCD | 43 ABC | 0.3696 ABC |
| Spyder LS | 4.3 BCDE | 31 ABC | 0.3583 BC |
| Stover Native All Purpose Mix | 4 DE | 41 ABC | 0.3688 ABC |
| Stover Native Bentgrass | 1.7 F | 27 C | 0.3657 ABC |
| Stover Native Fine Fescue Mix | 4.5 ABCDE | 45 ABC | 0.3561 C |
| Titanium LS | 4.5 ABCDE | 36 ABC | 0.366 ABC |