Dissecting Summer Dormancy in Mediterranean Tall Fescue

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INTRODUCTION

- Tall fescue (*Lolium arundinaceum* (Schreb.) Darbysh.), a perennial temperate grass is broadly adapted.
- Summer dormant "Mediterranean" ecotypes have better survival under dry and hot conditions than summer active "Continental" ecotypes (Norton et al., 2006).
- A standardized test to categorize summer dormancy levels would help target specific cultivars to specific environments and would facilitate the introgression of dormancy into higher yielding, summer active germplasm.

OBJECTIVE

- To develop a standard test for summer dormancy, modeled on the alfalfa fall dormancy test, in order to repeatable and reliably estimate the summer dormancy response of different tall fescue germplasm.

MATERIALS AND METHODS

- Germplasm
  - Four summer active tall fescues
  - 15 summer dormant tall fescues
  - Kasbah orchardgrass (*Dactylis glomerata*)
  - NFHG 4010 hardingrass (*Phalaris aquatica*)
- Locations and years
  - Davis, CA (2014-2016)
  - Fresno, CA (2017-2019)
  - El Centro, CA (2016-2019)
- Treatments (after Norton et al., 2008)
  - (1) full irrigation throughout the year
  - (2) no summer irrigation (from May to September)
  - (3) as (2) except for a mid-summer irrigation mimicking a "summer storm."
- Measurements:
  - % green tillers and plant height
  - Measured at key moments throughout the trial.

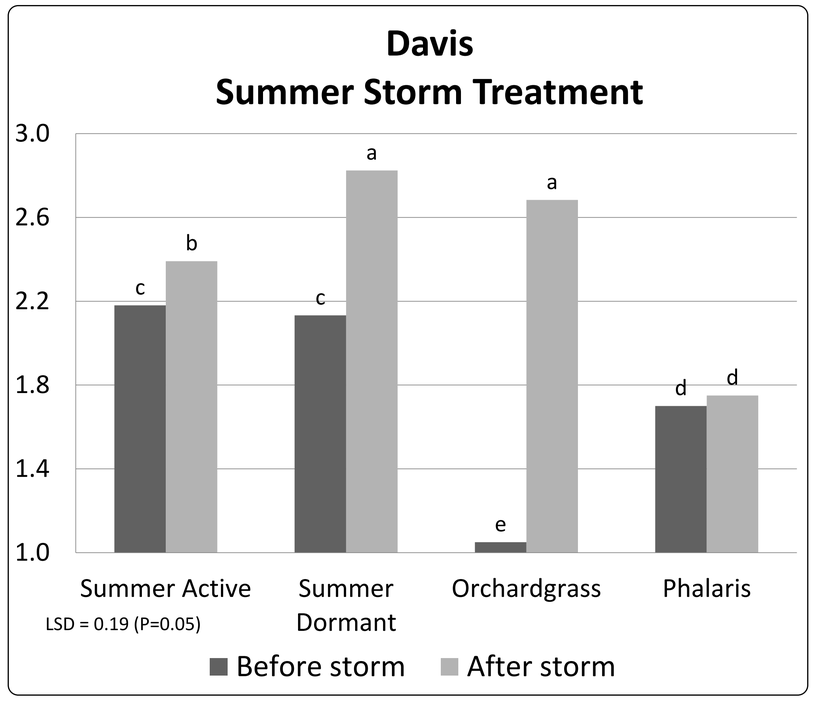

Fig.1. Greenness score (0 = no green tillers to 5 = all tillers green) before and after a summer storm in Davis 2016. Irrigation 7/21/2016; scoring 8/10/2016.

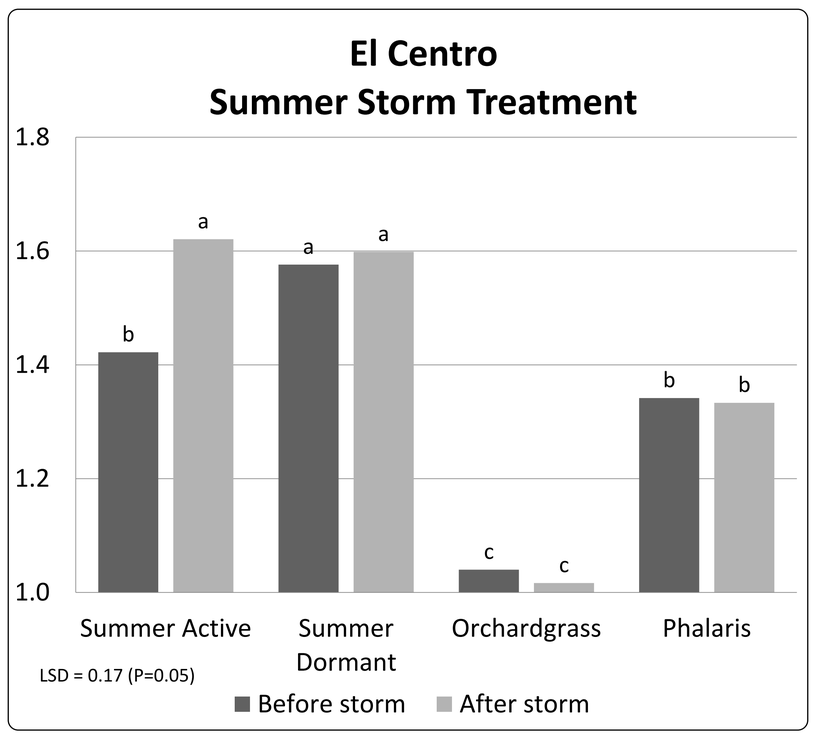

Fig.2. Greenness score (0 = no green tillers to 5 = all tillers green) before and after a summer storm in El Centro, 2017. Irrigation 7/17/17; scoring 8/17/17.

RESULTS

- In Davis, summer dormant ecotypes regrew following a mid-summer storm, suggesting that they did not exhibit dormancy (Fig.1). The reason for the lack of dormancy is not clear, although it could be related to photoperiod, night-time temperatures, and/or possible subsurface water.
- In El Centro, the summer dormant entries showed no regrowth following the storm, suggesting that they were expressing dormancy (Fig.2). Later in the year, based on this result, we established new trials in Fresno and El Centro, CA in fall 2017.

Davis Trial, 2016

El Centro Trial, 2017

CONCLUSIONS

- Based on 2017 results, the "Summer Storm" treatment appears to differentiate dormant and non dormant germplasm, leading to our new trials in 2017.
- The El Centro environment (and hopefully Fresno) with dry summer conditions coupled with very hot days and nights should be well suited for evaluating the amount of dormancy expressed among tall fescue germplasm.
- The lack of dormancy induction in Davis warrants further research.

REFERENCES

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