All About Discovery!

Poster No. 725

Does irrigating dormant bermudagrass pay off?

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Introduction

- Winter dormant bermudagrass should not be irrigated due to severe drought in the southwest US.
- Winter dormant warm-season grasses do not use water, however some soil evaporation still occurs.
- Hence, during winter a small amount of water is sufficient to replace evaporation water and keep the crown of the plant moist, in order to avoid desiccation.

Objectives

A study was conducted at New Mexico State University:

- To quantify the number of days of early bermudagrass green-up through application of winter irrigation
- To determine the optimum irrigation amount during winter in order to enhance spring green-up

Materials and Methods

- Where: Las Cruces, New Mexico State University (arid, 1265 m; USDA Plant Hardiness Zone 8).
- When: November 15th 2014 to June 1st 2015
- Design: randomized complete block with irrigation as whole block. Each individual plot measured 5 m by 5 m and all treatment were replicated three times.
- Bermudagrass (*Cynodon dactylon* L.) var. Princess 77.
- Irrigation: overhead pop-up sprinkler Toro precision™ Series Spray Nozzles (The Toro Company, Riverside, CA)
- Treatments: 3 mm irrigation:
  1. Once per week
  2. Once every two weeks
  3. Once per month
  4. Control (no irrigation)
- On March 30th irrigation was increased to 100% of ETos, to enable full green up of the area.
- Data collection: Green cover (%) determined weekly from March 13th until from digital image analysis (SigmaScan® Pro 5; Systat Software Inc., San Jose, CA).
- Sigmoidal models were used to calculate Days of the year needed to reach 50 (DOY50) and 95% (DOY95) of green cover (Figure 1).
- DOY50 and DOY95 were analyzed using ANOVA and mean separation tests (Fisher's Protected LSD, α = 0.05) using SAS Proc Mixed (SAS Institute, Inc. 2013).

Figure 2. Aerial view of research plots March 30th 2015) Irrigation treatments:
1) once per week
2) every other week
3) once per month
4) no irrigation

Figure 3. Aerial view of research plots (April 15th 2015) Irrigation treatments:
1) once per week
2) every other week
3) once per month
4) no irrigation

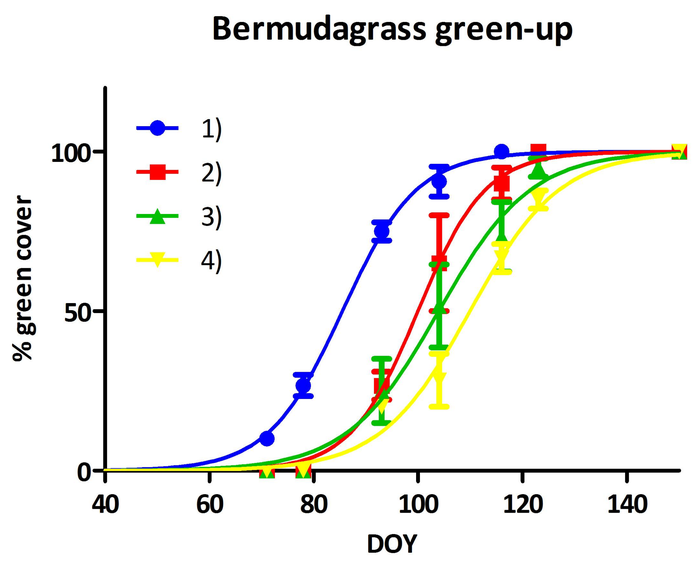

Figure 1. Spring green up affected by different irrigation treatments: 1) once per week, 2) every other weeks 3) once per month, 4) no irrigation

Table 1. Days of year to reach 50% (DOY50) and 95% (DOY95) of green cover for different irrigation treatments.

Irrigation	DOY50	DOY95
Once per week	85 A±	107 A
Once every two weeks	100 B	117 AB
Once per month	105 B	125 B
No irrigation	110 B	134 B

±Values in each column followed by the same letter are not significantly different from one another (Fisher's protected least significant difference, α = 0.05)

Data and Results

- Statistical analysis revealed a significant irrigation treatment effect on DOY50 (p=0.0045) and DOY95 (p=0.0325).
- Weekly irrigation was the fastest treatment to reach 50% green cover (DOY 85) followed by all other treatments (Table 1 and Figure 2).
- Irrigation once per week and irrigation every other week were fastest to reach 95% cover (Table 1 and Figure 3).
- Moisture changes at 5cm appear to be affected more from precipitation than from irrigation events (Figure 4).

Overall water consumption:

- ✓ 51 mm for once per week irrigation (17 applications)
- ✓ 27 mm for once every two weeks (9 applications)
- ✓ 15 mm for once every month (5 applications)
- ✓ no irrigation (control)

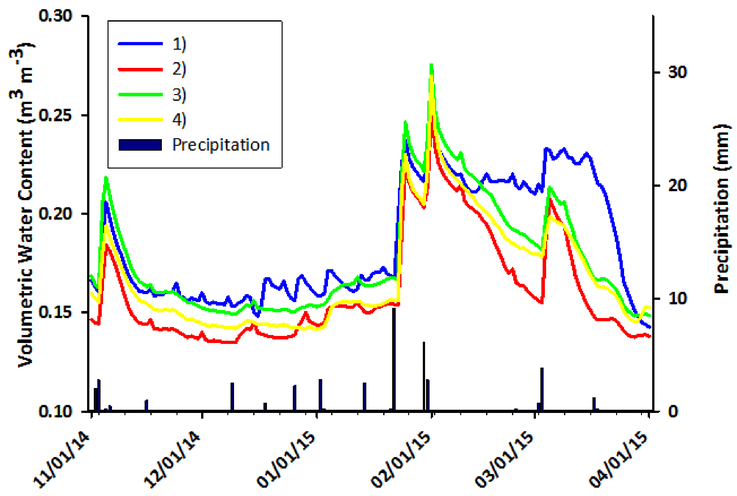

Figure 4. Soil moisture (m^3 m^{-3}) at 5cm depth for irrigation 1) once per week, 2) every two weeks, 3) once per month, and 4) no irrigation. Vertical bars indicate precipitation (mm) events from November 1st 2014 to April 1st 2015.

Conclusions

Our results indicate that **small irrigation amounts** applied either weekly or every other week during winter dormancy will result in **faster spring green-up**.

However, more research is necessary to investigate irrigation frequency and exact irrigation amount to achieve earliest green-up

Acknowledgements

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