High quality playing surfaces with minimal water use

Micah Woods, Ph.D.

March 4, 2024

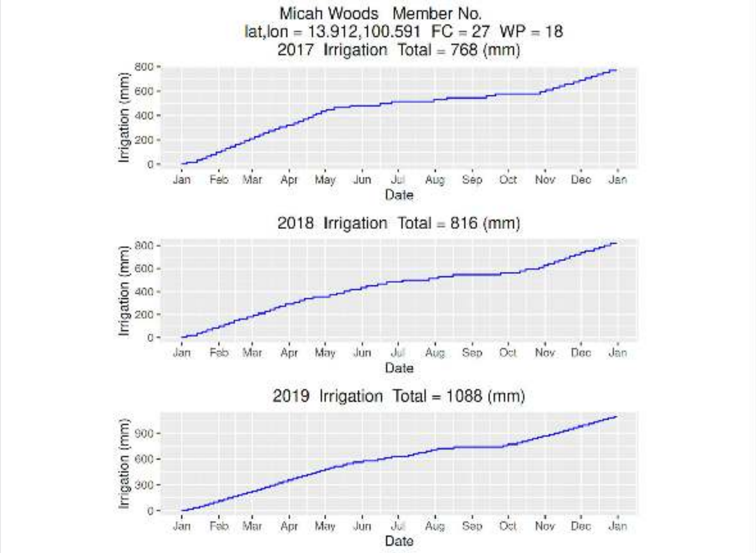
Asian Turfgrass Center
www.asianturfgrass.com

PACE Turf
www.paceturf.org

Know the water use

- How many liters (or m^3) of water was used?
- What was the irrigated area?

Use a water budget



Thursday, April 21, 2022

Easy tool for monitoring water use

Thursday, April 21, 2022 | Permalink | Water.

As the drought persists, water restrictions are again on the horizon. In an affort to assist in estimating water budgets, the PACE water budget spreadsheet and the new PACE Evapotranspiration and Irrigation estimates provided on your Weather page will come in handy. Evapotranspiration (ET) is estimated using the same method we implemented for the GCSAA Water Survey. Estimated irrigation is computed using raintall, soil water holding capacity and ET. Your PACE Weather page provides links to the past five years of ET and Irrigation data. These data make calculating water budgets easy and provide assistance in communication to members and regulators. An example has been provided below.

Most turf managers are expected to create, and to follow financial budgets each year. But water budgets are still very rare — at least for now. However, water budgets may become more common in the near future. Whether you are suffering in a drought–affected area, or you are trying to comply with water use regulations, or just want to save on your water bills, a water budget can be a useful and important part of your management program.

We have created an easy to use water budget spreadsheet that will estimate how much irrigation water it was at your location. By calculating water budgets for previous years, you can get an idea of whether you are over using irrigation water, or whether you are staying within generally acceptable guidelines. If you need to reduce water consumption in the future, some suggestions for reducing water use are described here.

Instructions for completing the water budget spreadsheet. This should take you less than 10 minutes to complete. Here are the factors you need to provide:

- **Number of square feet of turf, and number of square feet of landscape**
- **Landscape factor (LF)**: This is a number used by many regulatory agencies to determine the maximum volume of water to be used in specific areas. Typically, a factor of 1.0 is used for golf course greens, tees, fairways and roughs. This means that these areas are usually allowed to use the full reference evapotranspiration (ET). A factor of 0.8 is typically used for landscaped areas that are not high performance turf.
- **Drought factor (DF)**: In areas where drought is an issue, a mandatory or voluntary reduction in water budgets is sometimes applied. If your region has not been assigned a drought factor by regulatory agencies, you can set this value to zero.

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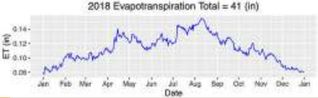
- For each previous year of interest, enter the annual irrigation (inches) from your PACE Weather Irrigation estimate for your location. The Irrigation estimate takes into account rainfall througout the year.
- The spreadsheet will calculate the total estimated water use for the year, and will then calculate your water budget for each year that you entered data for. The budget appears in the red box on the right side of the spreadsheet. Variables that will be calculated include:
  - Number of gallons used on turf
  - Number of gallons used on landscaped areas
  - Total gallons used
  - Total hundred cubic feet of water used
  - Total acre feet of water used

B	C	D	E	F	G	H
	Sq Ft.	Landscape Factor	Drought Factor % Reduction		Location:	Example San Diego golf location, 120 irrigated acres of turf, 15 acres landscape
Turfgrass	5,227,200	1	0			
Landscape	653,400	0.8	0			

Evapotranspiration (in)	
Year	Total
2017	35.0
2018	35.0
2019	30.0
2020	34.0
2021	30.0
Average	32.8

Water Budget				
Turf Gallons	Landscape Gallons	Total Gallons	Total HCF	Total Acre feet
113,979,096	11,397,910	125,377,006	167616	384.77
113,979,096	11,397,910	125,377,006	167616	384.77
97,696,368	9,769,637	107,466,005	143671	329.80
110,722,550	11,072,255	121,794,805	162827	373.77
97,696,368	9,769,637	107,466,005	143671	329.80



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Minimize irrigated area

Grass species and variety selection

“The inferior rooting, dehydration avoidance, and resultant drought resistance of the zoysiagrass genotypes in comparison to the bermudagrass genotypes results in a higher irrigation requirement to maintain actively growing, green turf conditions in the case of the zoysiagrass genotypes.”

Sifers & Beard, 1997[1]

[1] Sifers, S.I. and J.B. Beard. 1997. Bermudagrasses superior in dehydration avoidance and drought resistance when compared to zoysiagrasses. Turfax. Vol V, No. 4, pp 4–6.

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ORIGINAL ARTICLE

DROUGHT STRESS

Warm-season turfgrass species genotype-by-environment interaction for turfgrass quality under drought

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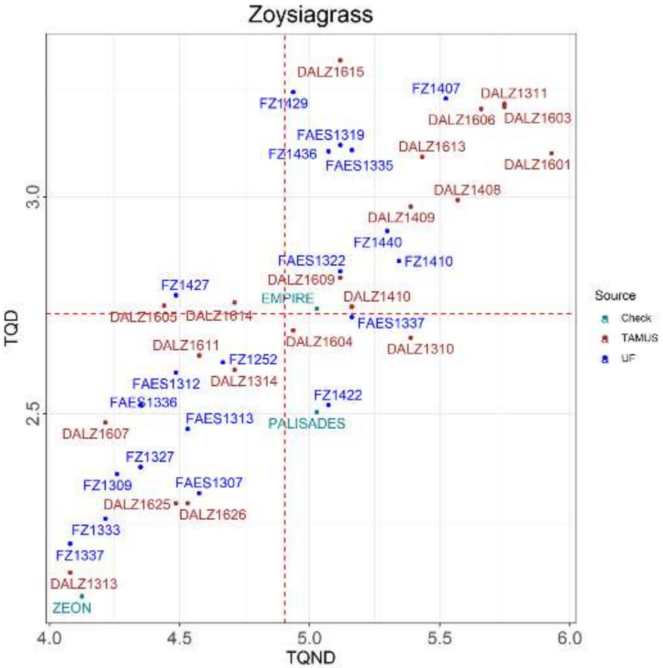
Abstract

One of the biggest challenges the turfgrass industry is currently facing is limitations of available water for irrigation of turfgrass areas. Efforts on breeding for drought resistance have increased over the past several years across the United States. Thus, the objectives of this study were to evaluate the performance of bermudagrass (*Cynodon* spp. Rich.), St. Augustinegrass (*Stenotaphrum secundatum* (Walter) Kuntze),



Zoysiagrass
TQD
TQND
3.0
2.5
4.0
4.5
5.0
5.5
6.0
DALZ1615
FZ1407
DALZ1311
FZ1429
DALZ1606
DALZ1603
FAES1319
DALZ1613
FZ1436
DALZ1601
FAES1335
DALZ1408
DALZ1409
FZ1440
FAES1322
FZ1410
FZ1427
DALZ1609
EMPIRE
DALZ1410
DALZ1605
DALZ1614
FAES1337
DALZ1611
DALZ1604
DALZ1310
FZ1252
FAES1312
DALZ1314
FZ1422
FAES1336
FAES1313
PALISADES
DALZ1607
FZ1327
FZ1309
FAES1307
DALZ1625
DALZ1626
FZ1333
FZ1337
DALZ1313
ZEON
Source
Check
TAMUS
UF

Sensible fertilizer use

Maximize soil organic matter

Check salinity and leach carefully

Use soil water meters or sensors

Implement irrigation zones

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Published October 18, 2018

EUROPEAN TURFGRASS SOCIETY CONFERENCE

Combining Trinexapac-Ethyl with a Soil Surfactant Reduces Bermudagrass Irrigation Requirements

Matteo Serena, Mino Sportelli, Elena Sevostianova, Rossana Sallenave, and Bernhard Leinauer*

ABSTRACT

Soil surfactants and plant growth regulators (PGR) have shown potential to lower irrigation requirements and increase turfgrass quality under drought conditions. A study was conducted from 2014 to 2016 to investigate the soil surfactant Revolution, (modified methyl capped block copolymer [Aquatrols, Paulsboro, NJ]), or the plant growth regulator 'PrimoMaxx' (A.I. trinexapac-ethyl [4-(cyclopropylhydroxymethylene)-3,5-dioxocyclohexanecarboxylic acid]) (Syngenta, Basel, Switzerland), or a combination of both on percent green coverage, turfgrass color, quality, soil volumetric water content (VWC) and uniformity on Princess 77 bermudagrass (*Cynodon dactylon* L.) grown on a loamy sand (mixed, thermic Typic Torripsamments) and irrigated at either 80%, 65%, or 50%

LAWNS AND turfgrass areas represent the largest irrigated crop in the United States, accounting for approximately 163,800 km^2 (±35,850 km^2) (Milesi et al., 2005; Morris et al., 2005). These areas provide benefits such as the reduction of heat island effects, soil erosion control, carbon sequestration, cool and safe surfaces for exercise and athletic activities, to name a few (Beard and Green, 1994; Leinauer et al., 2010; Wang et al.; 2016). In addition to the aforementioned environmental benefits, the turfgrass industry contributes billions of dollars annually to the United States economy (Haydu et al., 2008). However, despite these advantages, as a non-food and fiber producing crop, turfgrass water usage is a major concern in many communities. For this reason, multi-pronged approaches to conserve irrigation water, such as the use of alternative water sources, the use of effi-

Let it be dry

Use pigments

1. Know the water use
2. Use a water budget
3. Minimize irrigated area
4. Grass species and variety selection
5. Sensible fertilizer use
6. Maximize soil organic matter
7. Check salinity and leach carefully
8. Use soil water meters or in-ground sensors
9. Implement irrigation zones
10. Upgrade irrigation system
11. Use soil surfactants
12. Let it be dry (*use less water*)
13. Use pigments

Online handout with slides & more info

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