Products to Assist in Turfgrass Irrigation: Tools or Snake Oils?

Annual Spring Turfgrass Management Seminar
University of Arizona Maricopa Agricultural Center and
U.S. Arid-Land Agricultural Research Center
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Outline

1) Introduction
2) Subsurface Irrigation
   – Drip Irrigation
   – Sub Irrigation
3) Soil Sensing
   – Moisture
   – Salinity
4) Water Conditioning
5) Summary
Water Management

1. Availability
2. Quality
3. Distribution
Justification

✓ “Emerging Technology”
   (GCM, January, 2005)

✓ Exempt from water restrictions
   (El Paso, Drought Emergency Response Plan, Stage 2)

✓ Potential for water savings and efficient irrigation
Sprinkler Problems
Project

1) 21 grasses
2) 2 irrigation systems
3) 3 salinity levels
   a) Potable
   b) Blend
   c) Saline
Objectives

1. Study salinity effects on winter survival and determine if Las Cruces (zone 8a) has a sufficient growing season to establish cool and warm-season turf with saline water through sprinkler or sub-surface irrigation

2. Investigate if precipitation from monsoon season is sufficient to leach rootzone in drip irrigated grasses

3. Study long-term effects of water quality and irrigation type on turf performance

4. Study long-term effects of saline irrigation water on soil chemistry
Water Quality

• Saline
  – EC = 3.1-5.0 dS/m
  – SAR = 10.5
  – TDS = 2050 - 3220

• Potable
  – EC = 0.6-1.2
  – SAR = 1.61
  – TDS = 413 - 750

• Blend
  – EC = 1.7-3.0 dS/m
  – SAR = 6.1
  – TDS = 1200 - 3220
Grasses

**Cool Season**

- Hybrid Texas bluegrass
  - Thermal Blue
  - SRX2TK95
- Tall Fescue
  - Southeast
  - Tar Heel II
- Perennial Ryegrass
  - Brightstar SLT
  - Catalina
- Alkaligrass
  - Salty
  - Fults
- Fine Fescue
  - Dawson

**Warm Season**

- Bermudagrass
  - ‘Sahara’
  - ‘Princess’
  - ‘Riviera’
  - ‘Transcontinental’
- Zoysiagrass
  - ‘De Anza’
  - ‘Companion’
- Buffalograss
  - ‘UC Verde’
  - ‘SWI2000’
- Saltgrass
  - ‘DT16’
  - ‘A138’
- Seashore paspalum
  - ‘Seaspray’
  - ‘Seadwarf’
Results - Establishment

Subsurface

Sprinkler
Establishment Cool Season Grasses

Green Cover

Days After Seeding (DAS)

- Sprinkler saline
- Sprinkler potable
- Drip potable
- Drip saline

Sprinkler saline
Sprinkler potable
Drip potable
Drip saline
Establishment Warm Season Grasses

- Sprinkler potable
- Drip potable
- Drip saline
- Sprinkler saline

% green cover vs. Days after seeding (DAS)
Establishment with saline water 150 DAS

Princess Bermudagrass

Seaspray Seashore paspalum

SWI2000 Buffalograss
Quality – Perennial ryegrass cv. Brightstar SLT

Visual rating vs. SAR (0 - 10 cm) over the period from August 2004 to December 2005. The graph compares visual ratings for different irrigation systems:
- Potable - Drip
- Saline - Drip
- Potable - Sprinkler
- Saline - Sprinkler

The y-axis represents visual rating, ranging from 1 to 9, and the x-axis represents time from August 2004 to December 2005.
Quality – Seashore paspalum cv. Seaspray

Visual rating

SAR (0 - 10 cm)

28-Apr-05 17-Jun-05 6-Aug-05 25-Sep-05

Potable - Drip
Saline - Drip

Potable - Sprinkler
Saline - Sprinkler

Potable Sprinkler
Saline - Sprinkler
USGA Research Green
Objective

To investigate the effects of greens type, irrigation type, and root zone material on turfgrass establishment, turfgrass quality, and irrigation water use on a creeping bentgrass stand
Research area: 4000 m²
43,000 ft²

Plot size: 17 m x 17 m
55 ft x 55 ft
Evaporative Control System (ECS)
Soil Moisture – Soil Salinity Measurements

- Temperature:
  \[ r^2 = 1 \]
- Moisture:
  \[ r^2 > 0.94 \]
- Moisture readings not affected up to 4 dS/m
Wireless Sensor Technology
Salt Monitoring:
Experimental design

- Split plot design
- Water as whole block
- Treatments as sub-block
- Completely randomized, 3 reps
- 20’ X 20’ plot size

Water Conditioning Study
• Physical Water Conditioners for turf
  – Manufacturers claim that the devices:
    • Improve water penetration
    • Reduce establishment time
    • Improve turf quality
    • Reduce irrigation
  – Minimal data to support these claims
    • One small study in turfgrass
      – Concluded that the devices were not effective
        » Gazaway D. 2003
Magnawet

Freflo

Zeta Core
Research Objectives

Do water conditioners

• Effect turf quality?
  – Visual rating
  – Tissue analysis

• Effect Turf Stress?
  – NDVI

• Effect soil quality?
  – Soil tests

• Effect irrigation requirements
  – Run time data