

Stop #9: Tall Fescue and Bermudagrass Establishment and Management Using Subsurface Drip Irrigation (SDI) vs. Overhead Sprinkler Irrigation (OSI)

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The objectives of this research were to increase awareness of SDI for California turf and landscapes and to compare turf establishment from seed between the two types of irrigation at different times in fall and spring.

Soil:	Hanford fine sandy loam
Design:	Randomized split plot with 3 replications; main plots (20 ft by 20 ft) are irrigation type and species; sub-plots are seeding dates
Species/ Seeding Rate:	Tall Fescue 'New Millennia'/8 lbs PLS/M Bermudagrass 'Princess'/1 lb PLS/M
Seeding Date:	23 August 2012
Fertility:	0.5 lb N/M (Milorganite) at seeding and 15 days after seeding
Irrigation Regimes:	120% and 100% Eto for tall fescue and bermudagrass, respectively
SDI:	Toro DL2000; Emitter flow rate (0.5 gal/h); 30 psi Lines placed 3-4 inches deep; 1 ft by 1 ft grid between emitters and lines; Badger Series FM-1B Flow Sensors (2-50 gpm)
OSI:	Toro Precision Spray sprinklers; 30 psi; 20 ft spacing
Acknowledgments:	This project was funded by The Toro Company. Calsense provided the flow sensors.
Preliminary Results:	Seedling counts taken on 5 September 2012 (13 days after seeding) indicated significantly greater establishment of tall fescue on SDI compared to OSI plots. No significant differences in bermudagrass establishment were found between SDI and OSI.
Notes:	

Five Most Commonly Asked Questions about Subsurface Drip Irrigation (SDI) in Turf

1) Why should I use SDI? What are the pros and cons of SDI?

Subsurface drip irrigation systems irrigate more efficiently because they apply water from emitters placed within the rootzone. Advantages of SDI include the uninterrupted use of the turf area during irrigation, energy savings as a result of lower operating water pressure, no human exposure to irrigation water, reduced disease pressure, and potential water savings because irrigation is limited to the turf area and is not affected by wind drift or evaporation. Arguments against the use of SDI include high installation costs, difficulty in determining spacing and depth of pipes or emitters, a perceived inability to establish turf from seed or sod when using SDI, a perceived interference with regular maintenance, and a perceived inability to leach salts.

2) How much more expensive is SDI?

This question cannot be answered with a single number, as cost for material and installation (labor) depends on the soil type, and size and shape of the area to be irrigated. Subsurface Drip Irrigation systems for areas that require a large number of connections to the header lines can be significantly more expensive than a pop-up sprinkler system for the same area. However, a SDI system for areas with only few connections to the header lines (e.g. long and relatively narrow areas of turf) can be cheaper than a sprinkler system.

3) Does SDI allow for regular maintenance practices such as granular fertilization or aerification? What if I have to apply pesticides that need to be watered in?

Research has shown that turf irrigated from a SDI system can be fertilized with granular fertilizer without a loss in color or quality. If sufficient soil water is present, nutrients from the granule will become plant available regardless of whether water is applied from the surface or subsurface. However, most large turf areas with an SDI system have an injection system and apply liquid fertilizer. Home lawns can also be fertilized with a hose-end foliar/liquid fertilization system. If granular pesticide applications require watering-in from the surface either hand watering or a temporary surface irrigation system may have to be used. However, most turf pests can also be controlled by foliar pesticide applications. Core aeration can be applied if the drip lines are installed below the penetration depth of the core aerator. Deep tine aerification cannot be conducted on turf with SDI.

4) How long will SDI systems last and should I be concerned of emitters clogging over time?

We have no data available covering the longevity of SDI systems. We recommend and have installed all our SDI systems with filters (disk, screen, or sand) and flush valves to prevent clogging from sediments or other particles. Potential root intrusion can be addressed by using either ROOTGUARD® technology (e.g. Toro DL2000®) from Toro or the TECHFILTER® system from Netafim. Our oldest SDI system was installed in spring of 2003 and is still working fine.

5) Can salts be leached with SDI?

Several research reports have documented that SDI systems are less effective than sprinkler systems at leaching salts from soils in the absence of adequate rainfall, particularly for rootzone depths above the drip lines. However, warm season grasses seashore paspalum, bermudagrass, and inland saltgrass, and cool season tall fescue did not exhibit a decline in summer quality despite salinity fluctuations in the rootzone.