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- Research Report -

SUBSURFACE DRIP IRRIGATION FOR TURFGRASS:

EMITTER OBSERVATIONS

by

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BACKGROUND

The Center for Irrigation Technology has been conducting studies on the effectiveness of subsurface drip irrigation (SDI) on turfgrass since the summer of 1989. The original goal of the study was to investigate the production of healthy, visually appealing turfgrass using the SDI method. specific objectives were to:

1. determine whether SDI of turfgrass is a viable alternative to sprinkler irrigation,
2. evaluate the products of several manufacturers,
3. evaluate each product at, above, and below recommended spacing, and
4. identify successful management techniques for subsurface-irrigated turf

The study began with eight different drip products, representing seven manufacturers. As reported previously, only two products were rated as satisfactory in producing superior quality turfgrass over the past five years. Those products are the non-compensating point source emitter incorporating "ROOTGUARD" by Geoflow and the compensating "Techline" emitter by Netafim Irrigation, Inc. These two products satisfied the intent of the original study which was to grow healthy turfgrass with no chemicals or fertilizers, and managing water application at Etc, plus adjustments for non-uniformity.

OBSERVATIONS

Numerous inquiries from industry have been made to CIT about instances of root intrusion into the emitter itself. Thus, as a follow-up to the above study, randomly selected sections of the SDI study were excavated to expose the level of root activity around the emitter. The two plots that were examined for root activity were the above mentioned Geoflow and Netafim emitters.

On April 29th, 1994, Geoflow personnel and CIT staff exposed random sections of drip line in the Geoflow test plot. Nine emitters were exposed, and none of them showed any signs of roots penetrating the discharge opening of the emitter. It appears that the "ROOTGUARD" technology is continuing to provide protection after five years of service. On several emitters, roots (without root hairs) had passed along the channel of the emitter casing, but not into the discharge holes. Finally, the Geoflow product tested in this study is an inline, a non-compensating emitter which is attached to the tubing via barbed ends after the tubing is extruded. Geoflow also markets inline, compensating and non-compensating dripline products with ROOTGUARD emitters installed during the extrusion process.

On May 13th, 1994, Netafim personnel and CIT staff exposed random sections of drip line in the test plot. A total of nine (9) Techline emitters were exposed, with seven of the nine emitters (78%) showing no sign of root intrusion. However, in the remaining two (2) Techline emitters (22%), roots had visibly penetrated the labyrinth and had affected the discharge rate.

ACTIVITIES FOR 1994

There are several planned strategies to address root intrusion in the Netafim test plot during the summer of 1994. The Techline emitter design is unique because of a large cavity which acts as a "physical barrier" just inside the discharge opening. Roots which enter the discharge opening of the emitter do not initially affect the discharge rate. In fact, the root appears to grow for some period of time, perhaps 100 days or more inside this initial chamber in the emitter before moving on into the labyrinth. This time period is based on estimates of root length which exceeded 3 inches in some cases. It is only when the root moves out of this outer chamber into the labyrinth that flow rate begins to be severely affected.

Chemical applications will take place when the root is in this outer chamber. It is at this time that the root is most susceptible to killing by lowered pH or chlorination. This is because there is no buffering effect of the soil present and the emitter flow rate has not been demonstrably affected. Thus, the efforts of the summer of 1994 will be spent trying to identify management techniques that can be used to control root intrusion. This study will focus on areas where flow degradation is
