Understanding Problems and Identifying Solutions for Texas OSSFs using Drip Irrigation (DRIP)

Bonaiti, Jantrania**,** Gerlich, and Wolfe

Summary

This research effort addresses one of the four eligible projects listed in TCEQ Solicitation 582-21-10767, **RT-2.3.2**, Proper Dosing Techniques and Application Rates for Drip Irrigation. Research is needed to assist installers, maintenance providers, and designers by developing standard procedures for drip irrigation design, installation, and maintenance.

Almost 30,000 drip irrigation system permits have been issued in Texas since 1992; however, technical guidance for the proper design and operation of drip irrigation systems is lacking. The proposed research will use a combination of data mining and field experimentation to address the research topics specified in the RFGA.

A survey instrument and follow-up interviews will be used to document drip irrigation system designs, operational procedures, and problems reported by license holders and regulators in Texas. Information regarding dosing schemes, soil effects, and tubing depth effects will be gathered from survey responses and extensive literature review. Field experiments will be conducted at the Texas A&M RELLIS Campus, Bryan Texas to evaluate drip irrigation flushing and filtration schemes, and drip irrigation tube cleaning procedures. The information gathered through these research activities will be summarized in a drip irrigation guidance manual specific for Texas designers, installers, and maintenance providers.

Goal

1. Identify problems with poorly designed, improperly installed, and mismanaged systems in Texas

2. Develop detailed guidance manual to assist Texas on-site sewage professionals regarding proper design, installation, operation, maintenance, and troubleshooting of drip irrigation systems.

Objectives

1. Create a survey instrument to query and interview regulators and license holders regarding the most common design, installation, operation, maintenance and troubleshooting procedures associated with drip irrigation systems in Texas
2. Conduct an extensive literature review of scientific articles and existing local, state, and federal publications regarding drip irrigation practices.
3. Conduct field experiments at the TAMU OSSF center evaluating drip irrigation flushing and filtration performance and irrigation line cleaning solutions

4. Foster research synergism between the TOGP Drip and E-Flow projects by leveraging resources (i.e., use Drip project drip lines to dose wetland cells with ATU effluent).
5. Summarize designs, installation practices, maintenance schemes, and troubleshooting procedures based on surveys, interviews, literature reviews and field experiments and prepare a guidance document describing best practices for installing, operating, maintaining, and troubleshooting drip irrigation systems in Texas

Research Questions

The proposed applied research and demonstration project is designed to answer the following four main questions:

Q1. What are the operational problems faced by the users and operators with the current drip irrigation design in Texas?
Q2. Can the current design, installation, and maintenance be improved to achieve better distribution of effluent and to allow for better performance of drip irrigation systems?
Q3. Do screened filters perform better than disc filters, and how does auto-backflushing affect performance of both type of filters?
Q4. Are changes required in the current design specifications of a drip irrigation system in 30 TAC Chapter 285, and if so what changes are recommended?

Deliverables

1. Summary of survey/interview results and literature reviews
2. Measurement data from line flushing, filters, and line cleaning experiments
3. A drip irrigation guidance document for Texas designers, installers, and maintenance providers
4. Quarterly progress reports
5. Final report summarizing all project activities and results