

Maintenance Guide for Florida Micro-Irrigation Systems

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SITUATION

- Converting from high-volume irrigation to micro-irrigation conserves and protects water resources.
- Water and fertilizer can still be wasted if a micro-irrigation system is not maintained properly.

OBJECTIVE

- Improve the performance of Florida micro-irrigation systems.

METHODS

- Determine current state of knowledge.
- Measure micro-irrigation system performance in grower's fields.
- Survey irrigation water properties.
- Experiment with line-cleaning and scale-preventing chemicals.
- Compile irrigation maintenance guide.
- Educate irrigation managers.

PARTNERSHIPS

- Florida Dept. of Agriculture and Consumer Services and the South West Florida Water Management District provided funding to the University of Florida IFAS.



RESULTS

- Research identified causes of poor irrigation system performance.
- Lab and field evaluation identified several effective line maintenance chemicals.
- A 34-page maintenance guide was produced.
- Three irrigation maintenance seminars were held to distribute and explain use of the guide.

CHAPTER 1: INTRODUCTION

What is "routine maintenance?"

- Checking for leaks.
- Backwashing and cleaning filters.
- Periodic line flushing
- Acidifying (if necessary).
- Chlorinating.
- Cleaning or replacing plugged emitters.
- Evaluating and monitoring system performance.

CHAPTER 2: EVALUATING THE SYSTEM

Your local USDA-NRCS Mobile Irrigation Laboratory can.....

- Identify problems and suggest solutions
- Provide guidance on irrigation system selection and installation.
- Help with irrigation management planning



CHAPTER 5: WATER TREATMENT

- Prevent biological growths (chlorine).
- Prevent precipitation reactions.
- Dissolve scale deposited on inside surfaces of tubing and emitters.



CHAPTER 6: REMEDIAL MAINTENANCE

A "specialized" attempt to unclog emitters

- Must identify plugging material.
- Chemically reclaiming plugged emitters should be considered a "last resort."
- Possible chemicals include sulfuric acid, citric acid, and Na hydrosulfide



CHAPTER 3: TESTING THE WATER SOURCE

Physical, chemical, and biological criteria for plugging potential of micro-irrigation water sources



Factor	Plugging hazard based on concentration		
	Slight	Moderate	Severe
Suspended solids ¹	< 50	50 – 100	> 100
pH	< 7.0	7.0 – 7.5	> 7.5
Tot. dissolved solids ¹	< 500	500 – 2000	> 2000
Iron ¹	< 0.1	0.1 – 1.5	> 1.5
Manganese ¹	< 0.1	0.1 – 1.5	> 1.5
Calcium ¹	< 40	40 – 80	> 80
Alkalinity as CaCO ₃ ¹	< 150	150 – 300	> 300
Hydrogen sulfide ¹	< 0.2	0.2 – 2.0	> 2.0
Bacteria (#/mL)	< 10,000	10,000 – 50,000	> 50,000

¹Concentration as mg/L or parts per million (ppm).

Source: *Orange, Manual in the Field*, p. 25, 26, 27

CHAPTER 7: IRON, MANGANESE, AND SULFUR

- Iron scale is the most difficult problem to remedy.



CHAPTER 8: SUMMARY

- Preventative maintenance is the key.
- Regularly flushing the system is critical.
- Plugged systems require cleaning or replacing emitters and purging.
- Water treatment involves chlorine, acid, or inhibitors.
- Check effectiveness of chemical treatment with monitoring devices or uniformity measurements.



CHAPTER 4: ROUTINE MAINTENANCE

- Pump
- Power unit
- Water filters
- Line flushing
- Automatic valves
- Field pipe, tubing, and emitters
- Pressure gauges and flow meters
- Chemical injection equipment

