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FS793

Fact sheet

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Using Irrigation Water Tests to Predict and Prevent Clogging of Drip Irrigation Systems

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Why Water Testing?

Irrigation water testing is performed to evaluate the suitability of a water source for use with drip irrigation systems. Testing can also be used after emitter clogging problems arise to determine the source of clogging and to devise a plan to correct the problem. Water testing should be performed before a new drip irrigation system is installed or before a previously unused water source is used. Although emitter clogging occurs infrequently in New Jersey, it should not be considered unimportant. **Clogging can quickly and irreparably disable a drip irrigation system.**

How Is Irrigation Water Testing Performed?

The cost and effort required for water testing is minimal. Obtaining a water sample, delivering the sample to a testing lab, and interpreting the water analysis (with the help of this fact sheet) is usually all that is required. The cost of having a sample tested in 1995 was about $50.

Water Sampling Procedure

Groundwater: Water drawn from deep wells should be obtained from a faucet or port near the well head. Allow the pump to operate for 5-10 minutes before sampling. Collect 1-2 pints of water in a clean, glass jar. Fill the jar to the brim and seal it tightly.

Surface Water: It is best to obtain a sample that has been pumped by the irrigation system. Allow the irrigation pump to operate for 5-10 minutes before sampling. Collect 1-2 pints of water in a clean, glass jar. Fill the jar to the brim and seal it tightly. If running the irrigation pump is not possible, obtain a sample from near the inlet pipe. If time-of-year affects water quality, collect the sample when water quality is representative of water that will be used during the irrigation season.

Water Analysis

Deliver the sample to a water testing lab within 24 hours of when the sample was collected. This will minimize the chemical reactions that occur in the water sample during the time between sampling and testing. Specify that the parameters listed in Table 1 be measured. Many water testing laboratories are capable of performing these tests. Consult the yellow pages under 'Water Analysis' or 'Water Testing' to locate a nearby lab.

Water Analysis Interpretation

Emitter clogging occurs as a result of physical contaminants, chemical reactions, and biological activities. Physical contaminants (indicated by "suspended solids" in the water test) include mineral matter (sand, silt, clay) and organic matter (algae, weeds). High concentrations of these contaminants

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can overload the filtration system. Chemical properties of the irrigation water (pH) and chemical constituents (iron, manganese, hardness) can cause chemical reactions and result in the precipitation of certain water and fertilizer constituents. Bacteria are the principal biological contaminant which contribute to clogging.

Use Table 2 to determine the clogging potential of irrigation water based on the results of the laboratory analysis. If one or more of the water criteria fall in the Moderate or Severe categories, water treatment may be necessary to prevent clogging. To assist in interpreting a water test, consult a local county agricultural agent.

Table 1. Important irrigation water parameters

Suspended solids (ppm)
Dissolved solids (ppm)
pH
Hardness (as $CaCO_3$, ppm)
Iron (ppm)
Manganese (ppm)
Bacteria (total plant count/ml)

Table 2. Drip irrigation emitter clogging potential

Water Criteria	Clogging Potential		
	slight	moderate	severe
	concentration (ppm)		
Physical			
suspended solids	< 50	50 to 100	> 100
Chemical			
pH	< 7.0	7.0 to 7.5	> 7.5
dissolved solids	< 500	500 to 2,000	> 2,000
manganese	< 0.1	0.1 to 1.5	> 1.5
iron	< 0.1	0.1 to 1.5	> 1.5
hardness, as $CaCO_3$	< 150	150 to 300	> 300
Biological			
bacteria (plate count/ml)	< 10,000	10,000 to 50,000	> 50,000

Desktop publishing by Rutgers-Cook College Resource Center

Published: June 1995

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