

large enough to plug emitters. Certain bacteria can cause enough precipitation of manganese, sulfur, and iron compounds to cause emitter plugging. In addition, algae can be transported into the irrigation system from the water source and create conditions that may promote the formation of aggregates.

Emitter plugging problems are common when using water that has high biological activity and high levels of iron and hydrogen sulfide. This is a frequent problem in Florida, because iron and sulfur are common constituents of many Florida waters.

Soluble ferrous iron is a primary energy source for certain iron-precipitating bacteria (Gilbert and Ford, 1986). These bacteria can attach to surfaces and oxidize ferrous iron to its insoluble ferric iron form. In this process, the bacteria create a slime that can form aggregates called ochre, which may combine with other materials in the micro irrigation tubing and cause emitter plugging (Ford and Tucker, 1975). Ochre deposits and associated slimes are usually red, yellow, or tan.

Sulfur slime is a yellow to white stringy deposit formed by the oxidation of hydrogen sulfide commonly present in shallow wells in Florida. Hydrogen sulfide (H_2S) accumulation in groundwater is a process typically associated with reduced conditions in anaerobic environments. Sulfide production is common in lakes and marine sediments, flooded soils, and ditches; it can be recognized by the rotten egg odor. Sulfur slime is produced by certain filamentous bacteria that can oxidize hydrogen sulfide and produce insoluble elemental sulfur.

The sulfur bacteria problem can be minimized if there is not air-water contact until water is discharged from the system. Defective valves or pipe fittings on the suction side of the irrigation pump are common causes of sulfur bacteria problems (Ford and Tucker, 1975). If a pressure tank is used, the air-water contact in the pressure tank can lead to bacterial growth in the tank, clogging the emitter. The use of an air bladder or diaphragm to separate the air from the water should minimize this problem.

Chemical

Water is often referred to as the universal solvent since almost everything is soluble in it to some extent. The solubility of a given material in water is controlled by variations in temperature, pressure, pH, redox potential, and the relative concentrations of other substances in solution. Three gases (oxygen, carbon dioxide, and hydrogen sulfide) are important in determining the solubility characteristics of water. These gases are very reactive in water, and