



Water quality in the greenhouse

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The quality of water in a greenhouse operation will have a major impact on many aspects of greenhouse crop production and management including: 1) the water system (components and method of distribution), 2) plant growth and 3) wastewater discharge.

The grower should be aware of the source of water (i.e. private well, surface water body or spring) and its analysis to avoid potential environmental and operational problems. Nonmunicipal water used in Connecticut greenhouses is generally on the acidic side, pH less than 7, and is not in the hard water category (over 140 pm or 8 grains) at most locations.

Watering/Distribution System

The water quality problem that can be encountered is dependent upon the water source. With deep wells, there can be a mineral problem (iron, manganese or hardness). These minerals can cause plugging of spray nozzles or drip tube openings. A water hardness condition causes deposits in hot water piping on heating elements (electric hot water heater) and within the hot water heating coil. The latter two will result in decreased heating efficiency.

Acidic water can dissolve metal from metal piping (lead, cadmium, zinc). Attention should be given to pH level recommendations when mixing or injecting chemicals with water. For example if chlorine were used for disinfecting a water supply, more chlorine would be used when the water pH is greater than 7.0 than if it were less than 7.0.

Plant Effects

Plants can be affected by water having too many dissolved solids (organic matter, inorganic salts), high concentrations of chloride or boron or by a high percentage of sodium or potassium ions. Inorganic salts are calcium and magnesium carbonates, bicarbonates, chlorides and sulfates, with traces of iron, manganese and other substances. Excess sodium and chloride causes stunting of plants and can result in plant toxicity. Boron in water at a concentration greater than 0.5 ppm can present plant toxicity problems.

The data base for effects of water quality on many plants grown in the greenhouse is limited.

Therefore, it may be beneficial for the grower to collect water analyses information for constituents considered harmful to plants being grown or housed. Also test your water and get experience by testing new irrigation and water treatment practices on a small scale. All Cooperative Extension System offices should have a listing of the nearby state approved water laboratories. The Natural Resources Management and Engineering Department at Storrs has the laboratory listing for the state on file, if additional assistance is needed.

Wastewater Discharges

Environmentally, greenhouse operators need to review practices that can impact on water quality. This applies to surface runoff or any contaminated leachate migrating through the soil into the groundwater. These discharges should be made in an environmentally safe manner and

should not contribute to ground or surface water contamination. Where excess nutrient discharges from fertilizer applications are collected in a surface water pond, algal blooms and nutrient build-up can occur. If these nutrients enter into the aquifer below, nitrate build-up in the groundwater can occur.

Current and future thinking for greenhouse operations is to develop a resource management plan (RMP) that attempts to preserve water quality integrity. In particular, the RMP includes nutrient and pesticide management. For greenhouses having an earthen floor, the nature and amount of leachate infiltrating into the ground will need to be examined. The amount of leachate may need to be reduced, controlled or, in some cases, eliminated. Where there is a nonearthen floor and a drainage system used for collection of this wastewater, contaminant removal may even be necessary if environmental standards are exceeded.

Recently, the USDA Cooperative Extension System and the Soil Conservation Service signed a water quality initiative memorandum of understanding. In the future, the cooperative educational and technical assistance efforts of these two agencies will be emphasizing the resource management system planning process.