

Management of Saline Irrigation Water in the Nursery

Gary W. Knox*

Introduction

A salinity problem with irrigation water can be serious but not necessarily disastrous. Moderately saline irrigation water can be used to successfully grow ornamentals if proper irrigation management is combined with appropriate plant, growing medium, and fertilizer selection. Improper management of saline irrigation water can result in high concentrations of soluble salts in the growing medium. Before discussing approaches to this problem, some of the basics of soluble salts and water uptake by plants should be reviewed.

Water and Nutrient Absorption

Plants absorb water and nutrients primarily through root hairs, minute appendages of root cells that are in close contact with soil particles and with the thin film of moisture around each soil particle. This film of water contains dissolved nutrients and other compounds, collectively called "soluble salts" or "salts." Water is attracted to and held by soil particles and by the salts which are dissolved in the water. The attraction of water to dissolved salts is called "osmosis," and causes water to move from areas of low salt concentration to areas of high concentration.

Root hairs selectively absorb those compounds which plants require for growth. Water absorption by roots occurs actively as a result of nutrient uptake and passively as a result of water demand by shoots. The osmotic effect of the salts accumulated in roots causes water to move from the soil solution (area of low salt concentration) into roots (area of higher salt concentration) and then throughout the plant.

High concentrations of soluble salts in the soil create problems for plants for the following reasons: 1) salts in the soil solution become so concentrated that the plant cannot "compete" with these salts to attract water into the roots; 2) roots may be damaged if the osmotic effect of the soil solution is great enough to draw water out of the roots; 3) a compound may be so abundant that the roots absorb too much of that particular salt, which then accumulates to toxic levels in the plant; and 4) if sodium is pre-

* Extension Water Management Specialist, Agricultural Research and Education Center — Monticello, Fla., IFAS, University of Florida, Gainesville, 32611.