

# Part III: Noncontagious Diseases

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Part II is in this issue.)*

**S**ymptoms of some plant disorders may resemble or be confused with diseases caused by plant pathogens. A cultural history is often the key to interpreting symptoms of plant damage. In a few cases it will be difficult to make an accurate determination without a formal laboratory diagnosis, including soil and/or foliar analysis.

## **Spray Injury**

Application of pesticides, growth regulators or fertilizers may result in plant injury if applied to sensitive plants or to normally insensitive plants under the wrong conditions. Spray injury often shows as brown spotting, a faint yellowish mottling, leaf edge burn or yellowing or sometimes a bronzing of the leaf undersurface. Spray damage can appear within hours or a few days after treatment. Petals, buds and young growth are usually most susceptible to injury and may become twisted or distorted with time, after they have fully expanded. If spray injury is suspected, review materials and application methods, rates, timing and fre-

quency with the applicator. Environmental conditions at the time of treatment may also be important. The condition of the crop may also be significant, plants that are stressed from lack of moisture or which have few or no roots may be more prone to injury.

### **Monitoring Tips**

Learn to recognize plant responses to common treatments that do not represent actual problems. One commonly observed spray injury is the yellowing of portions of geranium leaves following Cycocel (growth regulator) application. In this case, the injury is temporary and not harmful to the crop. Some cultivars may exhibit this response, while others are unaffected.

### **Nutrient Toxicities/Deficiencies**

Soluble salts can build up in growing media, particularly in crops receiving regular fertilization where minerals in water are high and/or there is little or no leaching. High soluble salts causes a reverse osmosis; that is, water is drawn out of plant roots. Root tips become desiccated and usually collapse and turn brown. Fluctuating media moisture levels exacerbate a high soluble salts problem. Plants with extensive root damage then suffer from other nutrient and water problems, leading to wilting, marginal chlorosis (yellowing) or necrosis (tissue death), stunting or other symptoms. High soluble salts also tends to increase or trigger *Pythium* root rot.

### **Monitoring Tips**

Knock several plants out of their pots or flats and see whether plants show healthy white roots or root tips which are discolored and collapsed. If so, the cause may be either root rot caused by a fungus or root desiccation due to injury from high soluble salts. Portable conductivity meters can be used to get a quick idea of salts levels. Anticipate salts injury to appear first in areas where pots or flats tend to dry out most, such as the ends or sides of benches. If high soluble salts are detected in the growing medium, leach with dilute fertilizer solution or clear water and adjust the fertilization program for the crop.

### **pH Problems**

The most frequently encountered pH-related problem in bedding plant production is iron-manganese toxicity. Certain marigolds exhibit stunting and purplish flecking on leaves when grown at an excessively low pH. Zonal geraniums are also sensi-

tive to excessively low pH; 'Aurora' is an example of a particularly sensitive cultivar which shows brown flecking, necrotic margins and chlorosis on the lower leaves in response to excessive uptake of iron or manganese. Raising the pH to 6.0 is generally beneficial in such instances.

### **Monitoring Tips**

Regular monitoring of pH levels can help to provide the grower with early warning of a low pH situation developing in a sensitive crop. Changes in the fertilizer program or liming treatments may help to maintain crop health.

### **Injury from Air Pollutants**

In the cool temperatures at the beginning of the bedding plant production season, unvented space heaters are frequently the cause of injury to plants. Smokestacks that are not tall enough may also cause phytotoxic fumes to be pulled back in through the greenhouse vents. If fuel contains sulfur, sulfur dioxide may cause bleached or dead areas between the leaf veins of sensitive bedding plants. Ethylene, a gas that results from incomplete combustion of fossil fuels, is sometimes formed in greenhouse when sufficient oxygen is not supplied to a burner. Ethylene can cause various plant symptoms, including distortion of terminal growth, inhibition of the apical meristem, flower drop and leaf chlorosis. Tomatoes are particularly sensitive and have been used as indicator plants to assess whether plant injury was due to ethylene.

(This concludes the three-part *The IPM-Way to Manage Bedding Plant Diseases*. This article was reprinted from *Greenhouse IPM Update*, Vol. 5(8), 1995.)

