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Cold temperatures + Cloudy days = Careful watering!

With cold and cloudy days it can be easy to over-water your crops. Overwatering your crops can lead to a number of nutritional, disease, and insect problems.

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In many areas the U.S. we have seen colder than normal temperatures accompanied by cloudy weather. In conditions like this it is easy to run in to problems that start with over-watering if we don't adjust our irrigation schedules.

Over-watering plants can lead to any number of insect, disease and even nutritional problems with crops in the greenhouses. Watching the weather forecast is essential at this time of the year when huge swings in temperature can occur from day to day. Knowing what tomorrow's weather will bring will likely impact how you irrigate today. In this alert we will cover a few of the common problems that we encounter when our crops are over-watered.

Nutritional problems

Although they are underground, roots need oxygen to remain healthy and to operate correctly. Of course one of those operations that we need to be working is nutrient uptake. When plants are over-watered for a period of time they may begin to show symptoms nutrient deficiencies. Some of the most com-

Figure 1. a) plants with symptoms of nitrogen deficinecy; b) plants with symptoms of phosphorus deficiency; and c) plant with symptoms of iron deficiency.

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Figure 2. After looking at the roots of this plant there are few roots present, and those that are present are browning or clearly dead already.

mon symptoms of nutrient deficiencies associated with over-watering are nitrogen, phosphorus, and iron. Nitrogen deficiency is typically found on the lower, or oldest, leaves of the plant and appears as an overall chlorosis (Figure 1a). Lower leaf purpling is often associated with phosphorus deficiency (Figure 1b). Iron deficiency most commonly appears as interveinal chlorosis on the youngest leaves of the plant (Figure 1c). Of course there are other causes of these deficiencies, but if your electrical conductivity (E.C.) and pH are in acceptable ranges for your crop be sure to notice the moisture level of your substrate, it could be too saturated.

Diseases

All the symptoms described above in the "Nutritional problems" section can also be caused by the plant being infected by a root rot disease. In this case, the symptoms are secondary to the disease, but if the root growth is hindered, or the roots have been lost due to rot, the plant still cannot absorb adequate nutrients and deficiency symptoms appear. As in almost every case of diagnosing a plant problem the first thing you should look at is the roots. If you see poor rooting or brown mushy roots (Figure 2), your crop probably has a root rot disease. What you hope to see are plenty of roots that are a bright white color (Figure 3). If you do suspect a root rot, it is important to get it correctly diagnosed by a diagnostic lab or your local extension agent as control measures may vary depending on which disease has infected your crop.

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Figure 3. Plant with bright white healty roots.

Insects

Consistently wet substrate can promote infestations of fungus gnats and shore flies. Fungus gnat larva live in the substrate and prefer a moist environment. Substrate that cycles through a natural wet-dry periods are not overly conducive to fungus gnats. Fungus gnat larva will feed upon the roots and stems of plants. When plants are kept too wet algae often begins to grow on the surface of the substrate (Figure 4). This algae can be a food source to shore flies. The best way to prevent an infestation of either of these insect pests is to allow the substrate to dry out between waterings to eliminate any algae growth and avoid creating a habitable environment for them to live.

All of the issues addressed above are easily managed with a little forethought and strict water management. Be sure to walk your crop daily before making decisions about watering. Visual assessment is seldom adequate; get into the practice of lifting pots up to determine the water content based on weight. Even go to the extra effort of looking at the roots, you'll be closely monitoring moisture levels as well as scouting for any root problems at the same time.

Figure 4. After being overwatered for an extended amount of time, algae may start to grow on the substrate surface and serve as a food source for fungus gnats and shore flies.

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