



by Paul A. Thomas
pathomas@uga.edu

Are You Ready For The Spring-Swing? Your Leaves and Soil Will Tell.....

One of the main reasons we publish E-Gro Alerts is to provide growers with advance warning of problems and issues that are popping up in U.S. production. So...are you ready for the rapid swings in temperature, light and evaporation rates that will come in the next weeks as Winter moves on?



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This has been a very long, cold and snowy winter for most folks in the Eastern half of the United States. Here in the South, the warm weather broke through this week, and the local growers cheered as signs of Spring appeared both in and outside of their greenhouses. Now, a few 75-80 degree afternoons later, all kinds of symptoms are coming across my desk. In every case, the problem was attributed to the lack of the production protocol shift that must take place when the Spring warm up finally happens.

I preach this to my students, explaining that more sunshine, more evapotranspiration will change their watering schedules dramatically. I tell them that the soils will warm up and that

pH shifts happen fast now. I point out that many crops have adapted to the 5 endless weeks of cloudy weather we had (I hear Michigan and New York growers laughing

at me). When the sun comes out, many will not have the ability to handle the increased heat load unless very careful attention is paid to watering and air movement



Classic Oedema of one of the common sweet potato cultivars. Careful attention to weather, night temperature and fertility restraint can minimize this.

e-GRO Alert

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CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension -
Suffolk County
nora.catlin@cornell.edu

Dr. Kristin Getter
Floriculture Outreach Specialist
Michigan State University
getterk@msu.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension -
Suffolk County
dog1@cornell.edu

Dr. Brian Krug
Floriculture Ext. Specialist
Univ. New Hampshire
brian.krug@unh.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Dr. Roberto Lopez
Floriculture Extension Specialist &
Research
Purdue University
rglopez@purdue.edu

Dr. Paul Thomas
Floriculture Extension & Research
University of Georgia
pathomas@uga.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

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in the greenhouse. As time passes, and as new leaves are rapidly formed, the new foliage will be better adapted. Worse, many different species of flowering or vegetatively distinct plants respond differently to this seasonal change. Let us review a few areas to watch for...its all about being alert, aware and flexible as a grower.

Keep Your Night Temperatures Realistic.

Let us start with the mystery of Oedema. Oedema is a disfigurement of the leaves caused when leaf cells, usually found near the veins of the leaf, appear to rupture or leak in certain plants in early Spring. This leaves warty, sometimes

gritty bumps as seen in image 1. Interesting research by Nicole Ann Rud at Kansas State. 2009, reported in her thesis titled "Environmental Factors Influencing the Physiological Disorders of Edema on Ivy Geranium (*Pelargonium Peltatum*) and Intumescences on Tomato (*Solanum Lycopersicum*)," that factors such as soil moisture and greenhouse humidity did not seem to be correlated as the cause, nor did Calcium Nitrate application improve the chances of reducing it. From my personal observation on this year's crop of student-grown Sweet Potatoe, plants inspected at 5:30 pm on a Tuesday had no Oedema, and were fertilized by the students. The next morning, the



African Violets showing classic leaf spotting after being irrigated with cold water on a very warm sunny afternoon. If you must overhead water, do so when the leaves are coolest in early morning.

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portion of the bench grown crop exposed to a cold draft during the night (our big winter storm) showed distinct Oedema...in the leaves of plants nearest to the colder, wind facing greenhouse glazing. When I measured the temperature at 7:30 am, the soil temperature was 51F near the glazing. Two feet further in, the temperature was 63F. Only the first two rows nearest the cold glazing had strong Oedema, and the severity decreased as the distance inward increased. This tracks well with Oedema on Ivy Geraniums and Ipomea we have seen here in Georgia in greenhouses that set night temperatures very low to save heat, yet fertilize aggressively as signs of spring

appear and the days become sunny. I suspect membrane permeability is compromised in chilled plants as these are warm environment crops. Further research will need to be done to prove that, but we know that warmer night temperature reduces or eliminates it, as does warmer night and day temperatures later in the Spring. Perhaps going slowly with the fertilizer regime until the greenhouse can be kept at 65 F or above at night, or biting the bullet and raising night temperatures will help.

When light levels increase, turn up the air movement!

Another response we have seen in local greenhouses, especially with folks finish-



This Acuba had been growing nicely in a bright coldframe January and February. The first two sunny days in March caused the leaves to overheat, and cells to die. The coldframe never went over 80F

ing foliage plants for resale, or overwintering semi-hardy crops such as Acuba, is that after this long cloudy, cold winter, this rapid warm up has caused leaf scalding in older, winter-retained leaves. In almost every case, the culprit was rapidly warming, high-light conditions with no or inadequate air flow! No one check to see if fans were not running and leaf temperatures rose quickly. Interiorscape companies know the process to adapt a plant back to high light takes weeks, and if you don't provide increased airflow, the evaporation and cooling of these winter-adapted leaves is very poor.

Evapotranspiration Rises!

Concurrently, in most greenhouse crops, as the sun warms the air and the leaf surfaces, evapotranspiration increases rapidly. Plants that needed to be watered every 5 days now seem to need water every other day. Unless you make the shift in irrigation, adding that first big pulse of Spring fertility can induce rapid accumulation of fertilizer salts on leaf margins. This is due to the plant taking up so much more water, but not growing rapidly enough to assimilate the high pulses of fertility. As the water leaves the leaf, the portions of the leaf nearest the edges loses the most water, leaving behind the unused fertility (salts).

The end result is marginal or edge burn. Once again, pulse feeding just as the weather breaks can be risky.

Increased Edge Effects

Let us assume you turn up the fans, open the vents more and really watch the temperature. The very next thing we see is that evaporation from the soil surface, and the water usage by the plant increases at the edges of the benches. Again, if your staff isn't turned to the new regime and do a heavy pulse feed, and this is followed by a significant edge drying effect due to air-movement, you can pretty quickly see salt damage, wilted plants and even soil



High fertility levels followed by very bright sunshine, warm temperatures and high evapotranspiration rates can lead to leaf margin damage. In the second image, cucumbers grown organically experience excessive fertility as sun and soil temperature increased bio-activity and N availability.

pulling away from the sides of the pot wall. My students in one class were stunned that hanging basket fern in the path of an HAF fan can dry out in one day! The only proper response to this shift in air flow is to track it and mark areas for frequent scouting, especially the pots or flats at the edges and corners of benches or in the fan path.

Soil Biota And Chemistry Change in Warmer Weather

Even if you keep the night temperature rock steady, increased sunshine and warmer afternoon greenhouse temperatures will increase the average daily temperature of

your soil. This often promotes faster growth, but it can also mean more irrigation, more frequent fertilizations and more interaction between the lime particles, the peat particles and any significant properties of your water, such as pH or alkalinity levels. The best way to put this is that in cool weather, the processes that raise or lower soil pH happen slowly. As the Spring brings on warmth, this process speeds up significantly. The best advice is to do a "Pour Thru" pH and EC test once a week once your weather warms up, and scout often for tell tale signs of pH drift. Vinca make a wonderful tattle-tale crop.

When plugs are properly planted later in the Spring, they will react very strongly to any rise in soil pH.

Bugs and Pathogens Rise!

Once the suns out, you have to think about those bugs and diseases that explode in warmer weather! Suffice to say, we have excellent colleagues on the E-Gro team that will be addressing disease and insect population dynamics. Please consider my message that as soon as you see the shift to warmer weather, you better be versed and prepared, sticky cards in hand, for the new dynamics that warmer weather will bring. Enjoy!



Increased daily soil temperatures means much faster reaction rates for peat breakdown, microbial activity and lime usage by soilless mediums. When Vinca start growing once the weather warms, the soil pH almost inevitably changes, leaving the usual symptoms of an improper pH. Track it!