



by Paul A. Thomas
pathomas@uga.edu

Unexpectedly High Daytime Greenhouse Temperatures Can Disrupt Crop Expectations

Much of the mid-west, south and lower northeast have been experiencing unusually warm weather, characterized by many consecutive afternoons of much higher than normal temperatures. Here are a handful of greenhouse issues reported that you may want to check against to make sure your crops are not affected. If so, there is time to make adjustments to get back on schedule.

If you own or run a multi-acre, computer controlled environment greenhouse, this e-Gro alert may not be a critical read. If you run a small, family operation, or multiple heated hoop houses, read on! From time to time, afternoon temperatures can rise during the winter season, but rarely do these conditions last more than a day or two. This year we have seen up to 10 consecutive days of afternoon temperatures 20-30 degrees F above seasonal outdoor temperatures. Temperatures in greenhouses not controlled by computer systems rose rapidly each day. This temperature anomaly has thrown a few monkey wrenches into crop schedules/plans. Greenhouse production is all about control, but this Spring, control in smaller houses has been difficult. Here are a few of the many issues I have either seen or discussed with growers regarding the unexpected temperatures on their run crop production. Keep in mind your crops may not have experienced the same impact, but it wouldn't hurt to consider the following!

2017 Sponsors



Fig. 1. Diligent tracking of insect numbers can reveal early population growth due to temperature spikes.

e-GRO Alert

www.e-gro.org

CONTRIBUTORS

- Dr. Nora Catlin**
Floriculture Specialist
Cornell Cooperative Extension - Suffolk County
nora.catlin@cornell.edu
- Dr. Chris Currey**
Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu
- Dr. Ryan Dickson**
Floriculture Extension & Research
University of New Hampshire
ryan.dickson@unh.edu
- Thomas Ford**
Commercial Horticulture Educator
Penn State Extension
tgf2@psu.edu
- Dan Gilrein**
Entomology Specialist
Cornell Cooperative Extension - Suffolk County
dog1@cornell.edu
- Dr. Joyce Latimer**
Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu
- Dr. Roberto Lopez**
Floriculture Extension & Research
Michigan State University
rglopez@msu.edu
- Dr. Neil Mattson**
Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu
- Dr. Garrett Owen**
Floriculture Outreach Specialist - Michigan State Univ.
wgowen@msu.edu
- Dr. Rosa E. Raudales**
Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu
- Dr. Beth Scheckelhoff**
Ext. Educator – Greenhouse Systems
The Ohio State University
scheckelhoff.11@osu.edu
- Lee Stivers**
Extension Educator – Horticulture
Penn State Extension, Washington County
ljs32@psu.edu
- Dr. Paul Thomas**
Floriculture Extension & Research
University of Georgia
pathomas@uga.edu
- Dr. Ariana Torres-Bravo**
Horticulture/ Ag. Econ., Purdue University
torres2@purdue.edu
- Dr. Brian Whipker**
Floriculture Extension & Research - NC State Univ.
bwhipker@ncsu.edu
- Heidi Wollaeger**
Floriculture Outreach Specialist - Michigan State Univ.
wollaeger@anr.msu.edu

Copyright © 2017

Where trade names, proprietary products, or specific equipment are listed, no discrimination is intended and no endorsement, guarantee or warranty is implied by the authors, universities or associations.

Unexpected Stretch in Easter Lilies and Salvia

There are temperature sensitive greenhouse crops that naturally respond quickly when there are changes in the average daily temperature (ADT). This unusual winter/early spring weather increased afternoon temperatures in small houses, causing a much wider gap between the day and night temperatures. A direct response is stretch. Although not many small commercial operations grow Easter lilies, a few that do reported surprising early season internode stretch. This led to consternation as to whether to apply PGR's or not. Most went ahead and applied a treatment. Those that caught the stretch early gained control easily...scouting is essential. Another plant group that has responded to the weather by stretching are the Salvias. Those greenhouses in the south pushing for an early Spring sale saw very rapid, stretchy growth in February! It wasn't that growers didn't plan for stretch, it's that they didn't expect to have to implement PGR treatments so early.

Rapid increases in Endemic Insect Populations

If daily temperatures increase, so does the rate of reproduction for many greenhouse pests. One grower was surprised by a rapid increase in spider mites. To save money many small growers delay costly spraying programs until the populations appear. This year, mite populations, shore fly and fungus gnat populations were exploding in January. Once the issue arose, money was spent. Their pesticide cost budget is now looking grim. Scouting pays for itself!



Fig. 2. Tomato seedlings expressing temperature driven stretch just after transplant. The stretch started in the plug tray.

Rapid Onset Wilting Wilted plants

I have talked to a few greenhouses owners that have experienced wilting issues because their irrigation people were caught off guard. We all get into set patterns of growing tasks, and apparently, the low evaporation rates normally seen in January and February were replaced with very warm, dry conditions, and high evaporation rates. The end result was an afternoon or two where seedlings and plug trays being held dried out. Worse, when the seedling did dry out, they dried to the permanent wilting point. Solutions to this are easy if you have the infrastructure. Retractable greenhouse shading cloth, and an aggressive tray scouting policy when temperatures spike are common among plug producers.

Bedding Plants Significantly Ahead of Schedule

Some growers grow Spring bedding plants on the cool side because they are trying to conserve fuel/heating costs. One usually adds two weeks to the production of flats due to the keeping night temperatures low. Growers were quickly in big trouble this season following that plan! A grower I visited had Marigolds in full bloom four weeks ahead of schedule. Even with the plastic covered hoop house doors open, temperatures rose. Plant growth increases as night and day temperatures rise, and the Q10 effect was in full force. Had they known, they might have been able to generate a market down south and grown another turn. As it is, they are scrambling to sell the mature bedding crop. PGR's can only do so much and you must apply them early, just as the temperatures starts getting out of control. This is risky business in January. A far better approach is to evaluate the cooling capabilities in your hoop houses and install roll up sides!

Cooperating Universities

UConn



Cornell University



The University of Georgia

IOWA STATE UNIVERSITY

MICHIGAN STATE UNIVERSITY

NC STATE UNIVERSITY



THE OHIO STATE UNIVERSITY

PENNSTATE



Cooperative Extension
College of Agricultural Sciences

PURDUE UNIVERSITY



University of New Hampshire
Cooperative Extension



VirginiaTech
Invent the Future®



Excessive PGR Response

One of the PGR application mantras my colleagues are frequently heard chanting is to never apply PGR's on really hot afternoons. Q10 effects how plants adsorb, and metabolize plant growth regulators. The warmer the weather, the warmed the stem or leaf tissue, the more efficacious the PGR is. I'm sure it is no surprise that in response to the observed stretch, a few growers applied PGR immediately upon seeing the issue, in the afternoon heat of late January, and wound up with very strong effects. In this case, it was not phytotoxicity, but rather the plant just stopped growing and is still in stasis. If the weather is warm, spray in the early morning. A second consideration is that both growers decided to use the high recommendation rate out of concern. Using a higher rate in spring (in January!) is risky business.

Low (or High) Crop EC Values In Long-Term Crops Such as Ferns

Long term crops that are easily maintained such as foliage plants and hanging basket

ferns can be affected by the heat in different ways. Ferns love heat, but the increased evaporation requires more frequent irrigation. For large operation using drip, or sensor driven fertigation systems this is not an issue. For small operations that water and fertilize by hand, it is. Growers usually put these kinds of easy-to-grow plants on a simple fertility schedule, independent of watering. In January, large fern baskets frequently don't need watering between fertilization. This year they were being watered several times a week. The end result was pale, hungry looking ferns. When I checked soil EC, it was down to 0.21 mS. No wonder they looked hungry. Ideal EC levels are around 0.8 mS But wait! There's more! One grower whom had small fern liners freshly planted in 10" baskets, and was using a continuous feed program, noticed a bit of tip burn on the fronds. A check of the EC revealed a 2.64 mS EC. This is way above the industry recommended EC limit of 1.0 mS. His constant feed was only 75 ppm. What was happening was strong



Fig. 3. An almost uniform, first-wave generation of aphids brought on by the temperature spike.

evaporation from baskets, high the the upper portion of the house, allowed salts to rapidly accumulate. The air temperature in that upper portion of the hoop house was 98 degrees the day I visited. It was 78 outdoors. The solution is simply doing a pour-thru test on a fern or two each week, leaching with fresh water if you see high EC, and considering cooling strategies for January. We fixed the issue with a \$23.00 dollar box fan placed at the top of the leeward entrance doorframe. This increase fresh air intake and disrupted the hot air layer sufficiently. Simple fix if you scout.

Minor Tip/Margin Yellowing

As mentioned above, high temperatures do mean more water movement and several growers repoted tip and margin burn on some sensitive crops. I discuss the causes of tip burn in a previous issue of e-Gro Alerts that certainly ties into the issues we have discussed here.

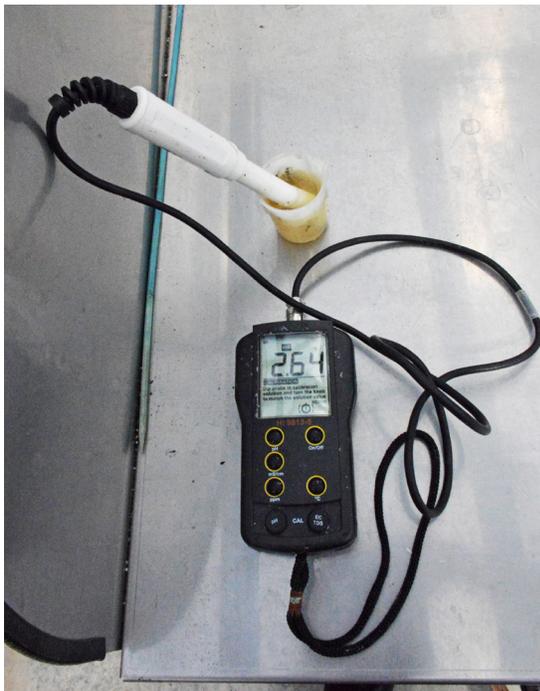


Fig. 4. A very high EC level for Boston Ferns caused by high temperatures and high evaporation rates. Time to leach!

Bottom line?

We are likely going to continue to see warmer winter and spring temperature fluctuations. If you don't happen to have the infrastructure to deal with this using automated systems, build a winter "heat wave" scouting plan and stress using sticky cards, temperature / light monitoring, pH/EC testing, options for ventilation and shade application options and please, consider using the low rates of PGR for winter season appliaction. We can't control the weather, but we can reduce it's impact on our crops.



Fig. 5. Angelona showing the increased afternoon heat experienced two weeks ago . Note the grower regained control.