The Greenhouse's Battle with Diseased Gloxinia

A mid-size greenhouse operation in Ohio that produced primarily potted flowering crops for a 'big box' discount chain store company ran into a crisis situation: the latest gloxina crop was rapidly declining from a disease problem. And in general, the operation was having crop health problems across the board--in addition to gloxinia, the Persian and African violets that the operation was known for were also lacking in quality of late; leaves (and whole plants, for that matter) appeared small and darkish green, and the crops lacked vigor in general.

The production history of the gloxinia crop, which was the most urgent problem, was as follows: 2-1/4" liners of gloxina were purchased from a specialist propagator in Florida and potted into 6" azalea pots on March 14. Temperature was maintained at 65-70 F night. The root medium was mixed on-site; the recipe was 65 sphagnum peat moss : 35 horticultural grade perlite with 10 lbs. dolomitic lime, 0.5 lb. potassium nitrate, 1 lb. gypsum, and 4 lbs. Esmigran micronutrient mix per cubic yard. Crops are fertilized with Plant Marvel 15-0-15 Hi Cal Special fertilizer [www.plantmarvel.com/greenhouse.htm], 150 ppm N from constant liquid feed.

Photo A. Three weeks after transplanting the liners, a number of gloxina appeared as in this photo, and the crop was going down quickly. A greenhouse crops consultant was called in on April 3 to evaluate the problem because collapse of the young gloxinia plants was occurring rapidly. From a sample taken by the consultant, a Plant Disease and Diagnostics Clinic isolated a relatively rare pathogen, *Myrothecium roridum,* from the crown rot associated with these plants. The grower dumped the entire gloxinia crop and began a preventative fungicide application rotation on all crops in this range.

Photo B. A handful of the gloxinia liners had not been potted up. They were not showing any symptomology of a *Myrothecium* infestation, and the grower opted to just leave them in the smaller container and grow them on to see if this could provide a hint as to the source of the problem. He applied the fungicide rotation of chlorothalonil (Daconil 2787), iprodione (Chipco 26019), and trifloxystrobin (Compass 50W) weekly, at label rates, to all crops in this production space, including the unpotted liners. Several weeks after the initial infestation, the gloxina plant in Photo B had reached reproductive maturity (though weak and spindly) but then suddenly wilted and died. *Myrothecium* was isolated from stem cankers near the soil line.

Photo C. The *Myrothecium* was located on Persian violets (exacum) and African violets in this greenhouse operation, as well gloxina. Photo C shows sporodochia at the base of the stem. It appeared that many of the plant species under production in this greenhouse range were succumbing to the disease, despite extensive and expensive drench applications of fungicides.

Notes in Consultant's Memo Pad from April 3 visit:

"Pathogen problem related to a crown rot; root systems not discolored, thought not vigorous"

"Sanitation appears adequate; source of pathogen unclear; extra liners from Florida supplier appear normal"

"Banrot drench applied at label rates at transplant; no other chemicals used to date in production cycle; no insect pest problems apparent; scouting program in place"

"Water source is well. Moderate alkalinity, so injecting sulfuric acid to bring pH into 6.0 range"

"In-house check of pH and EC on crops weekly; Saturated Medium Extract; pH ranged from 5.8 - 6.2 and EC ranged from 0.65 - 1.2"

"Collected several plant samples for submission to diagnostic clinic. Also collected tissue samples for nutritional analyses from "healthy" plants because lack of vigor problem is apparent, though most urgent problem appears pathogenic"

Water Quality Report (from well sample March 1)								
Total Alkalinity (ppm)	NO_3-N (ppm)	NH_4-N (ppm)	Total N (ppm)	K (ppm)	P (ppm)	Ca (ppm)	Mg (ppm)	Na (ppm)
231	2.8	0.4	3.9	9.6	4.2	98	17	67
Fe (ppm)	Mn (ppm)	Zn (ppm)	Cu (ppm)	Mo (ppm)	B (ppm)	Cl (ppm)	Fl (ppm)	Al (ppm)
2.3	0.7	0.01	0.01	0.02	0.01	196	0.1	0.03

Tissue Analyses (results from April 3 samples of "healthy' gloxinia plants)					
N (%)	P (%)	K (%)	Ca (%)	Mg (%)	S (%)
4.7	0.24	3.9	1.9	0.44	0.5
Fe (ppm)	Cu (ppm)	Mn (ppm)	Zn (ppm)	B (ppm)	Mo (ppm)
176	21	83	54	48	54

Assignment: As you unfold your case study, evaluate the adequacy of the nutrition and over-all production practices of the gloxinia crop. Present a theory as to a long-term solution to the disease problem in light of the fact that extensive fungicide applications do not appear to be working.