Filtration at its Finest

HOW METROLINA IMPROVED PLANT HEALTH BY REDUCING DISEASE PRESSURE

By Al Zylstra

In the process of solving a water source problem about three years ago, Metrolina Greenhouses learned a lot about the wide range of issues potentially affecting their water quality. As a result, they embarked on a deliberate program to evaluate the steps required to optimize water quality for their crops.

To solve the initial problem they began working with Charlie Hayes, an agricultural water specialist. Charlie is the key science and technology partner to DRAMMwater, the water treatment division of Dramm. The initial focus at Metrolina was only to solve the immediate water problem and move on.

According to Charlie, this is quite often the case; what he calls the "component-focused" approach to solving water problems, because it relies mainly on finding the "right piece of equipment, or silver bullet" to solve the problem. But, he says, this is "just a band-aid approach and usually results in only a partial solution, usually leaving out equally or more important factors contributing to the best water quality.

"You need the equipment but without addressing the big picture the end result will be incomplete."

Initial Evaluations

Metrolina decided to evaluate every aspect of their system to assure that their plants were getting the best water possible for the best plant health going forward, to reduce shrink in production and at retail and reduce existing and potential problems related to irrigation.

Water is the number one crop input so the best quality water is water that contributes to the best plant health. That's where water quality meets the bottom line of any growing business. Water quality has to begin at the source and go all the way through the irrigation system to the plant's root system.

Top: *Five new Deep Media Filters handling 500 gpm in foreground. Smaller filters with new glass media are visible in the background.*

Bottom: *Recently installed DRAMMwater LD Deep Media Filters.*

Working with Charlie Zylstra at DRAMMwater, the evaluation of Metrolina's water systems took a number of months, and is really an on-going process. It included analysis of the water source feeding the supply ponds; the ponds themselves; the filtration systems for flow from the ponds and within the greenhouse flood floor systems; and systems for disinfecting the water. The full evaluation resulted in a phased in approach involving all aspects of their water systems. This process is unfolding over time and some steps have already been implemented.

Improving Water Filtration

One of the first steps at Metrolina was the decision to improve the filtration of water coming from their main supply ponds. Fine filtration (e.g. below 15 microns) is always key first barrier to water molds and funguses and to reduce biological demand.

A first baby step at Metrolina was to replace the media in existing shallow sand filters, from silica to a new crushed glass filter media. This media is made from post-consumer glass (soda, wine and beer bottles) finely crushed, purified and filtered. Due to the angular shape of the glass particles, there is improved flow through the media and more surface area presented to capture particles, thereby improving filtration results. The glass holds a positive electrical charge so the particulate matter holds less tightly to the media and releases much easier during backwash, resulting in less backwash water.

One of the surprise results from just changing the media in these filters was that it alone significantly reduced the pythium spores coming through the filters.

Fine Filtration Installation

The next step was the installation of fine filtration for 500 gpm of flow for a 25 acre greenhouse ranges. The first new filters were installed in late 2010. Five large deep media filters were installed, and filled with the Dramm VitroClean crushed glass media. Auto-backwash valves automatically back wash the filters once per day. These filters remove approximately 95 percent of the particulate down to 5 microns in size. Even though mesh size doesn't go that high, it would be the equivalent of 2,500 mesh.

According to Chris Holshouser, the grower in that range, the main reason for installing the filters was to reduce the Pythium and Phytopthera in the water coming out of the water storage ponds. Most of the spores for these are in the 10 to 2 micron range.

Chris has now been growing with the 5-micron

filtration for about a year now and says he is very pleased with the results in his crop and the performance of the irrigation systems. There are about 60,000 drippers, 30,000 hanging baskets on the Echo Systems, and 25 irrigation booms in this section. Each of the zones of drip, each hanging basket zone and each boom has their own filter. Chris stated that, "before the 5-micron filtration, we had to clean the filters ever two or three days, and had clogged drippers and emitters constantly. After the 5-micron filtration was installed we've reduced that to cleaning the filters only ever 14 days, they're not even that bad then."

Tested water after the filters found no detectable presence of Pythium or Phytopthera. He said they've noted generally less disease in all crops, but particularly in vinca, which he said is a good "canary" crop to alarm for disease.

The next phase of filtration was just completed in January 2012. These units are filtering 1,000 gallons per minute down to 5 microns and are an advancement from the previous design. The new Large Diameter version facilitates pre-plumbing for faster installation and accommodates greater flows at a lower cost. The filter set that was recently installed is plumbed so it can be expanded to accommodate up to 2,000 GPM of total flow.

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Resulting Benefits

Fine filtration has allowed Metrolina to economically reduce disease pressures and labor related to irrigation system maintenance. A resulting benefit is the improved plant health due to reduced disease pressure. How this benefits the bottom line over time is promising.

Metrolina will continue to improve their water quality until they are confident that they are providing the very best water for the very best plants.

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