A Grower's Solution to Nutrient and Water Management©

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All of us in the nursery industry have become acutely aware of the importance of water and nutrient management. Whether because of regulatory pressure, environmental concern, liability risks, or drought restrictions, this matter is coming at us from a variety of fronts.

In 1993, with the expansion of our container operation to a new location, we had a sense of these looming issues from our own experiences and those of nurseries in other states. We had a decision to make: ignore the problem, which was the standard practice at the time, or try to deal with it up front. As is our preference, we decided to be proactive so that we could deal with this issue on our own terms and timing.

With design assistance from the Natural Resource Conservation Service we installed a "tailwater recovery" system. Since most of the land at this new location drains to one point before passing offsite, only one recovery pond was necessary to serve our needs.

During the excavation phase, we were careful to segregate the clay material for use later on as a pond liner. To augment the sealing ability of the eventual clay liner, we incorporated bentonite into the pond walls and bottom. The most elaborate aspect of our system is the weir that was constructed on the inlet end of the retention basin. This concrete catch basin (Fig. 1) serves to slow down the incoming runoff so that sediment settles out of the water prior to "spilling" over the edge and down into the pond. To handle the flow of water cascading into the pond, especially from severe storms, we placed a thick layer of 4- to 6-inch rock on the surface of the pond wall below the weir and then grouted it into place (Fig. 2). The outlet end of the pond was similarly protected with a layer of rock to prevent a washout during heavy storms. Once finished, the entire pond was closed in with a 6-ft-tall chain-link fence to discourage trespassing.

While our initial intentions focused mainly on the runoff issue, we soon turned our attention toward utilizing this significant amount of water. Instead of pumping the collected runoff onto our field production areas, we began chlorinating the water and using it for our container irrigation. This "wastewater" became a tremendous resource for our nursery. It allowed us to pump a high volume of water in a short period of time and take care of our watering needs in a timely and efficient way. We currently pump upwards of 8000 gpm with two diesel-powered centrifugal pumps. This allows us to irrigate our entire container production in three "shots" of 3 h each. That would be hard to duplicate by pumping directly out of wells, which is the normal convention in South Jersey.

Since our runoff represents approximately 50% of our pumping volume, we augment our recycled water with well water. We currently pump up to 1000 gpm from three nearby wells. This allows us to avoid any salt buildup from fertilizer runoff. It also affords us "fail-safe" protection of the aquifer beneath our retention pond. While we don't anticipate any leaching of potential runoff contaminants such as fertilizer through the clay liner and the clay strata beneath the pond, we negate that remote possibility by pumping any leachate right back to the surface.

Figure 1. Concrete catch basin.

Figure 2. Rock layer on the surface of the pond wall below the weir.

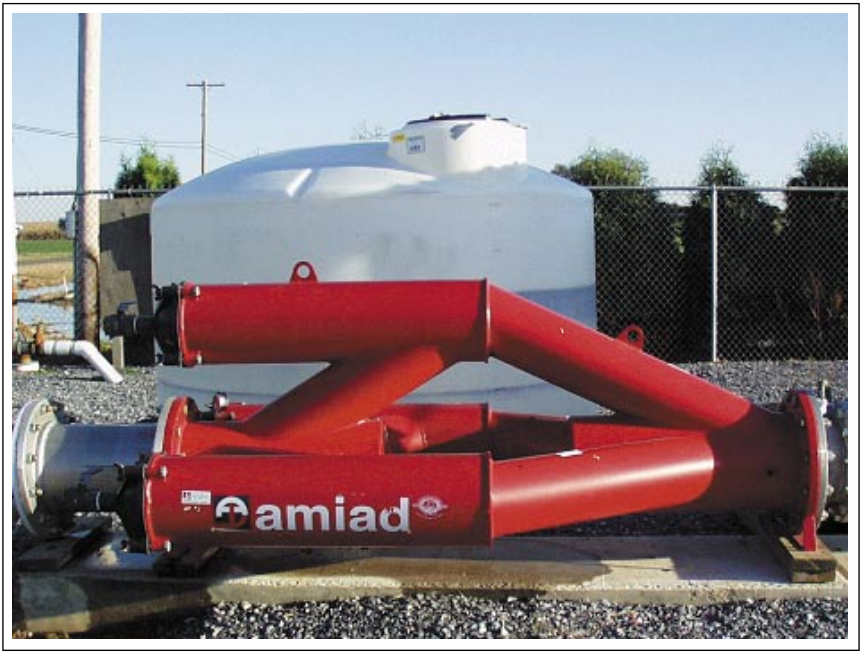

Figure 3. Amiad filter.

Figure 4. Finished tailwater recovery system.

To avoid disease spread and algae buildup in our irrigation lines, we inject chlorine gas during all of our watering cycles. Currently, we use a Regal chlorination unit that injects a metered amount of gas into a 2-inch PVC line that returns pressurized water from the discharge side of our pumping unit down to the pond water at the end of the pump suction line. This is a very simple and effective means of injecting a concentrated solution of chlorinated water into the irrigation system for disinfection's sake.

For new crops, we rely on slow-release fertilizer that is incorporated into our potting media with our in-line mixer. As conditions warrant during the initial season, we supplement this with an occasional liquid fertilizer application through our irrigation system. After the first growing season, we rely exclusively on liquid fertilizer. This is injected in batch treatments with a John Blue fertilizer injector at a rate of approximately 400 ppm. Salts testing of our container crops dictates the frequency of application.

To screen out any particulate matter, we utilize high volume Amiad filters at our two pumping stations (Fig. 3). Each unit has three chambers that contain 150-mesh screens. These are cleaned on an as-needed basis.

Our decision back in 1993 to recycle our water has allowed us to: minimize runoff concerns, irrigate our container-grown crops in an effective and timely manner, use our fertilizer efficiently, and conserve water. This has put us in a relatively secure position, in addressing the water and nutrient management issues that challenge all of us at the present time (Fig. 4).