



Super Oxygenated Water

by Al Markhart

One of the observations we have made for a long time is that plants are significantly injured by over-watering. Some people said that more plants are killed by over-watering than any other cause. But over-watering, we know—as well as compaction and other issues in the soil environment—reduces the oxygen availability to the root systems. Oxygen-deprived roots stop growing, don't absorb water, and don't absorb nutrients. Growers spend a lot of time trying to optimize the soil environment so they can increase water-holding capacity, as well as aeration of the growth medium.

My interest was really piqued when Ovation Sciences came to me and asked me to test a new product they were working on that increases oxygen availability to root systems. It uses an old science and applies it in a very unique and new technology. The science is the long-known ability to split water into oxygen and hydrogen using electrolysis. Pass a current through the water and you produce pure oxygen bubbles. What's unique about this technology is that the bubbles produced are so small—micro-bubbles—and are forced into the solution, saturating the water with oxygen. The result is what we've defined so-called *super oxygenated water*. We define that by any water that contains oxygen greater than 100 percent.

In the initial test I did, the water started out at about 35 percent saturated with oxygen, typical of water



that comes out of a well. I bubbled it, and it increased in oxygen to 100 percent, but will never go higher than that. Using the Ovation oxygenating system, I applied the current to the oxygenator and, in about 30 minutes, the oxygen level increased to over 200

percent saturated oxygen. I turned off the power at 30 minutes and the oxygen stayed in the water for a considerable period of time. So we tested this system, first in the greenhouses, on some small, potted flowering plants—petunias and coleus.

With coleus, for example, we found no affect on plant growth, but saw a significant effect on the coloration of the plants. In geraniums we saw significant increase in flower weight and number of geraniums, typically around 20-30 percent, both in the flood plants and non-flooded plants.

In our greenhouse experiments, then, we saw a significant increase in plant quality and flower number when we used the oxygenated water, compared to control. Now the system can be put in-line for a drip irrigation system, and this really excites me with the opportunities to grow vegetables, and in any system where we can use drip irrigation. So we set up a system experiment to look at vegetable production in an organic farm on the outskirts of Minnesota, where the oxygenated system was put directly in-line with their drip irrigation (water that came out of their well and directly to the plants). First, looking at some Brandywine and Betty's Best heirloom tomato varieties, we saw, with the oxygenated treatment, the plants consistently had approximately

20 percent more root and more total weight. So the size of the tomato in this case didn't increase, but the number of tomatoes in the oxygenated treatment was greater than those grown under the control treatments.

We also looked at bell peppers. Here we had an increase in fruit number of about 20 percent, but, interestingly, the fruit size was also larger. So, we had a greater total weight and the average size of each pepper fruit was larger under the oxygenated conditions, compared to the controls.

Our conclusions from this preliminary study are that the electrolysis micro-bubble technology super-saturates irrigation water with oxygen, so the water can increase growth and improve plant quality—this can be homeowner, potted plants or drip irrigation systems.

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GreenElf

by Andy Harding

Back in 2002, Karl Losely went on an ANLA tour of Australia, where he saw a prototype of the GreenElf fertilizer application system. Last year we were contacted by email from the company to see if we wanted to try it. So I went onto their website, which is www.greenelfworks.com.au, and looked at a chart designed to show just how efficient it is and how quickly you get your money back.

It's \$1,700 for the equipment. I filled in the boxes, came back, and saw that it would pay for itself in four days. I thought, "This is pretty good," but I was a little skeptical. In the end we



decided to try a couple of GreenElfs, so we ordered two last spring.

The GreenElf consists of a hand-held unit, which can be programmed from 1–150 to put out a certain amount of product—in our case, Osmocote fertilizer. You fill the tube that's slung over the operator's shoulder. There are two sizes of tube: one is 2-1/2 inches in diameter and holds eight pounds of Osmocote; the other one 3-1/4 inches in diameter and holds 15 pounds of Osmocote. Employee neck strain will determine which tube you want to use.

The GreenElf counts every shot the machine fires, and you can program it to count for a daily or weekly job, and it gives a total. We do about a quarter of a million cans a year, and it usually takes four to six guys five or six weeks to do our top dressing. We got these machines in and it took two people 12 days to do everything. We definitely did follow the chart and we got our money back in quick order. So we thought it was a great machine.

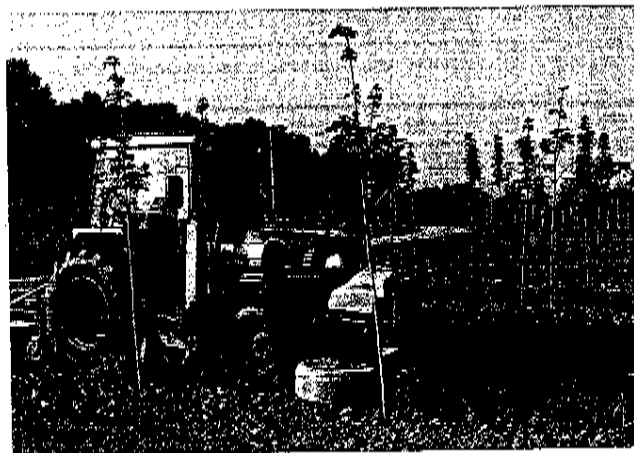
You pull the trigger and the fertilizer drops down the tubes, which come in varying lengths, depending on the height. You don't have to bend over, so there's less strain on the employee. It's exactly accurate every single time (our old method was to scoop fertilizer out of a can and pour it down a funnel). You can have it level; you can have it heaped; you can have it less than full; so it's an exact science. You know exactly how much you're using and exactly where it's going. There's much reduced contact with the fertilizer, so that's an advantage, too. And, it is very, very fast. As soon as you pull the trigger, the fertilizer is gone. If you're using larger amounts of fertilizer, you need to put two shots on a container, rather than one (we do that anyway so it's not all in one pile). It's still super-quick. GreenElf has one mode where you can program it to quick-fire without even pressing the button.

That's good for small containers and for plants with a very small canopy, because you have to keep it moving rapidly across the area or the fertilizer just goes everywhere.

We found GreenElf to be fast, economical, and very reliable. It does have a part inside of it that supposedly stops any jamming, but we've never had any trouble with it jamming. They say they've done five million shots and it's never jammed. The only problem we had—and I'm not sure it wasn't the nuclear power plant down the road—was with the tube splitting. We had to go back to using duct tape, but they were very quick in testing new tubing and sent us brand new tubing.

It charges overnight. It's just really a time-saving, labor-saving piece of equipment, and it works very well.

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Multi Tasking Tractor by Todd Ryan

What we're trying to do at Valley Hill Nurseries is utilize our auxiliary hydraulics and our 12-volt system, along with a three-point hitch on our tractors to accomplish two or

more tasks in one pass of the nursery row. We've created several implements to do this.

The first, the Clemons in-row cultivator, operates off our auxiliary hydraulics and mounts to the belly of our tractor. All our tractors come with drilled and threaded holes where you can bolt something onto the belly of the tractor, so that's pretty easy to do. This configuration leaves the three-point hitch free to run over the rows, or something else.

In our shop, we also built a cultivator that runs off hydraulics and mounts to the belly of the tractor. Basically we always want the tractors to mow, so anything we can do to keep them mowing, is what we're trying to accomplish. We made the cultivator from a recycled clay tree spade—a retired tree spade. We can fit several different attachments to it, with pins to pop them in or take them off.

We also use a fertilizer spreader that runs off our 12-volt system. It was designed to mount into the recess of a pick-up truck. All we did was mount it to the front of our tractor, on the side, which enables us to target the fertilizer exactly where we need it. The spreader runs off a variable speed, 12-volt, so we can throw the width we need, targeting the fertilizer exactly where we want it. Once again, our three-point hitch is free, to keep it mowing.

We also can attach an Enviromist sprayer to spray Roundup. That also runs off our 12-volt system. We mounted it to the front of our tractor, once again, leaving our three-point hitch free to mow.

We don't normally cultivate and apply

Roundup at the same time, but this system shows the driver can manage all three at the same time.

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