

The advantages of sprinklers over mist nozzles[©]

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INTRODUCTION

Elliott's Wholesale Nursery is 45 km north of Christchurch. We're primarily growing ornamental trees and shrubs and we're on nearly 10 ha. We grow and sell plants from 7 cm to 45 L. We have 16 full-time staff and propagate 90% of our own product. Our nursery grows plants totally on spec so our sales method is primarily peddling. I think all those things are quite significant when you're in the trade.

EVENTS THAT CHANGED MY THOUGHT PROCESS ON DOING THINGS

I've been in business 36 years or something now, and since the earthquake in Christchurch in 2011 we've had seven other events including two more earthquakes, a tornado, and three snow storms—and they've been the best things that have ever happened to us. Because if it wasn't for them we wouldn't have changed the way we think, and we wouldn't have moved ahead. We would just be doing the same old things we were doing 10 years ago.

One of the first things that happened with the earthquake of 2011 was that overnight, our sales to the landscape market stopped. Nobody did any landscaping. They all wanted to fix their properties. Landscaping was a third of our business. We had a third of our production area in it and we had to basically throw all of that out.

So what do you do? You look for new margins. So we set up a "factory shop", a little retail shop in Amberley where we could increase our margin. Now that shop does about 10% of our overall turnover and we're able to sell 50% of our nursery leftovers at a higher price to the public than we would get for it as first grade plants selling at wholesale. And we don't have to freight it or do anything else. And what that's done to our business is made it balanced all of a sudden because we've got rid of some of our shrinkage and it has made us a lot more profitable.

The earthquake sure made life tough and if we hadn't had a \$60,000 wage subsidy straight after the earthquake, I don't know how we would have survived.

In 2014 Caroline and I went for a trip to India and when we came back, we had a look around the nursery and it looked fantastic. And because I'd been away, we hadn't spent any money so there was \$60,000 less spend than I would have done and somehow also we'd sold \$60,000 more product than normal so the business was \$120,000 better off without me being there!

Anyway we'd just got home that evening and all of a sudden I could see these bits of plastic whirling around in the sky and next door to us a hailstorm had just gone through so I thought, I'd better go down and see what the nursery was like just in case, you know, something might have happened. Well anyway, I got down to the nursery and it sort of looked ok but as I got further and looked to the right it started to look a bit funny. I went on a bit and I could see there had been a tornado come through and taken out the shelter belts—and our propagation houses as well. Instead of having nine propagation houses we had only one functional one. All the others had their foundations ripped out and I don't know how they were just sitting there. One of the houses had been completely sucked up, the floor and everything had gone. I'm sure that was the one that ended up 2 km away and up a 15 m high gum tree (Figure 1).

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Figure 1. What remained of one of the propagation houses.

So you can see, we were in a real, real dilemma. We had no insurance or not much, having only insured our irrigation. What do you do? Well, you have to really, really think and, as I said, having so many things happen to us in such a short time, changed my thought process on things.

We had to start going again. We had to get some structures up, we had to do it simply because we didn't have lots of money and we had to do it fast. And one of the first things we were thinking of also, when re-building, was what we were going to put in the houses, mist, or sprinklers?

In our propagation houses we have always had a sort of dual system where, if we felt the house had rooted, we could turn off the mist nozzles and turn on the sprinklers. Well, one Christmas holiday one of my staff, Judith, had turned some of the houses inadvertently from mist to the overhead sprinklers. I would go down to check the houses as necessary and of course I'd do that early in the morning when the mist never goes on anyway so I didn't notice that there was anything wrong. But as the break went on eventually I did figure out what she had done—and then I realized that the houses that were on the sprinklers were so much better than the houses on mist so I immediately turned all the houses over to sprinklers. Our results improved markedly as soon as I turned off the mist. Our dry spots went away; our hand watering became none—we don't have to do any hand watering in our propagation. We put our cuttings in, we water them in, and we leave the house alone. Sure, we have some issues sometimes if we put in cuttings that are too big and the leaves shed the water across and the cuttings don't get any water so they go backwards, but you know stuff happens.

Most of our propagation is done at ground level and one of the advantages of this is that it is the coolest place in the house. As soon as you pull your propagation up onto benches, sure, it's nice to work at and we do have one house with benches and it's lovely to work in, but the coolest place for the cuttings themselves is down at ground level because obviously heat rises.

We have a normal irrigation controller and it operates for 3 mins three times a day. It goes off at 10 A.M., at midday and at 3 P.M. and puts 3 mm of water on the propagation crop. And that basically is what eliminated all our hand watering. We were spending 2 h a day in the morning in our propagation houses, somebody wandering through with a hose and my feeling is that hand watering is such a complicated subject and to do effectively it would take

me a lifetime to learn.

Having a sprinkler which gives 91% uniformity—which is what Naan claim for their sprinklers—is better than I'm ever going to do anyway.

The big thing we're trying to do with our houses is trying to keep them cool. I think in J.G. Wells book, one of the first propagation books I'd ever read, it was cool tops misty middles and hot bottoms and sometimes a lot of people who are in propagation are just propagating in environments that are way too hot.

I liken the whole thing as if you have a bucket of water and you throw it at somebody they're cool down pretty fast and if you have a sprinkler and you sprinkle them they're going to cool down pretty fast and if you have mist nozzles they're not really going to cool down that fast and if you have a fogger and you fog them they're not going to cool down fast at all.

So this is some Jeff logic. It comes without much research. The average day summer maximum temperature in New Zealand actually is 22-23°C so I'm assuming that the average plant has evolved to reach the maximum growing at probably 22-23°C. But most plants reach their maximum growing potential at a lot lower temperature than that. They probably reach their maximum photosynthesis at 10°C if they're going to reach maximum at 22°C for example, which I would imagine New Zealand plants are. In other words, if you can keep your plants at 10°C in a plastic house with good light levels they're going to produce as much photosynthesis as at 25°C. But the transpiration is also going to change at those levels. As the temperature goes up, the transpiration goes up and obviously peaks at a certain level which I'd imagine for New Zealand plants is probably around 27-30°C. And at that 27-30°C, they're just doing it tough. So what do you do? You've got to get the temperature down and the easiest and quickest way to do that is to spray them with water. And it doesn't matter whether you spray a leaf with a fine mist or a sprinkler—after 20 s. it will look the same because the water just spreads. So you can have in your greenhouse a whole lot of mist nozzles—we would need 15×6 plus a whole lot more around the edge to stop the drift—or you can have just nine nozzles running down the middle as we've got and you've got the same uniformity; much less capital cost and at the end of the day, the same results.

I have a fogging unit in my museum of bits and pieces. In 1983 after being in business a mighty 3 whole years I was actually making money in horticulture. Wow. I went to the United States doing my nursery 101 and I visited some of the big northwest nurseries. I met a couple of blokes that were really amazing. One was John Iseli. He was an absolute inspiration to me in the time I spent with him. He has now died, and so has Bruce Briggs who was another inspiration. One of the things Bruce had at his nursery was a Mee fog system and I thought, wow, this is amazing. He was doing all this tissue culture on this Mee fogger and I thought right, and I came back to New Zealand and the first thing I did was go and buy an Aussie fog system and for about 5 years I swore black and blue that it was the best thing since sliced bread. Anyway the reality was I had these overly hot, slimy glasshouses that were a death trap. I've still got those but they're slightly cooler. I gave up on the fog system. It was just too hot and I was getting nowhere. The temperatures in my fogger house were ending up at 40°C. The evaporative cooling just wasn't working so I gave up on this and went back to the mist system. Well anyway a few years later I went back to Briggs Nursery and he'd ripped out all his fogger systems as well. Long and the short of it, I hated fog, it was an absolute disaster for me. As soon as I got rid of the fog my results went up. And as soon as I got rid of mist my results went up even more.

GROWING MEDIA

Years ago I experimented with all sorts of propagation media, I tried polystyrene, crusher dust, plaster, sand, all sorts of stuff and the best results I got from all media was without doubt, sawdust, plain simple sawdust. It rooted the cuttings far faster than anything else.

There's no real scientific method in this but that was the thing. The one thing I realised pretty quickly is that most plants rooted or initiated roots in the first 3 weeks. But sawdust wasn't the best medium after 12 weeks. So eventually I went to using pine bark which also gave me some quite good results, it was less variable and there was no big nitrogen draw

down. And so we had one medium and it's been great and has so simplified the nursery.

I'm also now wondering whether we can actually get rid of the propagation mix altogether and have the general mix used as our propagation medium as well. I think we can just about achieve that because we use a long-term starting potting mix that's got an 8 to 9 month fertiliser in it.

LEARNING FROM THE UNEXPECTED

You know, some of the things you do in the nursery you forget until one day you have to remember them. I think the Judith incident was one of those times. And there was another involving one of my daughters. We were doing olive cuttings one day, shortening the leaf back in half, leaving two leaves and doing a cutting that was about 100 mm long. Emma who is my oldest daughter and is now 31, came along and said "here daddy I've found a cutting." And she gave me this big hockey stick cutting and I thought it's so sweet because she had never really been down to help us, so I put it in a 14-cm pot and stuck it in a corner of the glasshouse—and sold it 6 months later!

And you know after the tornado I recalled Emma's 50-leaf cutting and because we'd now got the houses cooler and better insulated, we've started doing a lot bigger cuttings.

I haven't finished this talk because what you do in the nursery is always ongoing always an experiment. But the best thing that happened in the whole thing was probably the tornado, I honestly think.

The tornado cost me about quarter of a million but I reckon we're already \$250,000 ahead because of it in 2 years. That's just enormous.

Sometimes the gains you can make through disasters, some of the memories you can bring back to mind, some of the silly things that happen to you, like the Emma cutting or Judith turning off the mist, can actually really, weigh in your favour really make you go ahead.