

The Cutting Cooler Journey

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Summary

I will be covering our process on how we improved our cutting storage. I will talk about our old cooler, its challenges and what inspired us to change. Then I will seg-way into our new and improved humidified

cooler and the benefits we have gained from the switch. Lastly, we will go into detail about how we built our humidifier and touch on some of the mistakes we learned along the way.

INTRODUCTION

First, let me introduce myself: I am Rose Daly from North Creek Nurseries in Landenberg Pennsylvania. We are a wholesale propagation nursery specializing in perennials, ornamental grasses, ferns, vines, and shrubs with an emphasis on Eastern US na-

tive plants. I started as a grower in December of 2018 and got promoted to Production Coordinator in January of 2022 in our Landenberg facility. My primary job is to oversee our production line and aid them in all processes to produce quality liners for our customers.

One of the most important tools for achieving a quality liner is where you store your propagules before they get stuck on the line. You want your propagation types whether it be unrooted/rooted cuttings or tissue culture to be stored for the shortest amount of time possible with consistent cool temperatures and 100% humidity. We were trying to achieve this with a commercial drink cooler. Yes, I said it, a commercial drink cooler!

Even though we were achieving quality flats with what we had, the road to the result was challenging.

Our old cooler- the challenges

We struggled with inconsistent temperatures constantly. The cooler couldn't cool down the cuttings fast enough coming in from our stock houses. With limited space, we would always be at maximum capacity. It was a game of balancing the storage between our inhouse cutting and our over shore buys. Each week we would be stressed about what we should stick first, what couldn't hold over the weekend and what took priority over other cuttings. When we got behind schedule sometimes cuttings started to fail in storage. Our attempts at hydration were subpar, misting inside the bags, tying them shut and poking holes in the sides, trying to create a humidity chamber. The environment we were supplying for our cuttings wasn't ideal, but we made it work with what we had.

Our cuttings relied heavily on our growers to bring them back to full turgidity with over head misters, but it came with a cost. Over misting, melt down, delayed or uneven rooting to name a few.

Stressed cuttings were also more at risk for pest and pathogen attacks due to their weakened immune systems. Something had to change.

Our inspiration

On a rainy day, our growing team got together to watch a presentation on YouTube by Ball Tech on Demand: "Success with Cuttings and Proper Storage = Happy Cuttings!" I highly encourage you to look up this talk series on YouTube. They covered research on the correlation between humidity, temperature, and successful rooting. They found that supplying 100% humidity in an open storage system at ideal consistent cool temperature would greatly increase turgidity and in turn, encouraged uniform rooting. We were amazed at the results from their experiments. After lot of thought and planning we decided to apply the idea to our own nursery practices.

Our new cooler

We decided on a walk-in fridge called a Norlake Kold Locker Indoor Walk-in Cooler with a Russel AC unit (**Fig. 1**). We then humidified the inside with our own home-made customized humidifier that I will go into detail about later. The dimensions of the cooler sit at 6 ft × 10 ft × 7 ft. It has a digital screen that displays the current temperature, a light switch, and a thermostat that consistently holds our temps between 45 and 52°F which is ideal for perennial cuttings.

We then added three wire shelves off Amazon to create storage inside for our cutting bags (**Fig. 2**). The bags are stored completely open, opposite of the old cooler's closed bag system.



Figure 1. Norlake Indoor walk-in cooler (left) with Russel AC unit (right). www.webstaurantstore.com <https://russel.htpg.com/>



Figure 2. Wire shelving- Amazon.com.

How we built our humidifier, how it works, and our results

First, we tapped into one of our main water lines in our production line bay with PVC piping and ran it through a drilled hole on the side of our cooler (**Fig. 3**).

This pipe is then connected to a 5-gal Lowes bucket. At the end of the PVC pipe inside the bucket, we attached an automatic float valve that stops the bucket from over filling. We wanted to have the bucket automatically refill to avoid employees having to refill it.



Figure 3. PVC tubing – Lowes.

Next, we bought a fan and a misting machine from a company called The House of Hydro (**Fig. 4**).



Figure 4. A 3-disc mist maker with float – The House of Hydro.com.

On the lid of the bucket, we cut a square and installed the fan. Inside the bucket, we placed the floating mister machine on the water surface. Essentially building a fogging machine, last we installed a white plastic PVC tube in the lid adjacent from the fan, so the mist would then leave the bucket into the cooler (**Fig. 5**). We then plugged the fan and the mister machine into a Plusmart outdoor waterproof timer (**Fig. 6**). The timer had a simple pin system that allows us the ability to program how many shots of mist and how long of a duration we want it to run for. The timer is then plugged into an extension cord that runs to a GFCI outlet with a waterproof cover (**Fig. 7**). We can adjust the mist ratio with a dial that came with the fan.



Figure 5. Our humidifier with a white plastic PVC tube in the lid adjacent from the fan, so the mist would then leave the bucket into the cooler.



Figure 6. Plusmart Heavy Duty 24 HR outdoor timer – Amazon.com



Figure 7. Waterproof outlet cover – Amazon.com.

How the humidifier works: The fan intakes air from the cooler. The air current passes over the mist machine carrying the mist out the tube, humidifying the air. Our device is working so well that when you open the door to the cooler it is completely foggy inside.

Over the next few months, we saw our cuttings health improve significantly. The cuttings have little to no wilt when they come out of the cooler, making it easier to stick on the line which increased production speed. With increased health and turgidity, Cuttings are less stressed, and growers can apply lighter mist which has decreased the risk of meltdown, pathogens, and pest pressures attacks.

Across the board, we are seeing quicker and more uniform rooting. This not only benefits our customers but us as well with faster crop turn over, less unmet ready dates

and most importantly quicker picking of orders and less consolidations. The new cooler has also extended our storage limits allowing us to efficiently plan out our week with less worry.

Learning from mistakes

But along with every success comes mistakes to learn from. The biggest lesson we learned came at a chilly cost! Waterproof your circuit boards and thermostat of your

cooler extra well. Over a few months, a small drip successfully corroded a circuit board, and the cooler ran all night long, dropping the temps from 50 to 14°F! We arrived in the morning to frozen cuttings. What a nightmare! We quickly learned that some extra proofing was needed, and it is of good practice to have two thermostats in the unit, one as back up, if the first should ever fail again.