# Fundraisers; Water Quality; Seed Storage



*Cultural and Technical Information for Greenhouse Professionals*

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COMING UP THIS WEEK:

Fundraiser Podcast
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Finish Line ... Happy TG!



## NEW PODCAST: A Million Dollar Idea?

Our industry is full of hybrid businesses, and I honestly think it's one of our strengths here in North America. In the **LATEST EPISODE** of my Tech On Demand podcast, I had the opportunity to talk to Tom Van Wingerden from Van Wingerden Greenhouses in Washington state about a business angle that isn't new but like many things these days, rapidly evolving tools and technology are increasingly available to potentially take it to the next level.

The topic is fundraisers. I know this can be a love-hate topic for many and although some greenhouses businesses have found success with fundraisers over the years, many have not and have given up the opportunity to create a profit center working with local organizations who are hungry for plants and ways to leverage plant sales to fund projects. Of course, greenhouses need to make money from these efforts because they require plenty of work, but what Tom's team has developed has resulted in more than tripling revenue while requiring fewer people to manage the segment. You read that correctly, fewer people and increased sales.

But, this isn't just a story about how Tom and the Van Wingerden team have grown sales. They actually developed a software system called **PLANTBUY.COM** that is now available for other greenhouses who want to streamline the fundraiser process. It's a system developed specifically for our industry and if we look to the future—could result in a network of greenhouses across the country who can fulfill orders from organizations who want to raise money through plant sales.

In the episode, Tom and I discuss the overall opportunity for fundraiser business, what is required by greenhouses and the organizations they partner with, how plantbuy.com simplifies marketing, ordering and fulfillment, as well as best practices Van Wingerden has picked up over the past 20+ years supplying fundraisers of all shapes and sizes. If you also have a garden center operation (like they do), the marketing potential alone might be worth the effort!

***Be sure to subscribe to the Tech On Demand podcast on your favorite app so you never miss an episode. And if you're not a regular listener, jump back into the archives and get caught up—there are more than 200 episodes!***

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## The Importance of Water Quality … According to Nick Flax

Some of the most common questions coming into the Tech On Demand team and also asked by growers in our GREENHOUSE TECH TEAM FACEBOOK GROUP are related to water. This makes sense since every plant, greenhouse and production team tends to rely a lot on water. So … I decided to dedicate a lot of space in this newsletter (and I'm planning more for next week) to sharing some of the best information we've published on the topic in the past few years. Nick

Flax has written a lot about water testing quality interpretations so I'm going to lean on his expertise a lot.

**Here's how he frames the discussion when working with growers:**

Water quality has a huge influence on how we grow our crops. It affects fertilizer choice and the need for various growing media amendments, changes the availability of mineral nutrients applied to your crops and even influences the efficacy of plant growth regulator applications and pesticides. So, when growers come to me with questions on problem crops that they struggle with for months each year, suboptimal water quality is often the culprit, and my first question is always, "Do you have a recent irrigation water analysis?"

High- and low-pH-loving crops often bear the brunt of misunderstood or unmanaged water quality, but ultimately no plant is safe when water quality is out-of-whack. Mineral nutrient deficiencies and toxicities are often the most common result of water quality concerns, but the need to correct issues like these during production should be avoided at all costs. Understand what's in your water to guide decisions on choosing the right fertilizer, growing media amendments, whether you need to treat your water, and what your water quality monitoring strategy should be. If you haven't already, be sure to send a water sample off to your favorite lab for testing soon, before it's too late and you're in the heat of the spring season!

**The Type of Water Test Counts**

As Nick says, all water quality tests are not created equal. Submit a water sample to a lab that provides agricultural water quality testing services—not standard drinking water quality tests. Depending on the lab, specific categories such as "greenhouse/nursery" water testing may be available. Whenever possible, choose the type of water test that is more directly applicable to what you do.

Drinking water tests often offer a small handful of mineral nutrient concentrations (often calcium, magnesium, iron, and sodium) and/or "hardness," all of which can indicate water quality concerns. However, these values only provide a partial picture of water quality and seldom provide enough actionable data to inform decisions on which fertilizers are most compatible with your water, whether acid injection is necessary, etc.

Agricultural water tests (sometimes as specific as "greenhouse/nursery" water tests) are far superior to standard drinking water tests. These include alkalinity, pH, most macro- and micronutrient concentrations, nitrate and ammonium levels, electrical conductivity (EC; sometimes TDS) and sodium absorption ratio. This broad view of your water quality facilitates targeted water management decisions. It also minimizes the risk of overdoing it and spending tons of money on unnecessary measures or worse over-correcting something that was within ideal ranges for crop production in the first place!

## Water Testing Frequency

Best practice is to test your water source(s) at least once per year. Depending on your operation's water source, more frequent testing may be advisable.

Municipal water sources tend to be very stable throughout the year, with the exception of municipal water collected from reservoirs in arid climates, on occasion. An annual agricultural water quality test is strongly encouraged and often provides ample information to stay on top of what's coming out of your hose. Some providers offer periodical water quality updates free to customers, so it doesn't hurt to ask for one.

Well water quality often changes more frequently than municipal water. Testing at least twice per year and additional times shortly after extreme weather events is advisable to avoid seasonal or sudden water quality changes, respectively. If you have multiple wells on your property, the quality of water coming out of each can be drastically different, so test ALL wells—*even if one of them is only used seasonally or as a backup*.

Surface water sources often provide the greatest number of challenges to greenhouse growers. Rainfall, snow, drought, temperature fluctuations, and unforeseen events that push contaminants into your water source necessitate frequent water testing if you irrigate from sources like a river water or retention pond. Ideally, water from these types of sources should be tested monthly (at minimum) or more often if severe weather or changes to the water level/flow occur.

## Nick's Tip of the Week: Water Quality Deep Dive—Understanding Alkalinity

*Each week, I'll work with my buddy Nick Flax, a technical services expert at Ball, to share a concern that's come up during one of his numerous calls with growers across North America. This week he's sharing tips for interpreting water quality tests, starting with alkalinity. Next week, he'll dig into soluble salts and nutrients.*

**PROBLEM:** When you send water samples off for testing and results come back, you need to know *what to do* with that information. The long list of water quality parameters that labs report can seem daunting when you receive the readout, so I'll break it down into a few digestible chunks this week and next.

**NICK'S TIP:** First, let's talk about alkalinity—arguably the most important water quality parameter to monitor and manage for floriculture producers who grow crops in soilless media.

**Alkalinity Core Concepts**

Not to be confused with the term "alkaline" (meaning a pH above 7.0), alkalinity is a measure of your water's buffering capacity—its ability to neutralize acid. **Alkalinity is most often reported as ppm CaCO3 (sometimes written as mg/L; 1 ppm = 1 mg/L) or meq/L. This value indicates the concentration of calcium, magnesium and sodium carbonates and/or bicarbonates present in your water.** As water reacts with things like fertilizer (water-soluble [WSF] or controlled-release [CRF]), soil amendments, acids produced by roots in the growing media and the growing media itself, these carbonates and bicarbonates break down, causing soil pH to increase over time. Keep the following in mind as you review alkalinity on your water report:

- The top take-home message is … *too-high alkalinity often means more crop challenges.*
- About 50 ppm CaCO3 = 1 meq/L (milliequivalent)
- **Ideal alkalinity levels for greenhouse growers range from about 50 to 75 ppm CaCO3.**
- Alkalinity greater than 75 ppm often makes high-quality young plant production challenging. Alkalinity between 75 and 150 ppm is often workable for finished plant production simply by using an acidic fertilizer formulation. Minimal intervention is generally needed, but low-pH-loving crops (like Petunia and Calibrachoa) may develop iron (Fe) deficiency later in production if alkalinity is on the higher end of this range.
- **Alkalinity greater than 150 ppm often requires raw water to be acidified through a separate injection system before blending with WSF.**

AlkCalc (currently hosted by our friends at e-GRO) is a great online tool that you can use to determine how much acid is needed to bring your alkalinity down to a manageable level. *Be sure to check it out.*

Sulfuric acid is one of the preferred acids among growers, as it is relatively easy to source and doesn't heavily alter the nutrient balance of your fertilizer solution.

Phosphoric and nitric acids are other options commonly used to manage alkalinity. However,

these will increase the total phosphorous (P) and nitrogen (N) levels (respectively) in your feed. For example (per AlkCalc): If alkalinity is 180 ppm CaCO3 and you want to lower it to 125 ppm, sulfuric acid will add approximately 27 ppm of sulfur (S), whereas phosphoric acid will add about 50 ppm of P. Adding 27 ppm of S likely won't change anything but 50 ppm of P is *a lot more P* than plants need, and it will undoubtedly have a negative impact on crop quality.

**Too-low alkalinity (less than 40 ppm CaCO3), while less common, presents its own set of unique challenges. Think of your target soil pH like a lane in a bowling alley and appropriate amounts of alkalinity in your water like bumpers.**

- Bumpers prevent your ball from rolling into the gutter and help keep the ball (roughly) in the center of the lane. In a similar way, alkalinity helps keep your soil pH "out of the gutter" by neutralizing various acids in the media.
- To replenish your buffer or *"get the bumpers to pop up each time it's your turn to bowl",* small doses of alkalinity need to be added to the media at each irrigation.
- Since low-alkalinity water does not replenish much buffering capacity (or "raise the bumpers"), it becomes easier for soil pH to spike or crash as your media's lime charge depletes. In turn, this causes nutrient deficiencies and toxicities to induce very quickly as the soil pH swings up and down, especially as the crop matures and acidic reactions (such as respiration and cation uptake) in the root zone occur in greater quantity.

**When alkalinity in your water is excessively high (ex. greater than 250 ppm CaCO3), acid injection alone may not be enough to correct it without being cost-prohibitive or causing nutrient imbalances in your feed program.**

- In this situation, use of reverse osmosis (RO) is often necessary, despite the typically high cost of installing and maintaining these types of systems.
- Blending RO water with raw water can reduce alkalinity to acceptable levels for good crop growth or make it feasible for acid injection and fertilizer selection to "do the rest."

## Seed Storage Article + Video

Storing seeds and the viability of seed kept on hand from last year is always a good topic of discussion that the tech teams are asked about all the time. I thought it would be a good idea to share this article from *GrowerTalks* written by my buddy Jerry Gorchels, who's now retired but worked with PanAmerican Seed for years and knows seeds inside and out. In the article **KEEPING GOOD SEEDS FROM GOING BAD**, he covered seed storage in an understandable way. Click the link for the full story; but for now, here are a couple quick tips from the article.

**Tip #1: Storage Conditions.** Ideally, the temperature for long-lasting seed storage should be 40F. The relative humidity should be between 25% and 40%. Higher relative humidity can cause faster degradation of the seed. Lower relative humidity can actually degrade the seed by drying it out. Remember: seed endosperm is a soft tissue that can dry out.

**Tip #2: Storage Options.** Although it may seem unrealistic for all businesses to have controlled environment seed vaults, it doesn't have to be that high tech. A refrigerator can give us the temperature we need for optimal seed storage. What we must think about next is how we handle and control the unwanted humidity in the refrigerator. The seeds we receive are usually in cardboard boxes that line up very nicely on refrigerator shelves. One option is to take the seed packets out of the boxes and store them in tightly seal containers, i.e., Tupperware, craft storage containers with lock-tight lids, etc. This will remove the seed packets from the humidity in the refrigerator.

**For even more on this topic, check out one of our short ONSITE VIDEOS if you'd rather watch versus read.**

## Finish Line …

It's hard to believe we're already in week 47 and Thanksgiving is less than a week away. It's possibly my family's favorite holiday and miraculously my wife (a middle school teacher) and both my girls have the entire week off! I am eternally grateful for this and subsequently we're heading down to West Virginia to hike in the Monongahela National Forest and do some cavern exploring for a couple days on our way down to the DC area for Thanksgiving with my side of the family.

I hope all of you have a chance to decompress a bit next week and spend time with football, food and family. For me, it's always a good opportunity to reflect on things and get psyched up for the holiday season, which always brings its own measure of joy and stress.

**Assuming we don't get lost in the wilds of WV, I'll be back next week with another newsletter. Happy Thanksgiving (early)!**

Please feel free to send your comments, constructive criticism and topic ideas to me at bcalkins@ballhort.com.

Bill Calkins

Editor - Tech On Demand

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