BALLTECH ON DEMAND™

WATER QUALITY: SOLUBLE SALTS; MICRO- & MACRO-NUTRIENTS

When water test results come back, there are specific parameters to consider.

Soluble Salts

The soluble salt content or electrical conductivity (EC) of your irrigation water has a huge impact on fertilizer selection and crop troubleshooting. When troubleshooting issues with EC-sensitive crops (like snapdragons) or performing routine maintenance like fertilizer injector calibration, a current, accurate EC reading is critical to ensure you take appropriate action. Most often reported in mS/cm (millisiemens per centimeter), EC is a measure of how many ions (such as Ca2+, K+, Mg2+, NO3–, NH4+, etc.) are present in your water. Pure water is not a good conductor of electricity on its own, but ions (salts) dissolved in water increase its conductivity. The higher the EC value, the more ions are present.

- Ideally, your water's EC should be below 0.5 mS/cm for plug and liner production. If you irrigate young plants with water that has an EC much above 0.5 mS/cm, these salts often accumulate in the growing media. High-EC in your water combined with ions added via fertilizer can cause salts to accumulate even more quickly, burning roots, stunting growth, or opening the door for disease. Monitor growing media EC regularly and leach with clear water as needed to avoid damage to plugs/liners.

- Finished crops can often be grown with few issues even if your water's EC is as high as ~0.8 mS/cm; many crops can even tolerate a baseline EC of up to 1.0. However, lower baseline salt content in irrigation water is almost always better and reduces the chance of complications. New Guinea impatiens, for example, can become stunted and distorted when soil EC is above about 1.5 mS/cm for extended periods.

An easy way to think about EC suitability of irrigation water is to do some quick math. For example, let's say your baseline EC is 0.8 mS/cm and fertilizer mixed to 150 ppm N at final concentration adds 1.14 mS/cm. This means you would apply a solution with a total EC of 1.94 mS/cm each time you feed. Since plants take up nutrients as they grow and salts don't all just accumulate, salt-sensitive crops will be less likely to have issues. However, if your raw water's EC is 1.35 mS/cm and you use the same feed, the EC of your fertilizer solution at the end of the hose will be 2.49 mS/cm. If your water's EC is on the higher end of "acceptable" for finished crops, monitor substrate EC regularly and leach with clear water if needed to avoid salt damage. Check out this video on Conducting a Pour-Thru Test for a quick way to check substrate EC.

Macro & Micronutrients

Thorough water tests provide concentrations of most (if not all) essential mineral nutrients for plant growth that are present in your water. The key is to understand how an overabundance or lack of these nutrients influence things like fertilizer selection or the diagnostic process when odd, abiotic disorders appear in your crops.

- Water test reports should include nitrogen (N—ideally nitrate, ammonium and urea forms), phosphorous (elemental P & soluble P_2O_5), potassium (elemental K & soluble K_2O), calcium (Ca), magnesium (Mg), sulfur (elemental S & soluble SO_4), iron (Fe), manganese (Mn), boron (B), copper (Cu), molybdenum (Mo), zinc (Zn), sodium (Na), chloride (Cl) and aluminum (Al).
- If one or more macro or micronutrients are already abundant in your water, select a fertilizer that has lower amounts of those nutrient(s) to avoid abnormal growth and physiological disorders. Sometimes it is impossible to find ready-made fertilizers that can accommodate excess or imbalanced macro- and micronutrients in your water, so a custom blend may be needed to ensure your crops grow appropriately.
- Depending on the nutrient and how overabundant it is in your water, extensive measures may be necessary to manage it. For example, excessively high levels of boron (B) cause distortion on new growth and tip abortion, which makes it virtually impossible to produce floriculture crops. Installation of a reverse osmosis system, which costs a lot to install and maintain, may be needed to lower the B concentration to a crop-safe level.
- Fertilizer systems that can automatically adjust or be manually tuned to add individual nutrients are another option. However, these are often expensive to install and maintain, so large growers are typically the only operations that utilize them.

If surface water is your primary source, macro and micronutrient concentrations should be monitored regularly—especially if you have a closed or recirculating irrigation system. Monthly water tests should be conducted if you irrigate from a retention pond, reservoir or other surface water source. Mineral nutrient levels in most municipal water supplies remain stable over time but this is not always the case, so biannual water tests should be performed at a minimum.