e-GRO Alert

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Sampling Irrigation Water for Routine Lab Analysis

Irrigation sampling is an important nutrient monitoring practice to determine water quality. Routine lab analysis is often performed to evaluate pH, electrical conductivity (EC), alkalinity, and available dissolved nutrients. Assessing irrigation water quality will help refine alkalinity neutralization and fertility programs and define limited or excessive nutrients for the appropriate corrective procedure.

On a recent greenhouse visit, I inspected a crop of Boston fern hanging baskets. While learning about the crop history, environmental conditions, and cultural practices, I discovered that the last irrigation water analysis was performed 10 years prior in 2011. Its not uncommon to come across instances where crop maintenance and production takes precedence over nutritional monitoring such as irrigation water sampling. However, sampling and assessing irrigation water is an important nutrient monitoring practice to determine water quality or chemical condition.

In general, a standard water quality analysis determines pH, soluble salts [referred to as electrical conductivity (EC)], and alkalinity or carbonates, bicarbonates, and hydroxides. In some instances, levels of dissolved nutrients such as N, P, K, Ca, Mg, S, Fe, Mn, B, Zn, Cu, Mo, and Cl may be included or for an additional fee. Irrigation water should be assessed at least annually or more frequently depending on the crop, cropping cycle and system.

Evaluating irrigation water is important because water quality varies by geographic location, time, water source, well depth, and rainfall events. For example, in geographic regions of the United States where irrigation water is drawn from aquifers, alkalinity may be elevated due to the concentration of carbonate, bicarbonate, and hydroxide anions in the water. For this reason, growers located in these geographic regions are often

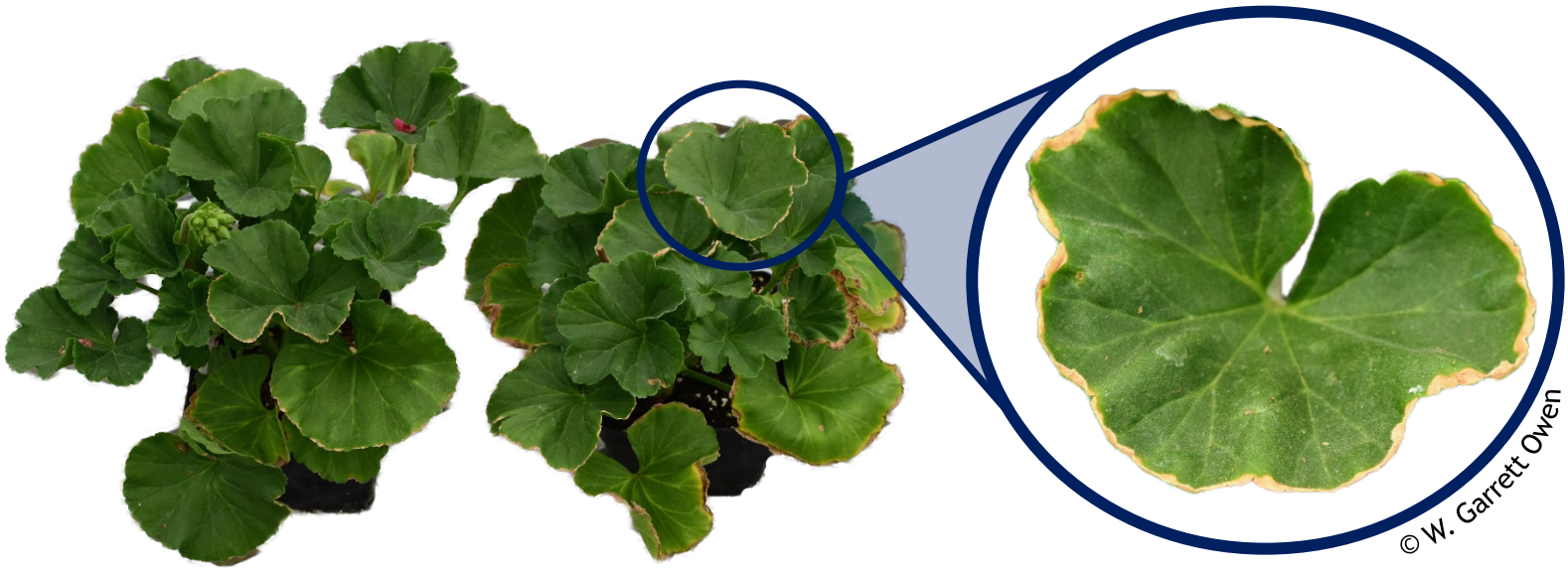

Figure 1. Geraniums exhibiting marginal leaf necrosis (deaf) as a result of sodium (Na) toxicity which was confirmed with irrigation water and leaf tissue nutrient analyses reporting levels of 80.2 and 995.8 ppm Na, respectively. Photos by: W. Garrett Owen.

challenged with substrate pH drift because alkalinity in irrigation water has the greatest effect on substrate pH rise than water pH. To mitigate the effect of alkalinity on substrate pH, neutralization or acidification is needed. Therefore, water quality analysis will help determine the need to determine alkalinity levels and refine alkalinity neutralization and fertility programs. Water analysis will also define limited or excessive nutrients dissolved in irrigation water that may manifest into nutritional deficiencies or toxicities (Fig. 1) and aid in the identification of the appropriate corrective procedure.

To sample irrigation water for routine water quality analysis, please follow this general procedure:

1. Turn on irrigation and allow water to run for five minutes to clear the line of impurities (Fig. 2).
2. Label an analytical lab issued or a clean, small plastic container (16 fl. oz; 500 mL) with your name and/or operation name, address, water source, and analysis requested (Fig. 3).
3. Rinse the plastic container two to three times with the irrigation water to be sampled (Fig. 4).
4. Fill the container with the irrigation water and cap tightly (Fig 5).
5. Provide all requested information on lab issued documents and ship the irrigation water sample within 24 hours (Fig. 6).

A mini poster is available on page 4.

Please note, before sampling, contact your preferred analytical lab to obtain sampling and submission procedures. To obtain consistent results and detect trends overtime, follow the same sampling procedure every time you sample. Most times, sampling procedures or guides are available online or upon request.

To learn more about nutritional monitoring procedures, refer to e-GRO's fertdirtandsquirt.com. To learn more about determining initial substrate pH and sampling, refer to e-GRO Alerts 8-01: 1:2 Dilution Procedure: Determining Initial Substrate pH and 10-01: Sampling Substrates for Routine or Diagnostic Lab Analysis, respectively. To learn about leaf tissue sampling, refer to e-GRO Alerts 9-06: Target Leaf Tissue Sampling for Precise Nutrient Diagnosis. For substrate pH and EC corrective procedures during greenhouse crop production, read e-GRO Alert 7-02: Corrective Procedures for Modifying Substrate pH and Electrical Conductivity (EC) and to download a free corrective procedures poster (11" × 17"), refer to Corrective procedures for high and low substrate pH and electrical conductivity.

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Figure 2. Turn on irrigation and allow water to run for five minutes to clear the line of impurities. Photo by: W. Garrett Owen.

Figure 3. Label lab issued clean, plastic container with your name and/or operation name, address, water source, and analysis requested. Photo by: W. Garrett Owen.

Figure 4. Rinse plastic container 2 to 3 times with the irrigation water to be sampled. Photos by: W. Garrett Owen.

Figure 5. Fill the plastic container with the irrigation water and cap tightly. Photo by: W. Garrett Owen.

Figure 6. Prepare lab issued documents and ship the irrigation water sample within 24 hours. Photo by: W. Garrett Owen.

Irrigation Water Sampling Procedure

1. **Run irrigation for around 5 minutes to clear the line of impurities.**

2. **Label a sampling bottle.**

3. **Rinse sampling bottle 2-3 times with irrigation water.**

4. **Fill sampling bottle with irrigation water and cap tightly.**

5. **Submit irrigation water sample for analysis.**

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