UNIVERSITY OF MARYLAND EXTENSION

Greenhouse TPM/IPM Report

Central Maryland Research and Education Center
Ellicott City, Maryland

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Cut Flower Education Seminar June 20, 2023

By: Stanton Gill

Our IPM team is setting up a one-day seminar at Castlebridge Farm in Ellicott City, MD for commercial cut flower growers on June 20, 2023. The Association of Specialty Cut Flower Growers is co-sponsoring this event with us. We have arranged to have speakers from The Botanical Trading Company, Syngenta Flower Division, Heartwood Nursery of Pennsylvania, and our IPM team with expertise in cut flower growing and problem solving. There will be a short tour of the farm in the morning.

For details and to register on-line: https://23Jun20Cutflower.eventbrite.com

For a brochure and to pay by check: IPMnet Conferences Page

Is pH the Important Water Quality Parameter?

By: Andrew Ristvey

Irrigation water quality is as important in greenhouse crop production as is the type of substrate and fertilizer chosen to grow plants. In fact, irrigation water quality should be the factor that a grower uses to determine the first two. But what factor of irrigation water quality is most important? When I ask growers if they have a water quality test, most tell me about their pH. It's true that pH is the driver of nutrient availability, but is pH really the most important parameter for water quality? Our organic substrates need to be at a pH of between 5.5 and 6.5 to optimally provide available nutrients, depending on what you are growing (see the April 13, 2023 Greenhouse IPM report).

While pH is an important factor for nutrient availability in the substrate, water pH means little. The principal factor of water quality is the measurement of bicarbonates and carbonates in water. In effect, it is how well the water is buffered against the change of pH. Bicarbonates and carbonates neutralize acidity. Irrigating substrates with high water alkalinity, however, is like adding lime to the substrate each time you irrigate. In contrast, a low water alkalinity will not buffer the effects of substrates naturally going acidic, especially if ammonium-based fertilizers are used.

In the greenhouse, there are several methods for managing this. First, the substrate's lime content can be manipulated. This however, may need some experimentation with different liming rates. Secondly, soluble fertilizers are made with different nitrogen forms which can either increase or decrease substrate pH. Acid fertilizers can effectively neutralize some alkalinity. Manufacturers will have information on the fertilizer bag regarding its potential acidity or basicity. Some suggest this method be used for irrigation water between 1.5 and 3.0 meq/l $CaCO_3$. The higher the meq/l, the more neutralizing capacity you need in your fertilizer. Neutralizing the alkalinity of the water itself with the use of injected acids is recommended, especially if your irrigation water has a meq/l $CaCO_3$ between 3 and 8. Typically, sulfuric acid is used. Phosphoric acid can add too much phosphorus and nitric acid is very caustic and dangerous to work with.

Acid injection is done by knowing the alkalinity of the irrigation water source and calculating the amount of acid needed. Alkalinity is measured in parts per million (ppm) and/or in milliequivalents per liter (meq/l) of calcium carbonate, total carbonates or bicarbonates (HCO_3^-). They are not the same. To convert between ppm and meq/l of $CaCO_3$, each meq/l is around 50 ppm. For example, 2 meq/l is 100 ppm $CaCO_3$. For bicarbonates, each meq/l is around 61 ppm HCO_3^-. For example, 2 meq/l is 122 ppm HCO_3^-.

Typically, 35% sulfuric acid is used in the industry for neutralizing water alkalinity. For every meq/l of $CaCO_3$, it takes 11 ounces of 35% sulfuric acid to neutralize 1000 gallons of water to a pH of 5.8 (roughly, 80ppm $CaCO_3$). If a water analysis shows 3.5 meq/l (175 ppm $CaCO_3$), then it would take about 38 ounces (11 x 3.5) of sulfuric acid per 1000 gal or water. A dilution of the sulfuric acid into a stock tank is needed before injection. Make sure your injector is able to handle the acidic solution. It's not possible to inject 38 ounces of acid into 1000 gallons of water with an injector. This strength of acid would not be good for the injector. Dilute 3.8 ounces of 35% sulfuric acid into each gallon of stock-tank water and inject at a 1:100 injection rate. Always add the acid to the water, not the water to the acid. The reaction creates a lot of heat and the large volume of water absorbs that heat. Adding water to acid will essentially cause an explosion of boiling liquid. Always use eye and hand protection along with long sleeve shirt and pants when mixing acid into water. Since the acid is very dense, stir the mixture thoroughly. With this example, the amount of sulfur in the fertilizer will be increased by about 43 ppm. Increased sulfur is not a problem in fertigation water, to a point. Neutralizing any more than 400 ppm $CaCO_3$ could add too much sulfur.

If you only have one injector, this acid/water mixture could be used for mixing certain acidic fertilizers, but not basic fertilizers, especially with high calcium. The calcium will form precipitates. It's always best to inject this neutralizing acid/water and fertilizer with separate injectors.

If a new injector is being installed, be sure to note the flow direction. If the injector is put on backwards, against the proper flow, it will not work. With any injector, always keep up with your maintenance and calibrations.

A University of Maryland Extension factsheet on injector care calibration is available here.

For help calculating the acid dilutions for injection see the e-gro.org AlkCalc website here.

Contact me (aristvey@umd.edu) if you have any questions.

July 2023 – Recreational Marijuana

Here is the response we received from the Maryland Cannabis Commission about production:

Thanks for your message. No, a greenhouse may not sell cannabis plants to nurseries for resale. Additionally, Maryland Cannabis Administration-licensed growers will only be allowed to sell cannabis plants to other licensees. Licensed dispensaries may sell cannabis plants directly to adult use consumers and patients. For greenhouses that are not licensed growers, federal guidelines prohibit the sale of cannabis plants or any part of the plant with a THC content higher than 0.3% on a dry weight basis to any person.

If greenhouse growers have any questions about selling cannabis plants they should reach out to the commission.

Commercial Ornamental IPM Information
extension.umd.edu/ipm