

# Water Soluble's Place In Sustainability

Carefully controlling nutrients is one consideration in sustainable production.

Preparing for spring. Flood floor on a grand scale at Garden State Growers of New Jersey.

by DR. CARI PETERS

It is not often that you see the words “mineral fertilizer” and “sustainability” in the same sentence. Responsible use of nutrients in regards to fertilization should be one of the main factors you consider when evaluating how your operation can become more sustainable. Is organic the only way to go or are there other solutions in regards to fertility? When overall plant quality is a concern in potted plant production, is it feasible to produce your best plant material without the control that typical mineral-water-soluble fertilizers provide?

Mineral fertilizers have played a huge part in the construction of what our horticulture industry is today. In the early part of the 1950s, greenhouses were popping up all

over our country as the love of gardening moved out of the farm and into suburbia.

Home consumers searched for attractive flowers to beautify their homes in expansive flower beds. The commercial greenhouse grower produced and finished plants to fill this need. Today, we have seen a shift from landscape soil

beds to large mixed container gardening and micro or dwarf plants for urban environments. All of these plants are still produced by the ever-adaptive commercial grower, either in small greenhouses or very large operations, challenged with the need to fill the demand created by the trends of the home gardener.

Fertilizers provide the integral nutrients needed for plant growth in environments where these nutrients are not naturally present. Water-soluble formu-

las are composed of synthetic or naturally occurring raw materials that are highly soluble in water. By dissolving into a true solution, water soluble fertilizers will provide each nutrient in a form that is 100 percent available to the plant for uptake by roots or leaves. This offers detailed control of the nutrients being directly delivered to your plant. You control the concentration of the fertilizer solution and the frequency that the nutrients are applied to the plant through your irrigation system. This will let you regulate the types of growth that are desired.

Improving the sustainability of your operation has to include an increased awareness of the nutrients you apply to your plants. Become more “nutrient conscious” by utilizing the most appropriate forms of nutrients specific to plant growth stage and growing conditions. The following are suggestions toward increased nutrient accountability. By incorporating some or all of these practices, you will improve your daily fertility program and reduce the risk of unused or over-applied nutrients, without jeopardizing the loss of control of



In this series on sustainability, *Greenhouse Grower* looks at the trends in sustainable products and processes and the growers who use them.

## GROWING GREEN

### FERTILIZER

your high-quality plant material.

#### Best Management Practices

Best Management Practices (BMPs) have been suggested for many years as guidelines for continual improvement in making growers' routines more efficient and less wasteful, and have less of an impact on our environment. There are several that apply to the use of water-soluble fertilizers:

#### Fertilizers For Control

Why are there so many formulas? Do the fertilizer companies enjoy making things more complicated by continually introducing new formulas and SKUs for you to use? Thinking beyond General Purpose forces you to discover why you apply the nutrients you do and how the plant takes them up and uses them.

Formula rotations to control pH (potentially acid formulas versus potentially basic formulas) can reduce or

Problem	Possible Solutions
Salt build-up in media	<ul style="list-style-type: none"><li>• Nutrients not taken up by the plant can be left in the media. Certain ions will block uptake of other ions and cause nutrient imbalance in the plant.</li><li>• Perform in-house EC tests by pour-thru method to maintain EC levels appropriate for your crop and watering method.</li></ul>
Inconsistent appearance of crop	<ul style="list-style-type: none"><li>• Constant liquid feeding (CLF) at lower concentrations will ensure the plant is receiving a consistent amount of nutrients at each watering. Plants will only take up what they need and your overall fertilizer use will decrease.</li></ul>
Poor root development	<ul style="list-style-type: none"><li>• Ensure that the media is uniformly moist at each watering event. Dry pockets will deter even expansion of roots in a pot.</li></ul>

eliminate concentrated acid use. Low phosphorus growing programs that utilize formulas with 0 percent  $P_2O_5$  can keep plants compact and reduce the need of plant growth regulators. Even learning which formulas can hold plants back for an unexpected ship date delay will help you manage your nutrient application and reduce overall fertilizer use.

#### The Gray Days Of Winter

In the cool, gray days of winter, a formula such as Dark Weather 15-0-15 can be an essential tool for regulating growth. When the weather is cool with little sunlight, plants take up less water and nutrients, leaving the applied fertilizer to sit in the root zone for prolonged periods of time. In addition, the cool temperatures slow down

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the rate of conversion of the different forms of nitrogen. Damage to the roots can occur if a fertilizer formula with high ammonium nitrogen ( $\text{NH}_4$ ) content is used in these conditions. Rotating the 'Dark Weather' formula into your fertilizer schedule will provide the plant with calcium nitrate ( $\text{CaNO}_3$ ), a form of nitrogen that is easily taken up in the root zone. This will greatly reduce the potential for damage to the roots of the plant and provide solid, balanced nutrition under these conditions. Dark Weather 15-0-15 is a very a good tool to have on hand to serve many purposes, including low phosphorous growing, a calcium boost in times of reduced transpiration and holding plants for a later ship date.

### Recycling Nutrients

Subirrigation by ebb and flow benches or flood floors are specifically designed to control the amount of water used in greenhouse production.

The benches or floors are slowly filled with a water or fertilizer solution that will provide the plant with a uniform amount of nutrient solution for a specific period of time.

The design is to achieve a closed system where the water used is collected and recycled. When used correctly, a significant reduction in the overall amount of water and fertilizer required to produce high-quality plants is observed. This benefits the plant by allowing it to take up the water and nutrients it needs from the bottom of the pot. The residual water-fertilizer solution can be collected in on-site tanks and monitored to replace lost water and nutrients, if necessary.

In-house electrical conductivity (EC) tests followed by regular laboratory analysis will indicate at what proportion nutrients and water need to be added back into the recycled solution to achieve the desired ppm concentration. Lower overall fertilization rates

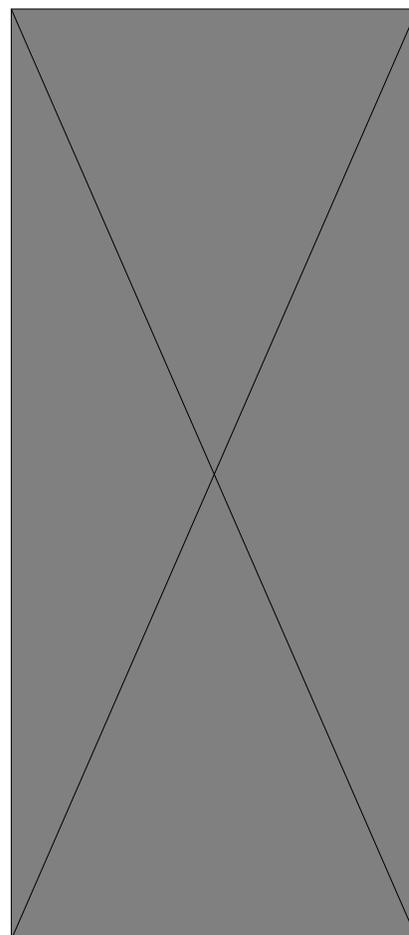
are advisable to only provide what the plant can immediately use.

### Lower Leaching Fractions

When problems arise in your crop, most growers' first reaction is to leach! Comforting as it may be, the practice itself is very wasteful in many ways. Increased leaching promotes nutrient loss and runoff, as well as increases the amount of time spent actually watering. A decisive watering and fertilizing schedule based on indicators such as growing conditions and plant water status is a more effective way to ensure your plants are receiving and using the nutrients you apply.

Reducing the leaching fraction, the amount of water lost after an irrigation event, decreases nutrient runoff on a per pot basis. A leaching fraction more than 50 percent of the water applied can really add up as nutrients are lost and run-off and money go down the drain. Deliberate hand watering,

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Quality geraniums grown by Joe & Karl Ledderer of Pennsylvania, using ebb & flow benches.

to become more efficient with your energy, nutrients, materials and most importantly, your time. Remember, providing your customers with the best quality finished plants you can grow will keep them happy and hopefully coming back. In the end, staying in business while implementing some sustainable practices assures your own sustainability in

appropriate placement of drip tubes in the plant root zone, capillary mats or computerized overhead booms are just a few methods that can to keep the amount of water lost from each pot at a minimum. Keeping your leaching fraction low will reduce or prevent un-

necessary run-off from impacting the environment.

Taking controlled "baby steps" toward an increase in sustainability for your operation can provide you with long-lasting benefits. Evaluate where in your operation you can improve

today's competitive marketplace. **GG**

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