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36. The benefits of applying controlled release fertilizers. Hulme, F. Greenhouse Management 31(1):66-68. 2011.

By Fred Hulme

Controlled release fertilizers can fit into greenhouse production as long as growers avoid excessively low or high production temperatures.

The benefits of applying controlled release fertilizers

CRFs offer growers another way to increase efficiency and profitability while promoting sustainability

Greenhouse growers are working harder than ever to remain profitable. This quest for profitability has caused many growers to scrutinize their production systems, looking for ways to save money on materials and labor. Recent university and grower trials have shown that a change in fertilizer practices may offer growers a real chance to cut costs, produce high quality crops and be more environmentally friendly.

Adapting to greenhouse use

Applied at the beginning of the cropping cycle, controlled release fertilizers (CRFs) are coated fertilizers that deliver nutrients to plants over a defined and extended period of time. Generally, CRF nutrient release is driven by average soil temperature. Higher soil temperatures cause the fertilizer to release nutrients more quickly. Greenhouse growers have much greater control over the indoor production environment compared to outside container nurseries, where CRF use is more prevalent.

While they're not necessarily the norm, CRFs can fit into greenhouse production as long as growers avoid excessively low or high production temperatures. In this case, CRFs can deliver nutrients far more efficiently, better matching crop nutrient demand as compared to a nutrition program consisting only of water soluble fertilizers.

CRF advantages

Incorporating CRF into growing media, especially during soil mixing, requires no extra application labor. It is easy to vary the amount of CRF applied to crops with different feeding needs. Because CRFs provide nutrients slowly and constantly and in a manner that is not tied to irrigation frequency, they provide more consistent nutrition for plants making it possible to maintain more consistent quality. Application of a CRF results in lower root zone pH or electrical conductivity compared to water soluble fertilizers as long as crops are properly irrigated (less stress).

Depending on rate and crop, CRFs may produce more compact plants that require less use of growth regulators. CRFs continue to feed plants under cool weather conditions. This is especially important during the busy shipping season. Depending on the rate and product selected, CRFs continue to feed plants while they're displayed at retail outlets, and often, long after their eventual purchase by consumers.

Choosing a CRF

Choosing the right CRF and rate is critical for success. Some greenhouse growers have had poor results after selecting unsuitable CRFs and/or applying excessive rates. It's important for growers to do their homework or consult with product experts to find the right CRF for their specific needs.

Patterned nutrient release products can offer better results with 100 percent coated, homogenous fertilizer prills for even distribution of nutrients pot-to-pot and controlled nutrient release. Completely coated prills provide safety, consistency and thorough feeding.

Equally important, CRF rates in the greenhouse need to be very low. Growers who have no experience with CRFs should start with a low rate of approximately 3-6 pounds per cubic yard. This rate may be even lower than the lowest rate stated on the product label. The proper longevity type depends on the crop, the growing environment and whether the grower desires post-production feeding at the garden center and at the eventual consumer's garden.

Controlled release fertilizers continue to feed plants under cool weather conditions.

Take precautions

Depending on product and rate, growing medium containing CRF should generally be used up as soon as possible, typically within a month after it's manufactured. This helps to avoid soluble salt buildup in the medium.

If greenhouse temperatures climb excessively, it is important to increase irrigation frequency to cool plants and avoid excessive soluble salt build-up.

Combination fertilizer programs

Research at Cornell University and Ohio State University has shown it is possible to produce high quality greenhouse crops with only CRFs. However, since this can be a major production change for growers who are used to applying only water soluble fertilizers, it might be best to consider starting with a combination program.

Water soluble fertilizers

Applying water soluble fertilizers has long been the preferred way to deliver nutrients to greenhouse crops. These fertilizers appeal to growers for a variety of reasons:

- Fast and simple application through irrigation systems.
- The ability to customize ferti izer programs to local water and growing conditions and crops.
- Readily available nutrients for quick plant response.
- The flexibility to change the timing, concentrations and formulations of fertilizer at any time.

Water soluble fertilizers are virtually the "fast food" of the horticulture industry. The affect of each water soluble fertilizer application is temporary. Many common water soluble fertilizer formulations don't have all the needed essential elements and require supplementation for optimum results. Water soluble fertilizer nutrients can be easily leached from root zones, even when applied with drip irrigation. Greenhouse growers unable to recapture and recycle fertilizer leachate waste some of the nutrients.

Other factors influence the efficiency and practicality of water soluble fertilizers. It is more difficult to apply water soluble fertilizers during cool, cloudy or extremely humid conditions when irrigation may not be necessary.

Most growers have just one irrigation system, so it's not practical for them to change water soluble fertilizer feed programs for different crop needs. Water soluble fertilizer mixing, concentrations, injector use and compatibility can be confusing and labor intensive. Water soluble fertilizer programs can cause wide fluctuations in root zone pH and electrical conductivity values depending on water quality and crops.

Water soluble fertilizers and CRFs can work hand-in-hand to provide greater benefits than either fertilizer technology alone. This is especially true when growing a variety of crops. Water soluble fertilizers can be used at one concentration for all plants, and the CRF rate can be increased for plants that are heavy feeders or plants with special fertilizer requirements.

CRFs can provide plants with nutrients during cool weather, lower light conditions and when the plants are growing but when irrigation is not possible. Weekend clear-water leaches also work better if there is CRF in the growing medium providing some nutrients during this time. This can lead to more uniform feeding throughout the crop production cycle and better leaf color. By selecting the correct CRF product, growers can provide sustained fertilization for retailers and consumers, providing a value-added difference.

CRFs can dramatically reduce environmental impact.

Environmental factors

Recent research at Ohio State University indicates that traditional, overhead hand watering causes approximately 60 percent of the fertilizer solution to miss the container medium or to splash out and be wasted. This may lead to significant amounts of fertilizer entering the environment. Additionally many of the nutrients in water soluble fertilizers that reach the pot can leach through container drainage holes.

Application of CRFs can dramatically reduce environmental impact. More of the CRF ends up in the growing medium. This means more of the nutrients are taken up and used by the plants.

Do the math

Studies have shown that although water soluble fertilizers cost less per pound, they can be far less efficient over the long run of the crop. If a grower needs to apply more fertilizer per unit crop over the entire production cycle with water soluble fertilizers, this can make the unit fertilizer cost-in-use significantly higher. This is especially true for long-term crops.

CRF can be much more efficient and applied in lower doses compared to water soluble fertilizers. This can lead to a lower fertilizer cost per unit pot. Application of CRF requires less labor as there's no need to make a stock solution and to monitor injector accuracy. GM

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Greenhouse MANAGEMENT

ON THE COVER:

Jen Kurtz designs garden products for the Urban Gardener program and markets plants to Home Depot stores in Connecticut and Massachusetts.

Photo by Julie Brown Photography

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THE URBAN GARDENER

Working mom Jen Kurtz of Kurtz Farms designed the Urban Gardener program to give time-starved consumers the opportunity to be gardeners and decorators.

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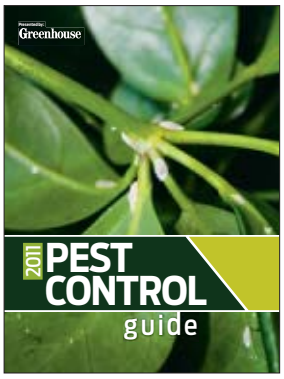

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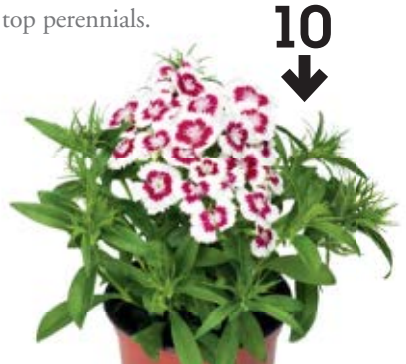

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