

Measures of Control

Despite a longtime resistance to greenhouse use, controlled-release fertilizers are perfect for these protected environments, where growers can monitor and change temperature better than outdoors.

By Fred Hulme

Controlled-release fertilizers (CRFs) are plastic- or polymer-coated, water-soluble granules that deliver nutrients to crop plants over a defined and extended period of time. There are a number of different brands of CRF in the marketplace that utilize various coating technologies. However, all CRF products are based on similar principles with soil temperature being the main driving force for nutrient release. Some CRFs may swell when activated so you know they are working; others will not. Still, regardless of technology, nutrient release will always occur more slowly at cooler root-zone temperatures and more quickly at higher root-zone temperatures. This makes sense, because within the range of acceptable growing temperatures, plant growth and metabolic processes also increase with rising temperatures.

Typically, CRF product longevity is tied to some baseline temperature (e.g., 70° F) that CRF manufacturers use in their quality-assurance programs. There is a general misconception that this is the critical temperature required for any nutrient-release activity, but CRF products will actively release nutrients at any time when crops are growing.

CRFs sometimes receive the misnomer of "slow release." Actually, slow-release fertilizers (e.g., methylene-urea or blue chip) usually are not coated; rather, they are slowly soluble or require microbial action to work. Slow-release fertilizers are best suited for use in nurseries and landscapes with well-established soil microbial populations. Because they are less predictable than CRF products, they are generally not recommended for use in the greenhouse as a main source of plant nutrition.

Water-soluble fertilizers (WSFs) have long been the fertilizer mainstay for greenhouses. They are quite versatile and can be used in numerous combinations and rotations, allowing for a variety of fertilizer programs. However, it

can be labor intensive to mix, apply and monitor water-soluble fertilizers, and problems can arise if fertilizer selection is poor or equipment calibration is off. Additionally, because water-soluble fertilizers are delivered with irrigation water, if environmental conditions are unfavorable (cool with high humidity) or if the proper equipment is unavailable, the fertilizer program can lose effectiveness. When used in combination with water-soluble fertilizers, CRF can be a great way to eliminate these issues in the greenhouse. A properly planned fertilizer program that combines CRF and water-soluble products can better match the nutrient needs of the crops, reduce waste and nutrient runoff, and produce superior crops with value-added benefits.

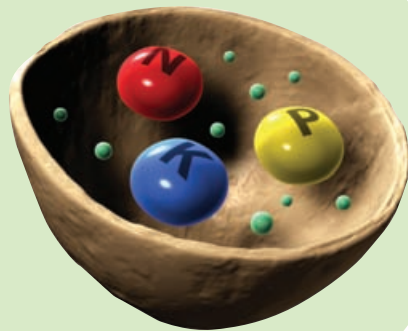
CRFs have long been used outdoors in container nurseries, but through the years, there has been some resistance to using them within the protected greenhouse environment. This is counterintuitive. Because they are driven by temperature, CRFs actually should be better adapted to greenhouse culture, where growers have much more control over the environment than in container nurseries. To successfully use CRF in the greenhouse, great care must be given to proper product and rate selection, application method, crop type, environment and nutrient monitoring systems.

Proper Selection of CRF

Myriad CRF products are available in the marketplace with a confusing variety of nutrient contents, components and technologies. Compared to container nurseries, greenhouse crops are relatively salt sensitive and grown in smaller containers in tighter, peat-based media. Because of this, CRF products that work well in the nursery may not be suited for the greenhouse. Scotts Professional recommends the following type of CRF product for greenhouse use:

- 100 percent coated (for safety)
- Homogenous in nature (so there is not an uneven distribution of different types of granules) from pot-to-pot for consistent feeding
- Controlled release of N-P-K
- Micronutrients (for complete feeding)

CRF companies like Scotts Professional



Do you want to receive the tags you ordered, delivered on the date you needed them?

It's Simple.

Call
MasterTag

1-800-253-0439

MasterTag has the best on time delivery performance record of any tag provider.

Write in 774



www.mastertag.com

grower 101

usually have representatives in the field who can help greenhouse growers develop successful fertilizer programs on site. To get started on their own, growers should use the following criteria to ensure selection of the best CRF products and programs for greenhouse use:

1. Read the product's guaranteed analysis to determine its nutrients content, including nitrogen types and secondary nutrients like magnesium and micronutrients.
2. Consider other nutrients that may be present in irrigation water, any accompanying water-soluble program and growing media.
3. Remember that blended products can segregate and lead to uneven fertilization, especially in small containers.
4. Select product longevity to match cropping systems and any need for sustained post-production feeding.
5. Rates are an essential part of success. Label rates on a fertilizer bag are generic and suggested for a wide range of situations, and these suggestions should be considered starting points. To determine which rate works best for any situation, conduct a trial. In the greenhouse, I would advise growers to be conservative and start with lower rates to ensure a high degree of safety while assessing the benefits of the CRF.

It's important to note that different crops have different nutrient requirements during certain points in their growth cycle. That's why it's essential to match the CRF product to the nutrient demands of the plants being fed — not just what nutrients they need, but also when they need them. For example, the Osmocote Plus family of controlled-release fertilizers from Scotts Professional incorporates third-generation Patterned Nutrient Release Technology that feeds plants earlier or later in the growing season, depending on their specific feeding habits. Because some plants, like annuals and perennials, are heavy feeders early on, they need extra nutrition at that time or plant quality may suffer and nutrients released later may be wasted. The same situation exists in reverse for plants that feed heavily later in the growth cycle, like summer or fall feeders.

Selecting a coated fertilizer that's not suitable for the prevailing climate or crop type, or applying the fertilizer at an improper rate, results in nutrients being released when they are not needed. Always carefully consider crop type, feeding habit, length of growing season, timing of application, container size in relation to plant size and irrigation/rainfall. The bottom line is that choosing a CRF that releases the right nutrients at the right time is key to the crop's overall success.

Application Methods

CRF can be applied in a variety of ways, and the right application method for a particular crop will depend on grower objectives, available equipment and timing.

Greenhouse growers most commonly use the incorporation method. With incorporation,



A properly planned fertilizer program that combines CRF and water-soluble products can better match crops' nutrient needs, reduce waste and nutrient runoff, and produce superior crops.

CRF prills at the target rate should be uniformly blended into the growing media prior to potting. Incorporation is the most labor-efficient way to use CRF, and it is probably best performed by your growing media blender. The key objective of incorporation is to ensure consistent fertilizer distribution throughout the mix for the most uniform delivery of CRF to each pot. One caveat to using incorporation is that the clock starts ticking as soon as the CRF is added to the mix. Depending on the chosen product and rate, growing media containing CRF should be used up as soon as possible — typically within several weeks after the date of manufacture — to avoid soluble-salt buildup in the mix. This would be especially true in a pile of bark-containing mix that could heat up after blending.

Growers who are blending CRF into growing media on their own should aim for a consistent distribution of CRF within the pile. If this isn't done with extreme care, it's possible to end up with plant injury (in pots that got too much CRF) and poor growth (in pots that didn't receive enough CRF). When using equipment like a cement mixer to blend in the CRF, don't overdo it. If the mixer runs too long, it may damage the CRF's coating and destroy the structure of the growing media.

CRFs can also be topdressed on the growing media surface, or dibbled or subdressed into the root zone, but these methods tend to be rather

www.gpnmag.com

grower 101

labor intensive unless you have equipment set up to do this on your potting line.

Some growers add CRF to containers as plants are shipped from the greenhouse. In this case,

they are not using CRF to grow plants; rather, they are applying an added value. Many consumers do not understand the value of fertilizing plants sufficiently. By applying a CRF dose to these

pots, growers are delivering products to consumers that are easier to care for. Not only can these plants survive the rigors of the garden center, but they also will thrive in a residential setting

when provided with adequate light and water.

Combination Programs

Water-soluble fertilizers and CRFs can work hand-in-hand, providing greater benefits than either fertilizer type alone — especially when growing a variety of crops. Growers can use a low rate of CRF as a steady base feed for all plants with a supplement of WSF as needed. Adjust CRF rates higher to accommodate heavier feeders. When plants are growing, CRFs can feed them under conditions when WSF can't — during cool, wet weather and lower light conditions that don't allow for irrigation. Weekend clear-water irrigations will work better if there is CRF in the growing media to provide some nutrients.

When performed correctly, combination fertilizer programs can help growers achieve several benefits:

Combination programs maintain better foliage color thanks to constant, uniform feeding throughout the crop cycle. If the correct CRF product is selected, both the retailer and consumer will benefit from sustained fertilizing, providing customers with a value-added difference.

These programs simplify liquid feeding programs. By using one concentration of WSF on all plants, the CRF can be increased for heavy feeders or plants with special fertilizer requirements.

The use of CRFs minimizes nutrient runoff for a healthier environment. Recent research on hardy mum production has shown that using CRF as a substitute for WSF dramatically reduces the concentration of fertilizer in the effluent leaving the pots. **GPN**

Fred Hulme is director of technical services for the Scotts Company. He can be reached at fred.hulme@scotts.com.

LearnMore
For more information related to this article, go to www.gpnmag.com/lm.cfm/gp080903

Commercial Greenhouses



PT30 greenhouse

The PT-30 is an innovative structure. It can be used as a seasonal cold frame but is also heavy-duty enough to be used as an inexpensive, year-round growing structure.

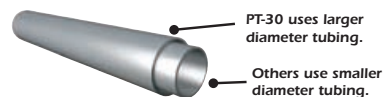
- Versatile and affordable
- Complete package saves you time
- Heavy-duty construction

NEW! Roll-up side ventilation

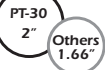
- * Simple operation
- * Self-locking gearbox
- * Full range of ventilation positions



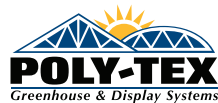
20% Larger Tubing!



We manufacture the PT-30 arches with an industry leading 2" x 14 gauge tubing so that you can rest assured it will provide years of trouble-free use.



To see our full line of retail and commercial greenhouses, visit us on the web at www.poly-tex.com or call us toll-free at **800-852-3443**.



©2008 Poly-Tex, Inc. All rights reserved.