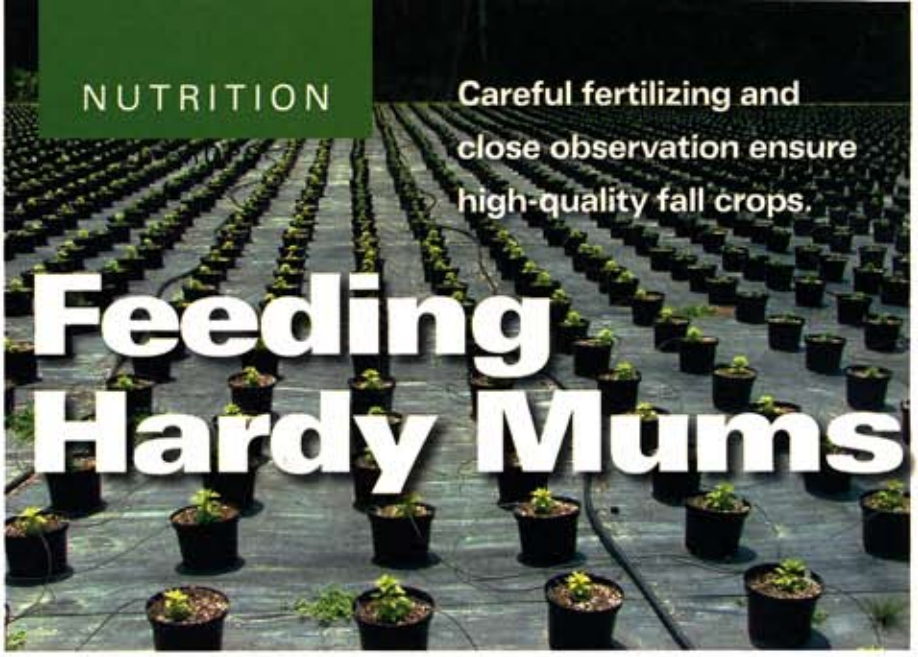
NUTRITION

Careful fertilizing and close observation ensure high-quality fall crops.



Feeding Hardy Mums

by ***FRED HULME***

HARDY mums and other fall crops are grown in the summer months for late summer/fall sale, providing many growers with a second income stream during this period. These crops are unusual when compared to most greenhouse crops, as they are most often grown outside in field conditions with fewer environmental controls.

This scenario is positive from an economic point of view. It can, however, result in some production challenges. Careful planning and implementation of a fertilizer program, combined with close observation, will ensure high-quality fall crops.

Mums – as well as asters, ornamental cabbage and kale – are relatively heavy feeders. The mum plant canopy is primarily built during the vegetative stage of production (the first 1.5 months). If nutrients are lacking during this time, the mums will not achieve their full size or color potential. After flowers are formed, nutrient demand diminishes greatly.

If you are using a water-soluble fertilizer (WSF) program, the key is to feed plants an adequate concentration of nutrients at an early enough production stage. Most growers will use a commercial growing media buffered to a starting pH of 5.8 to 6.5. These mixes generally will have a nutrient starter charge in them as well, but they are not actually designed to grow a crop. Begin constant fertilization as soon as cuttings are stuck, maintaining a high concentration for at least the first five weeks. Recommended WSF concentrations for mums irrigated from the top are:

- 200 to 300 ppm N on a constant liquid feed basis; or
- 350 to 400 ppm N on a periodic feed (weekly) basis

In later weeks, cut concentrations in half or reduce fertilizer frequency, as most of the plant growth has already occurred. This decrease in fertilization will help prevent salt buildup in the soil, reduce fertilizer waste and minimize potential nutrient run-off. Concentrations may be lowered slightly from the levels suggested above for reduced leaching practices or sub-irrigation systems as determined by a root zone EC monitoring program.

Fertilizer Selection

Fertilizer selection should always be based on irrigation water quality. In the first couple of weeks or so after planting, consider selecting a fertilizer formulation higher in ammoniacal N (such as Peters 20-20-20) to promote shoot breaks in the cuttings before switching to the main WSF formulation. For this purpose, you would typically select a higher nitrate percentage formulation with balanced N and K (and lower P levels) such as Peters Professional 20-10-20 PL, Peters Excel 21-5-20 or 15-5-15. Lower P formulations are recommended to keep plant growth compact and lessen the need for plant growth regulators.

Fertilizer selections for any specific location should be based on the results of an irrigation water test (especially water alkalinity and levels of calcium

and magnesium) to both ensure growing media pH ranges are acceptable and meet any nutritional gaps. The Scotts Company recently introduced an automated fertilizer selector at www.petersabc.com. This selection system is based on irrigation water quality, and is a useful tool intended to help growers choose the best fertilizer for their particular needs.

Fall mums are often grown in areas without access to injector systems or drip systems needed for proper water-soluble fertilization. Overhead sprinklers can be very wasteful when employed out in the field since much of the applied fertilizer solution does not hit the pots and is subject to run-off. This situation

calls for the use of a controlled-release fertilizer (CRF) like Osmocote Plus to enhance garden mum production.

University researchers have demonstrated in recent years that CRF can be used as a sole source of nutrition for hardy mums. Research has also demonstrated a qualitative advantage when growers employ CRF in combination with WSF treatments. The CRF can be incorporated into the growing media before planting, greatly simplifying the application process. However, for best results, any growing media combined with CRF should be used up within a month after incorporation. Keep in mind that once the CRF is mixed into the soil, it begins to release and soluble salts will build up in the media during storage time.

If you order your growing media well in advance, it's better to top-dress the CRF. While this is more labor-intensive, it does offer more flexibility in the rate between crops or cultivars. Remember not to pile the dose of CRF directly against the cutting stem and to place the dose near any drip emitters for best performance.

Using CRF in your mum production offers the following benefits:

- CRFs can simplify your WSF program. Use one concentration of water-soluble fertilizers on all crops and supplement with CRF for heavy feeders like mums or other plants with special fertilizer requirements.
- While WSF applications can easily be lost to leaching from rainfall or excess irrigation needed in hot weather, CRF will maintain a base nutrient level in the root zone.
- CRF provides a continuous, low-level base feed for when you can't use water solubles – during cool, cloudy weather or during busy shipping times.
- CRF can reduce nutrient run-off

levels into the environment as compared to overhead liquid feed systems.

• CRF continues fertilizing for the garden center or homeowner. Even with mum crops grown completely using water-soluble fertilizer, some growers top-dress pots with CRF at shipping or point-of-sale, resulting in bigger, greener plants for the whole growing season in the landscape.

For best success, I recommend the use of a homogenous, 100 percent coated CRF with micronutrients. Rate and type of CRF is an important consideration, as well. Match the longevity of the CRF product with your growing temperatures and desired delivery time. Choose longer-term release CRF products when you want to provide value-added nutritional staying power for your customers. Most mum growers in the United States achieve good results with five to six months or eight- to nine-month longevities. Some CRFs contain patterned release technology that determines when nutrients are released within the stated longevity time. For fall mums, a High Start formulation is the best fit, as a majority of the nutrients will be delivered early in the crop cycle when the mum plants need them. CRFs should generally be used at the low rate in a combination feed program to supplement your water-soluble fertilizer applications and produce crops that maintain better color for your customers. A medium rate is best suited for a 100 percent CRF fertilizer program and will grow a quality crop without any other supplemental fertilization under most conditions.

Measuring and Monitoring

It is essential to periodically conduct in-house testing of soluble salts and pH to ensure that your fertilizer program is working as it should. For best results, send growing media and tissue samples to a lab for comprehensive testing on a monthly basis. High salts can burn roots and create points of entry for opportunistic pathogens like pythium spp.

If growing media pH is out of balance, micronutrients like iron can be deficient or excessive. If growing media pH falls below 5.5, excess iron can cause toxicity symptoms, such as marginal burning of lower leaves. Here, basic-forming WSF applications or lime applications might increase root zone pH and reverse the cause of the problem. Conversely, if growing media pH rises above the mid-6.0s, deficiency symptoms such as yellow younger leaves can result. If these symptoms appear, a series of acidifying WSF applications or an iron chelate treatment can help mitigate them.

To determine the best fertilizer program for your fall crops, contact your distributor or fertilizer company representative. They should be able to make recommendations and help you set up a trial to determine practices that optimize hardy mum production for your specific operation. **GG**

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