



Retail Reflection\$

Post-Production Fertilization

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The Reality

It is late May, you have just sold the majority of your second turn, and your third turn is in flower and ready for June sales. By now, like all greenhouse growers, the muscles are a little sore and you are finding it hard to get up in the morning. You feel good about spring sales and are ready for a break. The third turn has been on display for about a week and you begin to observe customers selecting only the finest material from flats of bedding plants. You yourself are beginning to see why they're being so selective. The lower leaves are turning yellow, the plants are slightly stretched, and the flowers are spent. What you are experiencing is what many other growers encounter every year—improper management of plant nutrition in the retail setting.

Why establish a fertility program in the garden center or retail location? Plants continue to grow in retail environments, thus demand nutrients. But, remember that managing nutrition may include ceasing, reducing, continuing, or increasing fertility. Monitoring your crops' nutrition is a crucial part of managing it. Other reasons for establishing a fertility management program include:

- It maintains healthy crops throughout the marketing period.
- Foliage color is retained and more flowers are produced.
- Quality plants boost sales, which means increased revenues.
- Knowing how to manage fertilization increases your awareness of species' requirements.
- It's environmentally conscious.

If you are recognized as being a reputable establishment, then you have created a niche for yourself. You are the retailer who has healthy material in the summertime, and not just during the busy weekends of Mother's Day and Memorial Day! The ultimate advantage you have over large garden centers or mass-market chains is that you still have total control over the crop's nutrient regime. You know how the crop was fertilized from potting to market date. This knowledge is beneficial for maintaining healthy plants that sell quickly.

Monitoring

It is important to remember that fertilizers are not medicine. Overcoming deficiencies, especially in the retail area, will take longer because nutrient uptake is not rapid in the post-production stage. More importantly, monitoring the crops' pH and electrical conductivity (EC) so that deficiencies never occur should be common practice.

By maintaining the proper pH and EC, many nutritional problems can be avoided. The pH directly influences nutrient availability. The general pH range for most floriculture crops is 5.4 to 6.8, but maintaining the pH between 5.6 and 6.2 is recommended.

Electrical conductivity measures soluble salts, all of the dissolved salts in the substrate solution. Some salts provide nutrients while others are not essential for plants and may interfere with plant growth. Refer to Table 1 for pH and EC ranges for popular floriculture crops in the post-production stage.

You may be concerned with fluctuations in sales that may sometimes lead to cutting back plants or manipulating the environment constantly. Both actions require a tremendous amount of labor. Knowing the pH and EC values of a crop can help determine the amount of fertilizer to apply while preventing damage to plants. Maintaining compact growth while avoiding nutrient deficiencies should be relatively easy by simply monitoring the substrate EC levels. In most cases, conducting one analysis one to two weeks after displaying the crops will provide pH and EC values to direct nutrient management decisions.

The most practical means of attaining pH and EC values is by using the PourThru method. For detailed information about the PourThru method visit www.pourthruinfo.com. Principles behind pH and EC and information about pH and EC meters can also be found at this site. The PourThru manual, with detailed information on procedures, pH, EC, and other nutrient parameters is available for \$15.00 from www.nccfga.org.

Principles of Fertilization

It has been suggested that for most floricultural crops at visible flower bud, fertilization be discontinued or reduced significantly because plants require less nutrients. However, when the crop is marketed, nutrients should still be applied at an appropriate level. Many growers apply liquid fertilizer with a constant liquid feed program, and reduce the rate by half when the plant begins to show flower buds. Another method is a once weekly fertilizer application to continue a nutrient charge in the substrate.

Keep in mind that root development may be significant in the retail setting if pathogen infection and high EC levels have not damaged the root system. Water demand will be great, especially in late spring/early summer, and irrigation may be required daily in the retail setting if temperatures and light intensity are high. Therefore, multiple fertilizations each week may be required for crops, especially vigorous growing plants like petunias and combination plantings of vegetative annuals.

Avoiding Excessive Growth

Providing plants with a boost of highly concentrated fertilizer before marketing can severely affect quality. Applying too high of a rate can cause undesired growth which

will lead to leggy plants or cause too high of an EC level which may damage plant roots. Although growth still occurs, nutrients are required only in minimal amounts to keep plants healthy and toned.

A low phosphorus/ammoniacal-nitrogen fertilizer should be used in the retail setting. High levels of phosphorus have been shown to increase stem elongation, and ammoniacal-nitrogen causes lush growth with less flowering. Use fertilizers like 13-2-13, 15-0-15, and 15-5-15 in the retail sales area weekly at concentrations of 50 to 100 ppm N.

Slow Release Fertilizers-Best Management Practices

Generally, the cost of slow release fertilizers is too high to incorporate into bedding plant substrates. Further, nutrients can be released quickly due to high temperatures, which may introduce undesired levels of ammoniacal-nitrogen in the substrate, a causal agent of lush and leggy growth. The lack of ability to control the release rate is a deterrent to some growers.

A liquid fertilizer program is popular amongst many retail growers due to cost and ability to control fertilization rates. However, if you decide to use a slow release fertilizer, use a fertilizer that contains both ammonium and nitrate, such as Osmocote and Nutricote. Also keep in mind the release period. Most plants only need a temporary fertilizer boost before being transplanted into ground beds (usually just a one or two week time period). With this in mind, an 8-9 month release pattern is not very practical. Check with your fertilizer suppliers about the release pattern. Several companies are beginning to offer “custom” release patterns that may better suit your retail conditions.

Nutrient Management

During the post-production stage there usually are 6 to 7 common nutrient disorders that can occur when the pH or EC is too high or low. ①Iron deficiency (interveinal chlorosis of the upper growth) can occur when the pH rises above 6.6. ②In contrast, iron and manganese toxicity can occur when the pH is too low (<5.5).

Low salts can result from too many clear water irrigations in the retail sales area. Deficiencies like ③ nitrogen (lower leaf yellowing), ④ phosphorus (lower leaf purpling), ⑤ potassium (lower leaf marginal chlorosis), and ⑥magnesium (lower leaf interveinal chlorosis) deficiencies are common when PourThru EC values are below 0.5 mS/cm.

⑦ Because calcium demand is less in the post-production stage when plants are at their mature stage (less cell division and elongation), calcium in the irrigation water should be adequate. However, the demand for calcium will increase if plants are cut back because of stretchy growth in the retail sales area and a new plant canopy is forming.

Micronutrients like boron, copper, manganese, and zinc are generally provided by the breakdown of organic substrate components or from the irrigation water. One application of a complete fertilizer like 20-10-20 should provide sufficient micronutrients until plants are planted in garden soils. However, deficiencies may occur if the pH is ≥ 6.5 . Detailed information pertaining to nutrient disorders is available on www.floricultureinfo.com. In addition, color photo cards with pictures of and corrective procedures for nutrient disorders are available at www.nccfga.org.

External Factors Affect Plant Quality

Although nutrition plays a major role in how plants appear in the retail setting, several other external factors contribute to plant quality in the post-production stage. Because this article mainly focuses on nutrient effects on plant quality, these factors will not be discussed extensively, but don't underestimate them.

- **Irrigation**—Water should be reduced at the visible bud stage, and the growing substrate should be allowed to dry more thoroughly.
- **Light**—Levels should be reduced in the retail setting. Provide shade to plants when temperatures are $\geq 68^{\circ}\text{F}$. Tiered shelving is highly recommended in the display area as the bottom and top shelves will receive similar light levels.
- **Temperature**—It has been suggested to reduce temperatures by 5 to 8 $^{\circ}\text{F}$ during the post-production stage. Lowering temperatures will also enhance flower color.
- **Ventilation**—Maintain airflow in the retail setting to avoid disease and air pollutant accumulation.
- **Substrate Selection and Container Size**—Select a mix that provides proper aeration and good water holding capacity. Large containers (greater than packs) will help reduce the frequency of wilting.
- **Propagation and Potting Times**—Late season production should be kept to a minimum because it may lead to discarding final product due to slower sales, even if plants are looking their best in the retail area.
- **Plant Growth Retardants (PGRs)**—PGRs will keep plants more compact in the sales area. They also reduce water demand, and may enhance foliage color.
- **Employee Competence and Education**—Train employees to handle plants responsibly.

Conclusion

Fertility is just one component of plant production that affects flower and foliage longevity. Cultural factors including production temperature, irrigation, light, substrate, and container size affect post-production longevity. If these factors are ideal for plant growth then fertilization is not a large issue, but the reality is many retail environments are not perfect. Maintaining proper pH and EC values for specific crops is one of the best management tools you can use. Fertilizing at the appropriate growth stage, along with applying the right rate and concentration of nutrients, prolongs the visual quality of plants and will establish you as a producer of quality material.