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Nutrient deficient vegetable and herb bedding plants

Controlling growth of containerized vegetable bedding plants can be a challenge. It is common to make infrequent fertilizer application and/or use low-concentration fertilizer solutions. Though this can help suppress growth of vegetable bedding plants, it can also lead to visual deficiencies. This e-GRO Alert will focus on the cause of why we see nutrient deficient vegetable and herb bedding plants and how to prevent it.

Vegetable and herb bedding plants are a popular spring greenhouse crop. The wholesale value of flats and containers was \$128.5 million dollars in 2015. Vegetable bedding plants are similar to ornamental or flowering bedding plants in many respects. Both ornamental and vegetable bedding plants require growth regulation. However, there are fewer tools available for controlling vegetable and herb bedding plant growth. There are numerous chemical plant growth retardants (PGRs) for floriculture crops, and their use is ubiquitous in ornamental bedding plant production. Alternatively, the only PGR labeled for controlling vegetable and herb bedding plant growth is Sumagic, a uniconazole product, for use on Solanaceous crops including tomato, pepper, and eggplant; use is restricted to a total of 10 ppm when plants have between two and four leaves. No other PGR may be used on other vegetable bedding plants.

As a result of restricted PGRs for vegetable and herb

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Figure 1. While the eggplant in this container is compact, the lower leaves are chlorotic from low fertilization.

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bedding plants, producers must use non-chemical means of controlling growth. One of the most common methods used to suppress growth of containerized vegetable bedding plants is to restrict fertilization.

Fertilizer restriction

Fertilizer can be restricted in one or a combination of methods. First, the number of fertilizer applications may be restricted. For example fertilizer may only be applied once per week. Secondly, low concentrations may be applied.



Figure 2. The oldest true leaf on this squash is chlorotic from minimal fertilizer application.

Instead of fertilizing with 150 to 200 ppm, 75 to 100 ppm may be applied. A combination of restricted applications with low concentrations may be used, where perhaps 100 ppm is applied every other week.

While restricting nutrients can restrict growth, it can also produce cause visible nutrient deficiencies (Figs. 1 and 2). Lower-leaf yellowing from low nitrogen concentrations is very common. To improve the marketability of these plants, you'll need to do reduce the amount of yellow foliage somehow. I saw someone manually removing the lower chlorotic leaves of these cucurbits (Fig. 2); while this does reduce the amount of chlorotic foliage, it is a labor-intensive (and expensive) remedy. The other option is to green-up plants by providing more fertilizer, by increasing application frequency and/or increasing concentrations.

Alternative growth control methods

There are several alternative ways to control your vegetable and herb bedding plants, including improved scheduling,



Figure 4. Proper crop scheduling will make sure that your plants are the right size at the right time. These lettuce packs represent four different sales weeks.

brushing, and restricting phosphorous and irrigation. First, one of the best ways to minimize excessive growth is to avoid it. This can be done by improving your crop scheduling (Fig. 3). Crops have a tendency to stretch at the end of production due to the closing canopies. This late stretch is even worse for plants sitting on the bench for an additional week or two. Accurate scheduling can help avoid excess growth in the container.

Brushing plants is another height control method for vegetable and herb bedding plants (Fig. 4). By rigging a boom to drag a soft cloth or fabric across a crop a few times a day, you can suppress excessive stem elongation. You need to ensure that the material you are using for brushing is not too heavy or abrasive as to cause mechanical damage to your crop. Similarly, you'll want to ensure the boom is moving at a proper speed to avoid injuring crops. If you do not have a boom, brushing can be done manually with a long wooden rod or PVC pipe; however, this can be a labor intensive approach.

Another approach to controlling growth is to limit irrigation and "grow dry". There are several advantages to growing dry.

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Figure 4. The tomato plants are being brushed with a piece of shade cloth suspended from an irrigation boom to control excessive growth in the container. Careful selection of brushing material and managing boom speed can minimize any damage to plants.

First, excessive growth is avoided and plants are more compact. Secondly, the growth is harder and more toned and isn't soft; this is a benefit for shipping and garden performance. However, growing dry can be a challenge. A missed irrigation when substrate moisture is already low can cause irreparable crop damage.

In addition to reducing the overall fertilizer concentrations, you may choose to specifically restrict phosphorous in the nutrient solution. Phosphorous contributes to stem elongation, so minimizing P applications can produce more compact plants. Using 15-0-15 or 20-10-20 as your base feed and add some P from monopotassium phosphate either as a low concentration 5-10 ppm P_2O_5 (2.5-5 ppm elemental P) in a constant liquid feed program or a little higher concentrations for periodic applications.

An integrated approach

To produce healthy, marketable vegetable and herb bedding plants that are also compact, take a variety of approaches. You can surely apply less fertilizer than you do to flowering bedding plants, but do not hold back too much for controlling growth. Instead, combine crop scheduling with other practices such as brushing plants or restricting irrigation or phosphorous concentrations to produce vegetable and herb plants that are appropriately sized for their containers and marketable.