GROWERTALKS

Growers Talk Production

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Growth Factors

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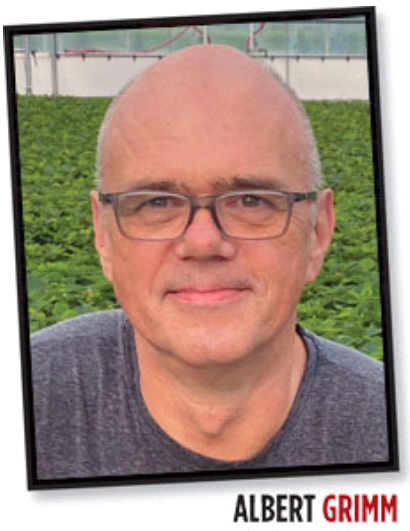

I know how strange this sounds, but it's not the job of a grower to grow plants. Plants grow perfectly well without our help. In fact, no chemical, no method and no recipe can force plants into growth that wouldn't happen naturally. The best that we can do is limit certain aspects of growth and development to get results, which we wouldn't find in nature.

There's a subtle, but important, difference between those two concepts: we cannot "make" plants do anything they aren't doing already; we can only keep them from undesired development by creating limitations.

Before we can successfully change the growth of plants, we need to understand how each species of plant has adapted to their natural habitat. Plants have evolved to outperform competing species by adapting to a unique mix of growth factors they find in nature. Growth factors include light, temperature, water and mineral nutrients. Managing growth factors is the only method that we can use to manage crops. Before we can do so, we must understand how each crop responds to each of these factors and we can find clues in the natural habitat of the plants. Let me explain with some examples:

Petunias come from young, nutrient-rich soils that carry abundant moisture during a short, warm, rainy season, which is followed by a long, cool, dry season. Consequently, petunias have evolved to take advantage of abundantly available mineral nutrients to outgrow competitors as fast as possible while water is available. As spring progresses, increasingly longer and warmer days switch the operating mode of the plants to spend all accumulated energy on the development of flowers, so that seeds have time to mature before drought kills the plant. High temperatures, drought and longer days signal to the petunia that it's time to abandon all growth and flower at full capacity.

For growers, this creates a challenge because we want to produce petunias that thrive throughout a long, hot summer. It's not in the nature of the plant to do so. It's tempting to expose petunias to water stress in a hot greenhouse because this will create balls of flowers that are appealing in the garden center. These plants, however, stop all vegetative growth as a result, and once the first flush of flowers is spent, these petunias wither and die prematurely. They flower themselves to death.

As counterintuitive as it sounds, growers can promote a much more lasting display of flowers in petunias by limiting those growth factors that promote flowering, while not limiting factors that promote vegetative growth. Consistent moisture, no water stress, cool temperatures and short days prevent the development of excessive flowers. If petunias cease their vegetative growth, they'll die after a brief display of excessive color. Consequently, if we limit

nitrogen and phosphorus for this crop, we take away the growth needed for more flower development. It's abundant availability of nitrogen and continuous moisture in the substrate that helps petunias flower continuously throughout summer.

An example from the other side of the spectrum are pelargonium, known to most of us as zonal geraniums, which have evolved in a dry climate on very old soils that are comparatively poor in nutrients. Pelargonium are tender perennials, which go dormant during the dry season. They'll tolerate extreme drought, but they don't have the luxury to spend energy on flowers unless conditions are perfect. While petunias flower excessively when we expose them to water stress, pelargonium will do the opposite. They'll abort flower development in preparation for a dormant season.

In nature, pelargoniums work hard at extracting the necessary mineral nutrients from those poor soils, whereas light is plentiful in the semi-arid climate. In our greenhouses, light isn't exactly plentiful in winter and early spring. If we supply these plants with an abundance of available nutrients, we easily create excessive vegetative growth. This growth isn't supported by light and the result is large leaves that quickly absciss. The dying tissue creates an ideal substrate for Botrytis.

As growers, we cannot limit water on pelargonium to the point of water stress. This would lead to poor flower development, but we must limit temperature, nitrogen and phosphorus during times of low light (less than 20 Mol/d/m^2) if we want to avoid unbalanced growth with excessively large, soft foliage, leaf abscission, and poor shelf-life in the garden center.

To be continued … **GT**

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