



By Erik Runkle



Plug/Liner Dip Guidelines

A plug or liner dip is a plant growth retardant (PGR) application technique in which a tray of finished young plants is placed into a shallow PGR solution for a short period of time. This allows the growing media to absorb the PGR from the bottom up and serves to inhibit stem elongation after transplant. After the dip, plants are usually allowed to dry for at least 12 hours before transplanting into finish containers. This permits easier handling of the young plants, since the re-entry interval would have expired for most PGR products.

Probably the biggest use of plug/liner dips is when different young plants are combined into a common finish container, such as mixed hanging baskets and large containers. Different crops have different levels of growth vigor, so when planted together, the vigorous plants outgrow the less vigorous ones. This can reduce the relative value of the less vigorous plants, since their aesthetic contribution to the finished plant is small (Figure 1). Since crops require different PGR rates to inhibit extension growth, one application rate is often not appropriate, and it is practically impossible to apply a PGR to just some plants and not others when they are growing together.

Applying a plug/liner dip to plants with moderate to high vigor can suppress their subsequent growth for a few weeks, which allows non-treated, less vigorous plants time to become established and grow. This selective PGR strategy can lead to more uniform growth of different

crops, which can lead to a more balanced finish container.

There are several potential advantages of a plug/liner dip compared to other PGR application methods, such as sprays, sponches or overhead drenches:

- The PGR solution does not make contact with shoots.

For some products and crops, overhead applications can cause a delay in flowering, especially when high rates of a spray are used.

- Absorption of the PGR by the media means that the active ingredient is present for a moderately long period of time, which leads to a longer period of efficacy.

- The lower portion of the root zone becomes saturated with the PGR solution, which is where the most actively growing roots are. Similar to drenches, PGRs have a greater effect when made from the “bottom up” compared with overhead “top down” applications. Thus, PGR rates can often be reduced by $\frac{1}{3}$ to $\frac{1}{2}$ when applied as a plug/liner dip compared with a typical overhead drench.

The following are guidelines to successful use of plug/liner dips:

1. Nearly all PGR products can be applied as a liner dip with the exception of daminozide (B-Nine and Dazide). Paclobutrazol (Bonzi, Paczol and Piccolo, among others) is the most commonly used PGR for plug/liner dips.

2. To improve consistency, make the dip applications when the media is moist, not wet or dry. If the media is dry, too much PGR can be absorbed whereas if it is wet, very little PGR solution is absorbed.

3. Make the duration of the dip application constant, such as 20 seconds. That is generally adequate to allow the middle-half of the root zone to absorb the PGR product.

4. If you already have developed young-plant drench rates appropriate for your growing conditions, reduce those by one-third to one-half. If you haven't used drenches on young plants in the past, start with 2 to 4 ppm of paclobutrazol for crops with moderate vigor and 4 to 8 ppm of paclobutrazol on the most vigorous varieties.

5. As with all PGRs, perform small-scale trials to determine appropriate rates for your growing conditions, crops, and magnitude of desired responses. 

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Figure 1. Vigorous varieties such as spreading petunia can dominate a mixed container. If a pre-transplant liner/plug PGR dip had been made to the petunia, the less vigorous, non-treated varieties would have probably become more dominant.

