

Success with Vegetative Petunias and Calibrachoa

John M. Dole, Brian E. Whipker and Paul V. Nelson
Department of Horticultural Science

Two of the most outstanding vegetatively-propagated bedding plants are petunias and calibrachoa. These two closely-related species offer consumers rapid growth, a wide range of colors and durability. The vigor of petunias and calibrachoa are great for consumers, but present a challenge to growers - too much of a good thing can make for tangled plants and shipping problems. In the following article we will discuss how to cost-effectively grow petunias and calibrachos with an emphasis on the areas we have been researching: propagation and growth (vine) control.

Cultivars

Most vegetatively-propagated petunias are hybrids between the bedding petunia (*Petunia x hybrida*) and *Petunia axillaris*. The original seed-propagated bedding petunia is a hybrid between *P. axillaris* and *P. intergrifolia*.

However, the reintroduction of *P. axillaris* genetics brought a greater emphasis on vigorous, trailing growth and post production durability. The first new cultivar released in the early 1990's was *Supertunias*TM. *Supertunias*TM are vegetatively-propagated, because this group produces few if any seed. The seed-propagated 'Wave' series was also introduced and

has similar characteristics, but a more restricted color range. A proliferation of new cultivars have expanded the range of growth habits, colors, and degree of doubleness being offered.



The calibrachoa (*Calibrachoa* hybrids) is considered a new species in the floriculture trade, but actually has been in cultivation since the early 19th Century. A renewed focus on the *Calibrachoa* genus has resulted in the introduction of several new cultivar series. *Calibrachoa* have a more limited color range than petunias, but finer textured foliage, more pronounced trailing habit, and abundant small, single flowers.

Propagation

HID lighting improves rooting during low light times of the year, especially for slow rooting cultivars such as *Cascadia Charme* and will reduce time to transplanting by 7 to 10 days. Cultivars which normally root rapidly will be ready to transplant in 10 to 14 days, slow rooting cultivars without HID lighting will be ready to transplant in 17 to 24 days. Either metal halide or high pressure sodium lighting can be used.

Growing plugs under HID lighting and short days will result in shorter plants. Using ambient lighting and long days will increase plug height and final plant height for some cultivars. Long day photoperiods can increase plug height and final plant height for some cultivars and decreased final plant diameter for all cultivars.

Cuttings should be rooted at 70°F minimum temperature with bottom heat. Use propagation tents and avoid overmisting which slows rooting and increases the likelihood of *Botrytis* and bacterial diseases. Some propagators recommend using rooting

hormones with 2500 IBA, especially on slow to root cultivars such as Cascadia Charme. Using 105 plug flats allows for better air circulation and results in less disease problems as compared to the higher density 288 plug flats.

Flowering Control

The typical seed-propagated petunia are facultative long day plants. Flowering will occur under LD or SD; however, plants will flower earlier with longer photoperiods and higher light intensities. Most vegetative petunias are also facultative long day plants; however, a few cultivars act as short day or day neutral plants. Apparently high light intensity can overcome photoperiodism as some cultivars are long day plants under ambient light, but are day neutral under HID lighting. Calibrachos are thought to be facultative long day plants.

What does this mean for the grower? Long day lighting should be given to both plugs during propagation and finished plants during the short day time of the year, from October to March to decrease time to flowering. Long day lighting applied only during propagation may decrease crop time for photoperiod-responsive cultivars, such as Petunia Bright Dream, by up to two weeks. Generally, however, long day lighting during propagation will decrease crop time by a week or less.

Temperature

Grow at 60 to 65°F night temperature until rooted cuttings or plugs are established in the final container. Continue growing petunias at 60 to 65°F nights and 60 to 75°F days for most rapid growth; lower temperatures of 55 to 60°F can be used, but will slow growth. Calibrachoa can be grown at a wider temperature range from 50°F night to 85°F day.

Light

Grow plants under a minimum of 5,000 to 6,000 footcandles. HID lighting of 500 footcandles or more improves rooting during low light periods, especially for slow to root cultivars. HID lighting can also increase number of branches, but only for plants grown under long days.

Irrigation

While petunias and calibrachos are drought tolerant

in the landscape, keep plants moist during production for optimum growth and to avoid lower leaf loss.

Nutrition

Both petunia and calibrachoa are considered to be relatively heavy feeders with recommended rates from suppliers of 250 to 350 ppm N for petunia and 200 to 300 ppm N for calibrachoa. However, we found that 150 ppm N was sufficient for good growth. Higher fertilizer rates either had no effect or delayed flowering. Not surprisingly, however, foliage color was darker green for plants irrigated with 300 ppm N (**Figure 1**). If lower fertilizer rates near 150 ppm N are used, plants can be greened up by using higher rates for a couple of weeks just prior to shipping. Phosphorus rates should be 1/4 to 1/3 of nitrogen and potassium rates should be 2/3 of nitrogen. So a fertilizer like 13-2-13 or 15-5-15 Cal-Mag would work well. Calibrachoa and petunias have a high requirement for iron; be sure to incorporate additional iron into the nutritional program. Iron chelates can be used as sprays or drenches.

Growing Substrate

Petunia and calibrachoa are adaptable plants which thrive in a variety of commercial growing substrate. pH should be monitored and maintained between 5.5 to 6.0. Calibrachoa can tolerate pH's slightly lower than 5.5.

Growth Control

Both petunias and calibrachoa grow rapidly and can become leggy. Environmental manipulation is the first control strategy to consider. Grow plants under



Figure 1. Petunia Pocket grown at four different nitrogen rates from 20-10-20 (front left to front right: 0, 150, 300, and 450 ppm N). Note color difference in flowers and foliage due to fertilizer rate.

high light, cool temperatures, and zero to negative DIF to reduce stretch and promote rapid flowering. Pinching and pruning can also be used as needed to control growth, see Pinching section for details.

Many vegetative petunia cultivars are particularly vigorous and plant growth regulator (PGR) applications may be required. Based on research at North Carolina State University, the following chemicals and rates are recommended for vigorous vegetative petunia cultivars, when applied 2 weeks after transplanting the cuttings into 6-inch pots. Growers should use the following rates as beginning guidelines and make adjusts to customize rates for their operation.

A single A-Rest® spray at 80 ppm was effective. The residual effects of A-Rest® appear to wear off after about 50 days and this suggests that a second application at a lower rate may be beneficial. Sumagic® foliar spray rates between 20 to 30 ppm were effective, with the higher rate providing more control. Bonzi® also worked well on vegetative petunia and foliar spray rates of 40 to 60 ppm are recommended. A tank mix of B-Nine® at 2,500 ppm and Bonzi® at 40 to 60 ppm worked well. The tank mix using Bonzi® at 40 or 60 ppm did not provide a synergistic effect because the degree of control was similar as when only Bonzi® was used. Greater synergistic effects occurred when B-Nine® at 2,500 ppm was used with Bonzi® rates >80 ppm, but that degree of control might be considered excessive by many growers. Based on these similar results with Bonzi® alone at 40 or 60 ppm or in combination with B-Nine®, growers may find it easier to use Bonzi® alone (Figure 2).

These recommended rates are based on North Carolina growing conditions. Growers in other locations will need to modify the rates: with growers in more northern locations using slightly lower rates, while more southern growers should use slightly higher rates. All the foliar sprays were applied with a spray volume of 1 gallon over 200 square feet.

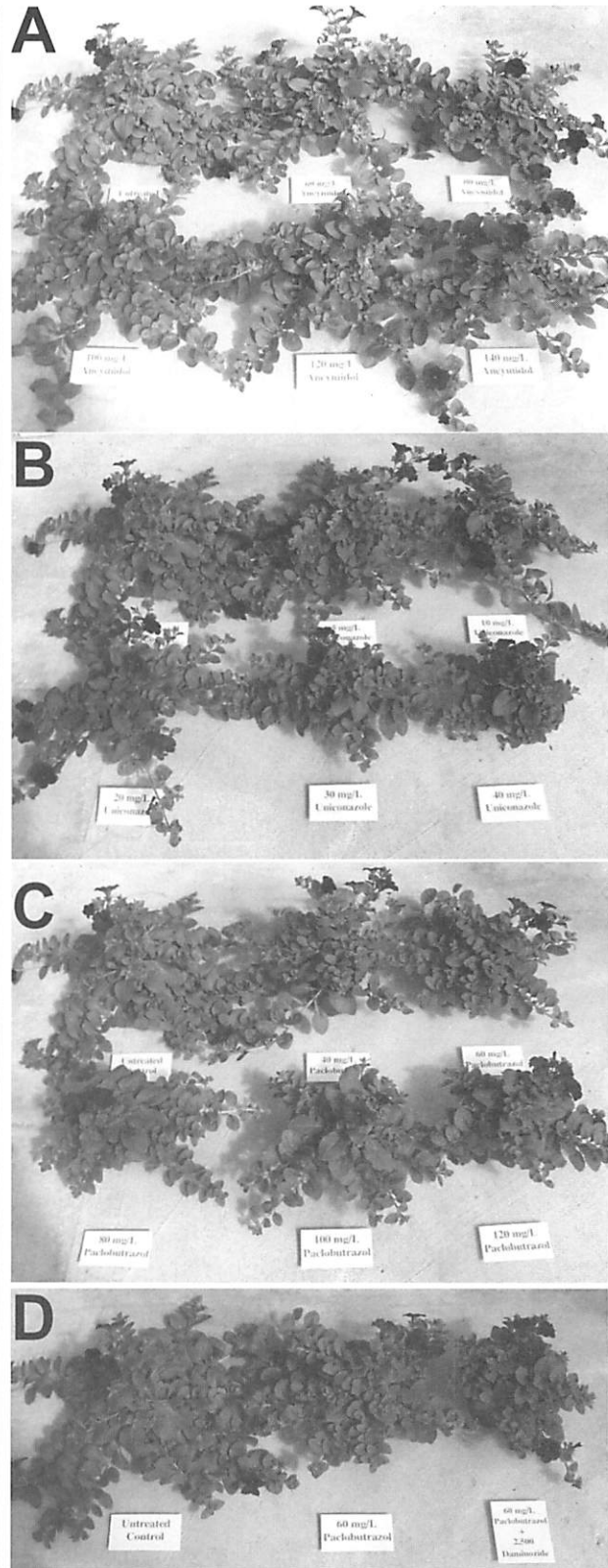


Figure 2. Plant growth regulator experiments with vegetative petunias (starting top row, left to right). Panel A: A-Rest (0, 60, 80, 100, 120, and 140 ppm); Panel B: Sumagic (0, 5, 10, 20, 30, and 40 ppm); Panel

C: Bonzi (0, 40, 60, 80, 100, and 120 ppm); Panel D: (0, Bonzi at 60 ppm, Tank mix of Bonzi at 60 + B-Nine at 2,500 ppm).

Spacing

With these rapidly growing crops, there never is enough space. The petunias in particular, can easily intertwine, making shipping and marketing difficult. Watch the crop and apply growth retardants or cut back as needed to prevent tangled plants. Space plants as far apart as possible.

Pinching

Pinching is not required; however, pinching can be used on strongly trailing petunia cultivars to encourage axillary branching and bushier plants. Plants can be pruned and shaped at any time to reduce stretch and improve aesthetics; however, flowering or reflowering will be delayed by 2 or more weeks. Most of the propagators suggest pinching the plants when they are transplanted, and then repeatedly pinching at 3 to 4 week intervals as needed.

Florel® at 500 ppm is effective in increasing branching on some cultivars, but may delay flowering. Apply when the roots reach the edge of the pot.

Schedule/Timing

Considering the rapid growth of petunias and calibrachos, crop time can be short. Four to 6-inch pots of petunias will finish in 5 to 7 weeks without a pinch; add 2 or more weeks when pinching. Use one rooted cutting per 4 to 6-inch pot; shorter crop time can be obtained with 2 cuttings per 6-inch pot.

Plant 3 to 4 cuttings per hanging basket, which will finish in 6 to 11 weeks. Late winter production will take 1 to 2 weeks longer than late spring due to higher temperatures and higher light levels. Calibrachoa will take 1 to 2 weeks longer than petunias.

Insects

Petunias and calibrachoa are more insect resistant than many bedding plants, but whiteflies, thrips, aphids, caterpillars, and fungus gnats can be a problem.

Diseases

Botrytis is a common problem on open flowers and can quickly eliminate summer floral displays after a rain or periods of high humidity. Be sure to provide adequate air movement and keep humidity below 70% to reduce *Botrytis*. Powdery mildew and crown rot can also be problematic.

Physiological Disorders

Chlorosis can occur with iron deficiency (low pH), nitrogen deficiency, root rot, or low temperatures.

Postharvest

Petunia flowers are very sensitive to ethylene and exposure results in rapid wilting. Ethylbloc® is labeled for use on potted plants, but its efficacy on vegetatively-propagated petunias and calibrachoa is not known.