

# FloriBytes

Digital newsletter for  
the floriculture industry

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## II) GREENHOUSE MANAGEMENT

### Propagating Poinsettia Cuttings

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Successful poinsettia propagation begins with high-quality cuttings and an ideal rooting environment. In this article, we will discuss how to maintain optimal greenhouse conditions for rooting and management practices for improving propagation success and minimizing losses.

#### Preparation of Your Propagation House

Poinsettia rooting requires a properly functioning greenhouse environment. Before harvesting or receiving non-rooted cuttings from your supplier, make sure that your mist or fog systems are functioning properly and not clogged, and thoroughly clean your propagation area to ensure it is free of pathogens, insects, algae, weeds, debris, freestanding water and pet plants!

High-quality water is important for propagation, so measure your water pH, electrical conductivity and alkalinity and make necessary adjustments.

## Start with High Quality Cuttings

There are generally two sources of cuttings: your own stock plants or plants purchased from a supplier. Depending on growing conditions, you can generally harvest cuttings of most cultivars from stock plants approximately five to seven weeks after the last pinch. However, cutting quality and maturity at harvest are often determined by the time since the last pinch. For most cultivars, rooting quality is highest when cuttings are harvested five to six weeks after the last pinch.

Industry specifications call for terminal stem cuttings with short internodes that are 2 to 3 inches long (5 to 8 cm) and have two or three mature leaves. A stem diameter (caliper) of 0.16 to 0.24 inches (4 to 6 mm) is desirable, but can vary by cultivar (Figure 1).



**Figure 1.** High quality and uniform cuttings being removed from shipping boxes.

When harvesting cuttings, disinfect tools with 10 percent bleach or trisodium phosphate (TSP) solution between stock plants. Avoid damaging leaves or stems as it can lead to greater disease incidence or uneven plant development. Take care to prevent exuded latex from cut stems from contacting adjacent cuttings or leaves as this can cause leaf distortions. Keep cuttings in a shaded area and quickly transfer them to a cool location after harvest.

If you purchase non-rooted cuttings from a supplier, they most likely come from offshore production facilities in Guatemala, Kenya, Ethiopia or Mexico. The cuttings are often wrapped in moistened paper and packaged in boxes with ice packs.

Upon receiving them, unpack the cuttings, inspect them, and immediately place them in propagation. If immediate propagation is not possible, place the opened boxes overnight in a humid cooler at 50 to 55 °F (10 to 13 °C) and stick the following morning. Do not allow cuttings to dehydrate at any point during storage or propagation.

Whether you harvest or purchase cuttings, before rooting you should visually inspect them to make sure they are vegetative, disease- and insect-free, and uniform in length, caliper, and maturity. Non-vegetative or non-uniform cuttings root and develop unevenly, which can lead to a delayed and non-uniform finished crop.

## Rooting Medium

You can root poinsettia cuttings directly into the finished container (direct stick). You also can root them in a range of propagation trays, strips or liners filled with a high porosity media such as a peat and perlite mix, foam and Rockwool (ex. Ellepots, Oasis or Agrifoam).

Regardless of technique, the optimal pH for the rooting medium is 5.8 to 6.3. The medium must support the cuttings, have good porosity, and adequate water holding capacity. When rooting, insert approximately 1 inch of the cutting into the rooting medium. At this time,

remove only lower leaves that would be in the rooting medium. Only remove large leaves if they will cover the stem apices of adjacent cuttings.

## Rooting Hormone

Poinsettia cuttings generally root well without rooting hormone. However, you can improve rooting uniformity by dipping the lower  $\frac{3}{4}$ -inch of the stem into a rooting hormone solution or powder. Suggested rooting hormone concentrations are:

- Indole-3-butyric acid (IBA) at 1,500 to 2,000 ppm
- IBA at 1,000 ppm plus naphthaleneacetic acid (NAA) at 500 ppm

Avoid any contact of the rooting hormone with the leaves or petiole as this can lead to twisted or distorted leaves (epinasty).

After sticking the cuttings there are two development stages before toning:

- Callus formation
- Root initiation and development

## Stage 1: Callus Formation

Seven to ten days after placing the cuttings in propagation, they will begin forming callus tissue around the stem base. This is the most critical stage of poinsettia propagation and you must avoid any stress from wilting or desiccation. To minimize this stress, maintain a thin layer of moisture around the leaf surfaces at all times by:

- Keeping air circulation low (turn off all horizontal air flow fans and minimize air exchanges)
- Keeping humidity high (90 to 100 percent)

The frequency of misting depends on specific system and greenhouse conditions such as light intensity, temperature, humidity, and air movement (Figure 2). Mist most frequently between 10 a.m. and 6 p.m. Nighttime misting is only required the first three to four nights.



**Figure 2.** Mist frequency is dependent upon your system and greenhouse conditions such as light intensity, temperature, humidity, and air movement.

After the cuttings have callused, reduce misting frequency but avoid wilting. Applying a spreader-sticker (ex. CapSil®) to the cuttings can reduce surface tension and water beading (Figure 3) and promote uniform coverage of moisture across the leaf surface (Figure 4).

Apply CapSil® until run-off at a rate of 300 ppm (4 fluid ounces per 100 gallons of water).



**Figure 3.** Without a spreader-sticker, moisture can bead on leaf surfaces.



**Figure 4.** Incorporating a spreader-sticker into the misting system can promote uniform coverage of moisture on leaf surfaces.

## Light and Temperature

Light transmission in the propagation house should be indirect or diffuse. Whitewash or a combination of exterior shade on the glazing with retractable internal shade curtains will provide a good system for light modulation, especially during the summer.

During stage 1, the maximum light intensity should be 1,000 to 1,250 foot-candles (200 to 250  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) or a daily light integral (DLI) of 4 to 5  $\text{mol}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$ .

Optimal rooting occurs when media temperatures are maintained (usually with bottom heating) at 79 to 83 °F (26 to 28 °C). Maintain air temperatures between 76 to 82 °F (24 to 28 °C) during the day and 70 to 74 °F (21 to 23 °C) at night. For the first three nights after rooting, maintain air temperatures at 68 to 70 °F (20 to 21°C) to help reduce moisture loss and desiccation.

## Growth Regulators

Growth retardant sprays such as chlormequat chloride (Cycocel® or Citadel® ) or chlormequat chloride plus daminozide (B-Nine® or Dazide®) will help prevent stretch in propagation. Apply growth regulators early in the morning or in the evening when shutting off the greenhouse's mist system for approximately 30 minutes will not stress the cuttings. Make the first application six to seven days after placing the cuttings in propagation.

## Stage 2: Root Initiation and Development

Root growth generally initiates 10 to 14 days after the propagation process starts (Figure 5). At that time, you can increase light intensity to 1,250 to 1,500 foot-candles (250 to 300  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) or a DLI of 5 to 6  $\text{mol}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$ . But the light should remain diffuse. You also can reduce media temperatures to 72 to 79 °F (22 to 26 °C). Air temperatures can be reduced to 75 to 80 °F (24 to 27 °C) during the day and 68 to 70 °F (20 to 21 °C) at night.



**Figure 5.** Roots after 10 days in propagation.

## Fertilization

Media leaching from misting can lead to nutrient deficiencies. Prevent deficiencies by incorporating a fertilizer into the mist system ten days after initiating propagation (50 to 75 ppm nitrogen and potassium, plus micronutrients). Alternatively, water cuttings every four or five days with a solution containing 150 to 200 ppm nitrogen and potassium, plus

micronutrients. Do not use phosphorus fertilizers because foliar applications can distort leaves.

## **Toning for Finishing Environment**

Seventeen to 21 days after initiating propagation, your cuttings should have developed a root system, so they can grow under drier and brighter conditions. At this time, you can make a second growth regulator application.

Restoring air circulation now will help tone the cuttings and get them acclimated to the finishing environment. You can increase maximum light levels to 2,000 to 3,000 foot-candles (400 to 600  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) or a DLI of 7 to 8  $\text{mol}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$ , and reduce air temperatures to 72 to 75 °F (22 to 24 °C).

Minimize misting to about every 30 to 40 minutes from 8 a.m. to 6 p.m. Between 21 and 28 days after initial sticking, the cuttings are ready to be removed from the propagation.

## **Insect and Diseases Management**

The warm, wet, and humid propagation environment make poinsettia cuttings susceptible to several diseases such as *Botrytis*, bacterial soft rot (*Erwinia*), *Rhizoctonia* and insects such as fungus gnats, shore flies, and whiteflies.

Fungus gnat larvae damage poinsettia cuttings by feeding on young roots and callus tissue. They also transmit diseases. Avoid saturating the rooting medium as this will delay rooting and increase the risk of fungus gnats and disease.

By carefully following the above protocols you will minimize cutting losses and provide an ideal propagation environment for your poinsettia cuttings.

To download a Spanish Purdue Extension publication on the propagation of poinsettia cuttings, visit: <http://www.ces.purdue.edu/extmedia/HO/HO-235-SW.pdf>

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