Poinsettia
Culture Guide

Propagation

SANITATION
To reduce the chance of fungal and bacterial infections, it is important that the propagation area is cleaned and sanitized before cuttings arrive. Weeds should be removed and algae-infected areas scrubbed and cleaned. All benches and floors should be thoroughly disinfected using a greenhouse disinfectant containing quaternary ammonium.

Make sure sanitation protocols are in place as the greenhouse is prepared to receive cuttings. Foot baths containing disinfectant should be placed at all entrance ways into the propagation area. These baths should be renewed daily with fresh disinfectant. Managers and workers should wash hands with a disinfectant or anti-bacterial soap before entering the propagation area after lunch and breaks.

UPON ARRIVAL
Make sure that the rooting media is laid out on clean benches several hours (or the day before) cuttings arrive. For direct-stick programs and those where cuttings are handled in sticking lines, make sure that all workers are present and that equipment is working correctly. Workers should be prepared for the day’s shipment.

Store opened boxes at 50 °F (10 °C) for no more than 24 hours and prevent cutting dehydration during storage (ideally 90% relative humidity in coolers). Do not open up the individual bags of cuttings as this helps maintain high humidity around the cuttings.

Stick the cuttings immediately if possible. For relatively large shipments, pull out only enough cuttings for each worker to stick within an hour or so before replenishing with another fresh box of cuttings from the cooler. If cuttings can’t be stored in a cooler, then try to store in the coolest area of the facility and monitor closely for humidity and cutting water loss. Some growers without cooler space also lay opened bags on propagation bench and begin misting. Do not leave opened, un-stuck cuttings on the propagation bench for more than a few hours or they can become twisted and curled.

TEMPERATURE
Warm temperatures and humid conditions are needed for successful poinsettia propagation. Bottom heat is very helpful, especially in northern areas where night temperatures are relatively cool. Try to maintain temperatures between 73–75 °F (23–24 °C) in the media until the cuttings are fully rooted. Poinsettias are propagated during the warm summer months so greenhouse day temperatures will normally be significantly higher than night temperatures and constant temperatures are more difficult to hold. If at all possible, try to avoid night temperatures below 70 °F and day temperatures above 85 °F the first two weeks of rooting.

After good root development, temperature and humidity can be reduced and the cuttings acclimated to higher light intensities. Ideal media temperatures would be between 70–72 °F (21–22 °C) with air temperatures varying based on climatic conditions. Again, try to avoid relatively low night temperatures and relatively high day temperatures as cuttings are finishing up the propagation process.

Most varieties are generally well-rooted in four weeks using these recommended temperatures.
ROOTING HORMONE
Many growers feel that they do not need to use rooting hormones if they have good bottom heat and good healthy cuttings. Syngenta Flowers suggests that rooting hormones slightly reduce rooting time and even out rooting along the bench. Some growers use powdered material while others use liquid types (e.g., DipN Grow®, Hortac IBA water soluble salts, or Rootzone® AA water soluble tablets). When applying, use a 0.1–0.2% IBA or combination IBA + NAA applied only at the base of the cutting. Trials are recommended before using new rooting compounds or concentrations. It is not recommended to use IBA overhead sprays in propagation since leaf burning and distortion can occur, especially when using alcohol-based IBA sources.

HUMIDITY
High humidity, especially for the first five days, is critical to reduce stress on the cuttings and to help get them out of a wilted and flagged stage. Many growers are now using fogging systems to maintain humidity above 90% in the poinsettia propagation area, especially in dry climates. High humidity should be combined with heavy shade and minimal air movement. This helps reduce the amount of misting that is needed and reduces the chances of Botrytis and other diseases.

MISTING
Use a fine mist, applying enough to wet the foliage but not to the point of drip. Short and more frequent bursts of mist are better than long mist cycles with less frequency. Adjust mist daily according to weather and humidity requirements for misting during propagation and leaves can get heavily leached of nutrients, especially medium-green-leaf varieties. Many times the first leaves that develop on a rooted cutting are yellowish green caused by lack of nutrients within the plant. The first feeding to the media can be done 9-10 days after sticking and after root initials have formed and early rooting has begun. Growers should start with 100 ppm N and K. Once the roots begin to form, rates can be increased to 150 ppm N and K and eventually up to 200 ppm N and K if needed. Some growers sub-irrigate the rooted cuttings to avoid overhead fertilizer burn; however, be aware of the potential disease spread along the bench using such setups. Cases of Rhizoctonia fungi moving along the bench and infecting cuttings in sub-irrigation troughs has been reported in several cases.

PLANT GROWTH REGULATOR (PGR)
PGRs should be applied as needed to control growth in propagation. They are generally applied either early morning or early evening when misting and irrigation can be turned off for several hours. It is helpful to know the relative vigor of varieties and, if possible, to group these together on the bench. CycoZot® sprays at 750–1000 ppm are commonly used on moderately vigorous varieties while spray combinations of Cycozot at 750–1000 ppm + B-Nine® at 1000–1500 ppm are used on more vigorous varieties. Sprays generally begin 17–21 days after sticking and as the cuttings begin to root out. One spray is sufficient for many varieties, but two or more sprays might be needed for the most vigorous. It is not recommended to use Bion® or Sumax® sprays in propagation because of the risk of getting these chemicals into the rooting area and causing stunting.

DISEASES AND INSECT MANAGEMENT
There are several diseases and insect pests to watch for during poinsettia propagation.

**Erwinia** *(bacterial soft rot)*
Erwinia is a bacterial disease that causes slimy black lesions along stems and leaves. It is caused by *Erwinia herbicola*, and can become very severe if not controlled early in propagation. Be aware of the risk of getting these chemicals into the rooting area and causing stunting.

**Fungus Gnats – Adults & Larvae**
Root and stem injury caused by fungus gran larval feeding can often begin during mid-late stages of propagation. This is especially true in direct stick programs and in propagation areas that have not been properly sanitized. Fungus gran larvae can bore into the base of stems as well as feed on callus tissue and roots, restricting root growth and providing an entry point for disease causing pathogens. Periodically inspect developing callus and roots for larvae. Monitor adult populations by placing yellow sticky cards several inches above the crop canopy. See Section below on Insect Control for additional information and recommended control options.

**Pythium and Rhizoctonia**
Pythium and Rhizoctonia are fungal root and basal stem rots that can occur in propagation. They generally occur a bit later in the propagation process compared to Erwinia and Botrytis. Both will cause blackened roots and eventual death of the young plant. Reducing the chance of infections starts with a clean propagation area and good sanitation protocols. If growers suspect either of these diseases, it is best to test samples sent off to a diagnostic lab for confirmation. Rhizoctonia can occur when cuttings are stuck too deep into the rooting media. The disease commonly starts with blackening along the base of the stem, eventually working its way down into the root area. It can quickly spread along the bench from over-head and flood irrigation.

Pythium is common after roots have developed, but the rooted cuttings have then gone through a severe dry down. The stressed and damaged roots are highly susceptible to attack. See Section below on Diseases and Plant Protection for recommended fungicides.

**Fertilizer**
Start the fertilization program early. Poinsettia has relatively long requirements for rooting during propagation and leaves can get heavily leached of nutrients, especially medium-green-leaf varieties. Many times the first leaves that develop on a rooted cutting are yellowish green caused by lack of nutrients within the plant. The first feeding to the media can be done 9-10 days after sticking and after root initials have formed and early rooting has begun. Growers should start with 100 ppm N and K. Once the roots begin to form, rates can be increased to 150 ppm N and K and eventually up to 200 ppm N and K if needed. Some growers sub-irrigate the rooted cuttings to avoid overhead fertilizer burn; however, be aware of the potential disease spread along the bench using such setups. Cases of Rhizoctonia fungi moving along the bench and infecting cuttings in sub-irrigation troughs has been reported in several cases.

**Fungicide**
Fungicides are recommended to be applied as needed to control Botrytis infections. When applying, use a 0.1–0.2% IBA or combination IBA + NAA applied only at the base of the cutting. Trials are recommended before using new rooting compounds or concentrations. It is not recommended to use IBA overhead sprays in propagation since leaf burning and distortion can occur, especially when using alcohol-based IBA sources.

**Insecticide**
Insecticides are recommended to be applied as needed to control insect pests. When applying, use a 0.1–0.2% IBA or combination IBA + NAA applied only at the base of the cutting. Trials are recommended before using new rooting compounds or concentrations. It is not recommended to use IBA overhead sprays in propagation since leaf burning and distortion can occur, especially when using alcohol-based IBA sources.

**Plant Growth Regulator (PGR)**
PGRs should be applied as needed to control growth in propagation. They are generally applied either early morning or early evening when misting and irrigation can be turned off for several hours. It is helpful to know the relative vigor of varieties and, if possible, to group these together on the bench. Cycozot® sprays at 750–1000 ppm are commonly used on moderately vigorous varieties while spray combinations of Cycozot at 750–1000 ppm + B-Nine® at 1000–1500 ppm are used on more vigorous varieties. Sprays generally begin 17–21 days after sticking and as the cuttings begin to root out. One spray is sufficient for many varieties, but two or more sprays might be needed for the most vigorous. It is not recommended to use Bion® or Sumax® sprays in propagation because of the risk of getting these chemicals into the rooting area and causing stunting.

**Diseases and Insect Management**
There are several diseases and insect pests to watch for during poinsettia propagation.

**Erwinia** *(bacterial soft rot)*
Erwinia is a bacterial disease that causes slimy black lesions along stems and leaves. It is caused by *Erwinia herbicola*, and can become very severe if not controlled early in propagation. Be aware of the risk of getting these chemicals into the rooting area and causing stunting.

**Fungus Gnats – Adults & Larvae**
Root and stem injury caused by fungus gran larval feeding can often begin during mid-late stages of propagation. This is especially true in direct stick programs and in propagation areas that have not been properly sanitized. Fungus gran larvae can bore into the base of stems as well as feed on callus tissue and roots, restricting root growth and providing an entry point for disease causing pathogens. Periodically inspect developing callus and roots for larvae. Monitor adult populations by placing yellow sticky cards several inches above the crop canopy. See Section below on Insect Control for additional information and recommended control options.
To reduce the chance of stem rot by Rhizoctonia infection, avoid planting potted plants at 50 °F (10 °C) for no more than 24 hours. It is recommended to plant rooted cuttings immediately. If you cannot plant upon arrival, production of finished plants may be compromised. Under-nourished plants may be stretchy and soft, and the media to allow sufficient aeration and good root growth. Blanket spraying at 2–3 oz/100 gal for broad spectrum fungal disease prevention.

For softer, lush growth and to increase leaf expansion and overall plant size, use Peters® Professional 20–10–20 or similar ammonium-containing fertilizers until early October, then alternate with high nitrate-containing fertilizers, like 14–0–14, 15–0–15, 13–2–14, or 10–5–15 until November 1. For more toned growth and smaller foliage early on, use 17–6–17, 15–5–15 or similar Cal-Mag (calcium nitrate + magnesium nitrate) fertilizers. In all production cases, use strict high nitrate-containing fertilizers for the last two weeks before maturity and shade. Moving to slowly nitrate fertilizers at the end of production will result in plants that are stouter and with better post-harvest keeping quality. Molybdenum and magnesium usually have to be added to the fertility program if not already supplied in higher amounts with the other regular fertilizers. Drench plants with magnesium sulfate at 1–2 lb/100 gal when early stages of magnesium deficiency are observed. Add Molybdenum to fertilizers as supplemental ammonium molybdate or sodium molybdate.

**VERY IMPORTANT:** To catch potential problems and monitor overall nutrition of the crop, a complete media analysis should be done prior to planting and every two weeks thereafter. Tissue analysis should be done periodically to supplement the media analysis, especially if nutrient issues are suspected.

**TEMPERATURE**
Managing heat stress can be difficult early in the season. Review the Production—Tips for Establishment and Early Growth document under Technical Services (click on Weekly Tech Tips) at www.syngentafloralsnc.com for more information.

**FERTILIZATION**
Exact feed levels vary by variety, condition, age of the plants, climate, water quality, watering practices and adjustments based on media analysis. Start feeding with a balanced fertilizer early. Poinsettias need fertilizer immediately after planting, especially if they are pale and hungry coming out of propagation. Under-nourished plants may be stretchy and soft, resulting in stem breakage at the end of the crop.

**VERY IMPORTANT:** It’s critical for a future upright, strong plant to have well-toned and properly fertilized plants grown at high light conditions and with proper growth regulation before they get pinched. This will ensure a strong branch connection with compact internodes of the developing branches. See details below under Stem breakage, Height control and Flori.

Depending on light level, age, and growth rate, constant feed with 225–250 ppm N for dark-leaf varieties and 250–275 ppm N for medium-green-leaf varieties is recommended. In the beginning, up to 30% of the total N should be ammonium for optimum leaf expansion. If plants look strong with good leaf expansion, reduce ammonium to 15% by the end of September.

**AVOIDING STEM BREAKAGE**
The key to proper height control is to know the relative vigor of the varieties being grown and to anticipate and monitor rapid growth phases for the crop. Use of a graphical tracking system is recommended. With well-controlled, consistent day and night temperatures, chemical height control is minimal for many varieties. With day temperatures more than 5 °F (3 °C) higher than night temperatures, Cycocel® growth regulator treatment at 750–1,000 ppm, one to four times after pinching, is sufficient in northern climates. With day temperatures greater than 60 °F (27 °C) and night temperatures greater than 70 °F (21 °C), spray a Cycocel plus B-Nine® growth regulator mix one to three times, one to four weeks after pinching at 1,000 ppm Cycocel plus 1,500 ppm B-Nine. Instead of the Cycocel plus B-Nine® tank mix, Bonzi® growth regulator can be sprayed at 5–10 ppm. Avoid B-Nine and Bonzi sprays after flower initiation to slow small bracts and flower delay.

**FLOREL®**
The Flori treatments should be done instead of other growth regulator treatments. Do not apply Flori after flower initiation. Flori plant growth regulator applied at 500 ppm three to five days before and three to five days after pinching (for vigorous varieties again three to five days later) leads to shorter internodes, more even branching, and a rounder finished plant. For optimum results, spray Flori early in the morning and check for a good root system. Plants should not be wetting or under water stress during treatment. For best absorption of Flori, apply when the solution can remain wet on the plant for two to three hours. If Flori dries too quickly, moistening the foliage with a light spray of water helps to reactivate the Flori and facilitate additional uptake. A spray adjuvant, such as Capsil® helps with absorption into the leaf surface. Keeping the Flori spray solution at a pH of 4.5–5.0 also maximizes its effectiveness.

**SELECT VARIETIES**
Select varieties with V-shaped growth habits, like Titan® Red, Titan Pink, Titan White, Early Mars® Red, Mars Pink, Mars White and Mars Marble, Sigma®, Nova® and Mars Late Red (formerly Mars Red II).

**POTTING**
Production of finished plants under Height control and Flori.

**HEIGHT CONTROL**
Very important for newer varieties: More compact varieties like Sigma and Mera, usually need only two PGR treatments (one before and one after pinch). As the Titan varieties are quite vigorous early on and tend to get long internodes after the pinch if not regulated properly, three sprays of Pilla are needed (one 3–5 days before and one 3–5 days after the pinch and again 3–5 days later, resulting in compact internodes and uniform branching. Additionally they have to be fertilized sufficiently and exposed to sufficiently high light to achieve a strong plant base.
When plants are taller or growing faster than desired and Cycocel growth regulator spray applications are not providing adequate growth control, an early to mid-seaon (late September through October), low-rate Bonzi growth regulator drench provides additional growth control without delaying color, distortion, bracts, or significantly reducing the bract size. Recommended drench rate after flower initiation and prior to 50% color is 0.05 (1/20) to 0.1 (1/10) ppm. The 0.1 (1/10) ppm rate is used on medium-vigorous-growing varieties and when moderate growth control is desired. The 0.05 (1/20) ppm rate is used on compact-growing varieties or when the growth rate needs to be slowed down slightly. Try to keep total accumulated amount (from several drenches) to a maximum of about 0.25–1 ppm. The drench volume needs to be consistent from pot to pot. A good starting volume is about 1 fl oz/1-inch pot diameter. The early Bonzi drench can be reapplied as needed, so start at the 0.05 (1/20) ppm rate. Do not drench at rates higher than 0.25 ppm (½ ppm) until plants are at least ½–1” below the desired height and/or one to two weeks (up to three weeks) after the last drench. Ultra-low rate drenches work best for controlling vigorous varieties that grow quickly. Under growing conditions, however, some northern growers have used these ultra-low rate drenches successfully for vigorously-growing varieties. The ultra-low rate drenches work best for controlling vigorous varieties that produce large bracts.

**TRADITIONAL LATE-SEASON BONZI DRENCH**

For traditional late-season growth control, Bonzi drenches are typically done in the north at ½–1 ppm (0.75–1.5 oz/100 gal) or in the south at 1–2 ppm (1.5–3 oz/100 gal). This can be done when the plants are about ½–1” below the desired height and/or one to two weeks (up to three weeks in the south) before shipping. If the effect is not strong enough, the treatment can be repeated. The later the drenches are applied (and with more color on the bracts), the less effect they will have in reducing bract size at maturity. Applying these late-season drenches too early in the growing season; however, some northern growers have used these ultra-low rate drenches successfully for vigorously-growing varieties. The ultra-low rate drenches work best for controlling vigorous varieties that produce large bracts.

**CONSISTENCY OF BRACT COLOR**

Providing even heat distribution and maintain levels along with good air flow yields the most consistent bract colors. Ensure plants have a good root system and avoid excess salt levels in the media. Eliminate nighttime light intrusion. (If you can read a newspaper, there’s too much light.) Watch for brown spot, Alternaria in the greenhouse, and black curvatures which can result in slow or uneven bract coloration within the crop. Diseases and Plant Nutrition

**DISEASE MANAGEMENT**

**Pythium**

Apply Subdue MAX at 1 oz/100 gal as a soil drench after planting. Rotate with Trobatam WP (6–8 oz/100 gal) or Sanygen (1–3 oz/100 gal) fungicides every four weeks for protection. Some growers have success incorporating RootShield® into the media or drenching RootShield® fungicide one week after making the first chemical drench. A half-rate reapplication of RootShield® WP is recommended midway through the crop. Regularly inspect the root system and apply additional fungicide treatments if needed. To help prevent root and stem infections, keep the planting media moist, avoid dry out or waterlogging, and monitor the EC levels regularly. High salts can damage roots. If the soil gets dry, use clear water before watering. When root damage is confirmed, apply drench treatments listed above. It is also always a good idea to send root and media samples off to a reputable diagnostic lab to see if other pathogens besides Pythium spp. might be causing the root damage. Powdery Mildew

Powdery mildew continues to appear on poinsettia crops around the country. To prevent outbreaks, maintain good air movement and low humidity in the production area. Apply preventive fungicide treatments throughout the month of October if a history of powdery mildew exists. Effective fungicide spray treatments include: Mural (4 oz/100 gal), Palladium (4–6 oz/100 gal), and several products from FRAC group 3: Eagle® 23EW (8 oz/100 gal), Terraguard® (8 oz/100 gal), and Strike® 50 WDG (0.5 oz/100 gal). Do not rotate among products with the same FRAC group number. Miltone®, Cease and Actinovate® fungicides also have suppressive activity against Powdery mildews. Fungicide products reported to be safe for bracts include: Mural, Palladium plus Captisol spray adjuvant, Miltone, Pythofol® CV, or Strike 50 WDG Growth-regulating factors (compact growth and puckered bracts) and severe flower delay can occur with repeated applications of Strike, Terraguard or Eagle fungicides. Select one product from FRAC group 3 and use in rotation with other fungicides listed above. Zerafol can be used on bracts, but will leave marks on infected bracts where the fungal colonies were located. Rhizoctonia

To prevent root and stem infections by Rhizoctonia spp., avoid planting too densely and maintain proper EC levels and moisture content of the media. Drench formulations of Medallion (1 oz/100 gal) fungicide or a triazole-methyl product (e.g., Clearys 3336 or OHP 6672) at full label rate can be alternated on a 4 week interval for prevention. If broader control of primary root and stem rots is needed, drench with Mural at (2–3 oz/100 gal) for control of Rhizoctonia, Pythium spp., and Phytophthora spp.

Scab

Scab is a occasional problem that periodically surfaces up in poinsettia. Look for raised “bleached white” scab-like lesions on stems and leaves, with excessive elongation of the infected stems. For prevention and control, spray with Mural at 4–7 oz/100 gal or Eagle 23EW fungicide at 8 oz/100 gal. Products containing Mancozeb (Fore®), Dithane® or Protect® 1200 can also be used in the rotation for prevention of this disease.

**INSECT CONTROL**

**Whirlies**

To keep whirlies populations under control during the production season, drench the growing media with Mainspring® GNL Insecticide (FRAC Group 28), at 8–10 oz/100 gal, the week before pinching the crop and once the plants are well rooted into their container. This systemic alternative to neonicotinoid chemistry will provide extended protection against whitefly and thrips (Lepidoptera & Diptera) during the production season when following the application instructions on the labels. Kontos® Insecticide is another alternative that may be used as a soil treatment for control of whitefly, generally providing 4–5 weeks of protection. Prior to pinch, foliar sprays of Avadex®, Endorse®, Mainspring GNL, Scimitar® GC, Tadarid®, Raivar®, Jasan®, Distance®, Erathol®, Botanidor®, Preclude®, Tristar® TR, Atrac®, TR, and Talus® insecticides can be used for whitefly management. If late-season control is needed, spray with Avad, Talstar, Talus or Tristar® insecticides using a spray adjuvant like Captisol®.

**Thrips**

Thrips feeding causes scarring on the leaves and bracts of poinsettia. Monitor populations using sticky cards and apply control treatments as needed. Drench applications of Mainspring® GNL applied 2–3 weeks after pinch will prevent injury and control thrips in addition to whitefly population in poinsettia. Maintain good air movement and low humidity during this time frame and avoid excess salt levels in the media. Eliminate nighttime light intrusion. Effective whitefly management treatments include the following: Agro® (compacts growth and puckered bracts) and severe flower delay can occur with repeated applications of Strike, Terraguard or Eagle fungicides. Select one product from FRAC group 3 and use in rotation with other fungicides listed above. Zerafol can be used on bracts, but will leave marks on infected bracts where the fungal colonies were located.

**mites**

Two-spotted spider mites and Lewis mites are the two primary mites that can cause injury to poinsettia. Early applications of Avid or Sarantin made after transplanting and/or during the first few weeks after new transplants begin expending will prevent and control outbreaks from occurring and will also contribute to whitefly management.

**Fungus Gnats & Shore Flies**

Good sanitation procedures are still the first line of defense for controlling fungus gnats and shore flies. Products such as Remgro, MicroBioXL, Greenseek®, Green-Shield®, Phytosan 25® and Talstar® are tank mix (or total release aerosol) and Overture® insecticides can be used for whitefly management prior to the drench or as needed. Consorse or Avid may be used if needed after bracts are in color.

**Mites**

For a moderate boost of growth, a 2–3 ppm spray of GA using ProJob® 4% or Fascination® plant growth regulators is recommended. The maximum growth/stretch happens about two weeks after application. Two to four inches of growth are possible within this time frame depending on variety and temperature. Spray plants any time during production; however, experience shows that earlier sprays (up to mid-October and beginning of color development) are more effective than late sprays which lead to upward curling of petals and some ‘hocking.’ It becomes too vigorous, slow down growth with Cycocel sprays or Bonzi drenches (see earlier sections). Conduct small trials in good years before making large scale applications for the know-how when the hits. If color hits poor, spray plants only 3 ppm of GA as a spray 10 days before shipping for more even and quicker coloration. If plants are not still when they are ready, drench with Bonzi to avoid late stretch. Make sure to conduct trials first. For white varieties (i.e. White, Titan White, Mira® White, Mars White), applying 4% or Fascination® plant growth regulators is recommended. The will result in overly small bracts. At these low rates, Bonzi drenches can be used for controlling whitefly, generally providing 4–5 weeks of protection. Prior to pinch, foliar sprays of Avadex®, Endorse®, Mainspring GNL, Scimitar® GC, Tadarid®, Raivar®, Jasan®, Distance®, Erathol®, Botanidor®, Preclude®, Tristar® TR, Atrac®, TR, and Talus® insecticides can be used for whitefly management. If late-season control is needed, spray with Avad, Talstar, Talus or Tristar® insecticides using a spray adjuvant like Captisol®.
Shipping and Post-Harvest Handling

DURING SHIPPING
The keys to shipping poinsettias are to prevent exposure to extreme temperatures, avoid severe bruising and mishandling, and minimize the amount of time that plants have to sit in trucks or boxes. It can be discouraging and expensive when great-looking products have gone out the door only to have been damaged and refused by the retail buyer.

Depending on how they are finished in the greenhouse, poinsettias can be damaged from rough handling. Plants finished on the warm side that have larger, softer bracts are more susceptible to bract bruising and abrasion than those with smaller bracts. Care should be taken when sleeving and placing plants in boxes or on racks to be rolled onto trucks. Make sure that the boxes or cart shelves are slightly taller than height of the plant sleeve to prevent bruising.

There has been an increase in using plant-support rings to reduce stem breakage and improve the sturdiness of the plant during handling. These are usually placed on the pots anywhere from 5–8 weeks before shipping depending on the size of the container. Rings are highly recommended for 8-inch and larger containers, but many growers now use them for all sizes 6-inch and larger. While they add some cost to the final product, they are a good insurance against loss and improve the overall presentation of the product.

The best temperatures for shipping poinsettias are between 51–55 °F (11–13 °C). Temperatures above 65 °F (18 °C) can lead to increased ethylene exposure and epinasty, especially if plants are shipped for lengthy periods of time. Epinasty usually expresses itself as a distinct wilting of the plant after it is unsleeved.

On the other hand, poinsettias are chilling sensitive and can be damaged when exposed to temperatures below 50 °F. Generally the longer the low temperature exposure, the more damage that is seen at retail. Red varieties with chilling damage have bracts with bluing or necrotic edges with inner bracts that sometimes turn a whitish color.

The shipping manager should make sure that all logistics are in place and that the packing/shipping team understands how to handle finished poinsettias. Team effort is important in getting the plants on racks or in boxes in the appropriate number, by customer order, and in an organized manner.

Delivery times for poinsettias can range from a few hours to several days. Staying on schedule and minimizing delivery time is important in the post-harvest performance of the plants. The longer plants stay in sleeves, the greater chance of epinasty, especially under relatively warm transport conditions. Keeping poinsettias in the dark for several days also leads to a greater occurrence of bottom leaf yellowing and bract fading at retail. While some varieties handle shipping stress better than others, the general understanding is that the shorter the transport time, the higher the quality at retail and for the customer.

AFTER SHIPPING (RETAIL)
Properly handling poinsettias at retail ensures that plants will perform to their genetic potential for the end consumer. The key is to provide an optimum retail environment for the plants to maintain their health and overall beauty.

Carefully unsleeve plants and place them adequate spaced in the retail display area. While sleeved plants can be placed closer together and might not be damaged as easily by the shopper, unsleeved poinsettias make a better display, have better sell through, and have less chances of epinasty.

Although it can be difficult in big box stores and larger settings, retailers should try to water the plants before placing them on display. Make sure that the water drains thoroughly from the pot and that the excess water is discarded. One of the quickest ways to destroy roots and possibly kill poinsettias is to let them set in a pool of water for lengthy periods of time (i.e. "wet feet"). If removing the drained water from saucers or pot covers is not feasible during irrigation, then try to schedule irrigations by applying just enough water to wet the media with little water draining from the bottom of the pot and into the saucer or pot cover. Plants should be irrigated when the media feels dry to the touch. With experienced retailers, the plant and pot can also be lifted up and judged by weight on whether watering is needed.

The best retail environment for poinsettias is one where there is adequate light intensity and moderate temperatures. Temperatures should ideally be in the 65–72 °F (18–22 °C) range. Retailers should not place plants in areas where extreme heat or cold temperature exposure can occur. Retailers in the southern U.S. who have outdoor displays should make sure plants are monitored regularly and brought indoors when temperatures or other weather conditions are not conducive for the plants.

Plants exposed to higher light intensity exhibit better post-harvest quality. Many poinsettia varieties placed in areas with less than 100 foot candles (0.5 mols/day) generally have significant bottom leaf loss and poor keeping quality, especially under relatively warm temperatures. While incandescent and fluorescent lights are commonly used in retail displays, displaying plants under natural light is ideal for presenting the plants’ true colors.

Maren™ Poinsettia