



Bringing out the best in Ornamental Plant Growth Regulation

# Topflor<sup>®</sup> Plant Growth Regulator

Product Use Guide



## Top Quality Plants with Topflor

The positive attributes of Topflor will allow growers to produce top quality plants resulting in improved crop marketability. Today's consumers demand the highest quality plants that are compact, possess vibrant blooms and dark green foliage, and with demonstrated outstanding garden performance. Growers now have a PGR tool that provides the ability to grow the "perfect" crop that consumers demand. Some of the many benefits of using Topflor include:

- Topflor's unique activity range allows growers to control even the most vigorous plant species while providing the proper amount of control for slower growing crops.
- Topflor has more efficient stem plant uptake vs. other PGRs, which in many cases results in lower application rates required to achieve optimum growth regulation.
- Topflor is highly active through plant roots, which lends itself to more uniform growth regulation and reduced flower delay.
- Topflor is active on a wide range of ornamental plants, which makes selecting a PGR less complicated.
- European growers have experienced that Topflor treated plants produce darker blooms and fewer faded blooms.
- Topflor strengthens and tones plants, which reduces shipping losses.
- Dark green foliage is evident in Topflor treated plants.



B. Whipker, NCSU

The choice of which PGR to use has just become simplified. Topflor possesses the essential characteristics that growers need to produce the highest quality plants that maintain optimum size and shape to maximize sell through at retail. Consumers who purchase plants treated with Topflor will be able to enjoy compact plants with outstanding flowers and foliage that will demonstrate outstanding garden performance.

## How Topflor Works

Topflor effectively reduces internode elongation through the inhibition of gibberellic acid (GA) biosynthesis, resulting in a more desirable plant. The **active ingredient in Topflor, flurprimidol**, is a nitrogen-containing heterocyclic compound of the **pyrimidine chemical class**. Flurprimidol acts as an inhibitor of enzymes catalyzing the steps in the GA biosynthetic pathway that involve oxidation of ent-kaurene to ent-kaurenoic acid, a GA precursor.

In addition to height regulation, Topflor has been shown to enhance overall plant quality. Other desirable qualities Topflor provides are enhanced leaf and bloom color, higher chlorophyll content, greater leaf thickness, stronger stems, and decreased water loss.

Topflor is a **0.38% formulation** containing 15 grams of flurprimidol per gallon of product.

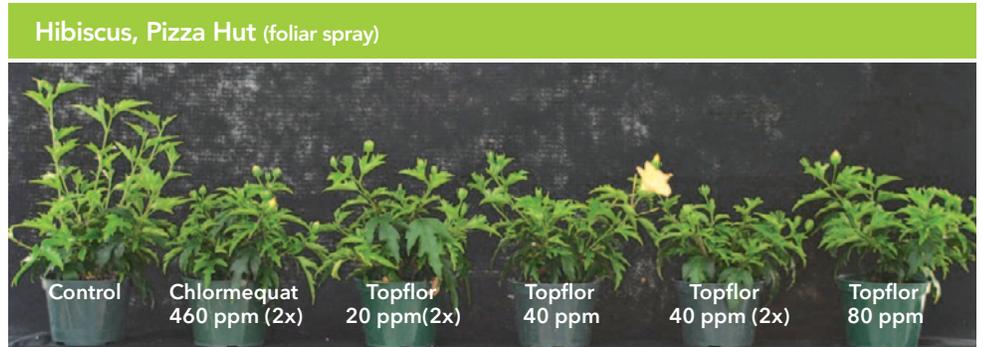
**Topflor has a CAUTION label with a low 12-hour re-entry interval (REI).** Required personal protective equipment (PPE) includes: coveralls, chemical-resistant gloves made of any waterproof material, long sleeved shirt and pants, and shoes plus socks.

## Factors that Influence Topflor Efficacy

Cultivars or varieties within a given plant species may respond differently to Topflor. Varieties that are taller or more vigorous generally require more Topflor than naturally short or less vigorous varieties. Stage of plant growth at the time of application will also influence the amount of Topflor needed. Environmental conditions can also strongly influence the response to Topflor and, therefore, the amount of product applied. Growers in warm climates may need to use higher rates and/or more applications compared to those in cooler climates. The Topflor rate, as well as number of applications, may also vary depending on the time of year, with higher rates and/or more applications needed during warmer months.

Cultural practices may affect the plant's response to Topflor. Plants that are grown at close spacing or in small pots and using high water and fertility levels may require higher rates of Topflor to achieve

the desired response. The effectiveness of all PGR drenches may be reduced in root media that utilizes a high amount of pine bark. Another factor that influences the amount of Topflor required for an optimum growth response is application method (spray or drench) and technique including the uniformity of coverage and degree to which the spray solution is allowed to run off the pot.



T. Cavins, Oklahoma State

## Plant Safety

Topflor has been found to have acceptable plant tolerance in research trials for those crops tested and listed within this guide. However, due to the large number of species, varieties and cultivars and variable growing conditions, it is impossible to test every plant and variety or cultivar for tolerance to Topflor. SePRO has not determined whether Topflor can be used safely on all ornamental plants.

Establish specific application rates based on small-scale treatments under actual use conditions. Keep records as to plant species and determined cultivar sensitivity before applying Topflor to a large number of plants.

## Topflor Application Methods

Plants absorb Topflor through roots, stems, and foliage. Topflor may be applied as a spray, drench or chemigation to achieve the desired plant height control. Use industry standard application equipment, including backpack sprayers, low-pressure hand wand drench applicators, or other similar equipment. Additionally, standard chemigation equipment and practices may also be used. Multiple or split applications may allow greater treatment flexibility, more uniform growth regulation, and safety from over-application.

### Spray

Topflor applied as a foliar spray is absorbed through plant foliage and stems. Dilute Topflor to the desired concentration using *Table 1, page 4*.

When applying as a spray, the following should be noted:

- Do not use additional wetting agents in combination with Topflor as crop injury may occur.
- The spray technique used should provide consistent and uniform coverage over all treated plants. Uneven application or over-application may result in irregular or excessive growth control.

- Adequate spray volume should be used to thoroughly wet the plant foliage. The spray volume that drips down to the stem or media may be desirable as it will be taken up by both the stem and roots increasing the effectiveness of Topflor.
- Apply uniformly at a rate of 1 gallon of spray per 200 sq. ft. of growing area regardless of plant spacing. For small plants in small containers or plug trays that are closely spaced, use 0.5 - 1 gallon of spray per 200 sq. ft. of growing area. For larger plants with a well-developed canopy, a spray volume of 1.5 gallons per 200 sq. ft. of growing area is recommended.

**Table 1: Topflor Dilution Rates**

ppm a.i. desired concentration	mL per gallon solution	fl. oz. per gallon solution	fl. oz. per 10 gallon solution	fl. oz. per 100 gallon solution
0.5	0.48	0.02	0.16	1.61
1	0.96	0.03	0.32	3.23
2	1.91	0.06	0.65	6.46
3	2.87	0.10	0.97	9.69
4	3.82	0.13	1.29	12.92
5	4.78	0.16	1.61	16.15
10	9.55	0.32	3.23	32.30
15	14.33	0.48	4.84	48.44
20	19.10	0.65	6.46	64.59
25	23.88	0.81	8.07	80.74
30	28.65	0.97	9.69	96.89
35	33.43	1.13	11.30	113.04
40	38.20	1.29	12.92	129.18
50	47.75	1.61	16.15	161.48
60	57.30	1.94	19.38	193.77
80	76.41	2.58	25.84	258.37
100	95.51	3.23	32.30	322.96
200	191.02	6.46	64.59	645.91

- Typical foliar application rates are from 0.5 ppm to 80 ppm (varies by cultivar), with a maximum of 200 ppm, applied in 1 gallon of spray mix over 200 square feet.
- Do not allow spray drift to contact non-target plants.
- Shake well before using.

**Drench**

Topflor applied as a drench provides treatment accuracy for consistently uniform results. Topflor is readily absorbed by the roots and translocated to the terminals. Root medium should be moist, but not wet at the time of treatment. Best results are obtained when moisture content allows the drench treatment to become well distributed and retained entirely within the pot. This may be achieved by watering the plants the day before treating. Response may be variable if part of the drench solution is lost to flow-through or if root medium is too dry to allow for even distribution of the treatment, especially when multiple cuttings are in the same container. Generally, a volume of 2 fl. oz. (59 ml) is required to treat a 4-inch pot or 4 fl. oz. (118 ml) for treatment of a 6-inch pot (Table 2). Typical application rate is 1 gallon of drench solution per 32 six-inch potted plants. Dilute Topflor to the required concentration using the dilution rates described in Table 1. When applying as a drench, the use of pine bark in root media may reduce the effectiveness of drench treatments.

Drench applications are expressed in either part(s) per million (ppm) or milligram active ingredient per pot

(mg a.i./pot). PPM measures the dilution ratio of the drench solution which equals mg a.i./L water. Therefore, the amount of active ingredient supplied to each individual treated pot will be determined by the total drench volume applied to each pot.

For example, a 1 ppm Topflor drench at 2 oz./pot will supply 0.059 mg a.i., whereas if you were to use the same concentration of 1 ppm and double the amount applied to the pot, you will supply 0.118 mg a.i. Therefore, drench volume is the determining factor used in calculating the actual mg a.i./pot.

For this reason, Topflor rate recommendations are expressed in mg a.i./pot, so the grower can determine the exact rate required for each crop. Table 2 provides a guideline to growers to determine the approximate required ppm of drench solution necessary to deliver the desired mg a.i./pot. For example, a grower has determined that a poinsettia in a 6-inch pot requires a Topflor drench of 0.25 mg a.i./pot. According to Table 2, if the grower mixes a 2 ppm solution and drenches at 4 fl. oz./pot, then 0.236 mg a.i. will be applied to the poinsettia.

The following formulas can be used to make these conversions.

$$\text{ppm of drench solution} = \frac{\text{desired mg a.i./pot} \times 33.814}{\text{fluid ounce/pot}}$$

$$\text{mg a.i./pot} = \frac{\text{ppm} \times \text{fluid ounce/pot}}{33.814}$$

**Table 2: Drench Volume Application Guidelines**

Pot Diameter (inches)	Drench Volume		mg a.i. Topflor/pot from solutions mixed at the following ppm*				
	fl. oz./pot	ml/pot	0.5 ppm	1 ppm	2 ppm	3 ppm	4 ppm
4	2	59	0.029	0.059	0.118	0.177	0.236
5	3	89	0.044	0.089	0.177	0.266	0.356
6	4	118	0.059	0.118	0.236	0.355	0.473
8	10	296	0.148	0.295	0.590	0.888	1.183
10	25	740	0.370	0.740	1.480	2.220	2.960
12	40	1184	0.592	1.178	2.360	3.543	4.727

\*Refer to Table 1 for mixing instructions.

**NOTE:** The listed drench volumes were based on the soil capacity of a common 6-inch "azalea-type" pot. Extrapolating the rate for this type pot to smaller or larger containers may not be correct for the total drench volume, but should only be used as a guideline. The user must determine the appropriate rate and drench volume needed to achieve the desired result, based on both pot size and root medium used.

### How to Mix Topflor

The sprayer must be clean and free of other chemicals. Use the *Dilution Table (Table 1)* to determine the amount of Topflor and water needed for the required concentration. Fill the spray tank with half the required amount of water. Measure the desired Topflor volume accurately and add it to the tank. Fill tank with the remaining amount of required water. Agitate the Topflor and water mixture frequently to ensure uniform distribution within the spray solution during application.

### Application Rates and Crop Guidelines

The amount of Topflor required for an optimum growth response depends upon several factors: desired height, duration of growth response and degree of control, pot size, stage of growth, method of application, season and cultivar response. Species-specific cultural practices such as watering, potting media, fertilization, temperature and light conditions also affect the growth response to a given dosage. Therefore, growers should establish specific application rates based on small-scale treatments under actual use conditions and keep records as to plant species and cultivar sensitivity before Topflor is applied to a large number of plants. The rates recommended in this guide are rate ranges and should be used only as a guideline.

For spray, drench and chemigation applications, do not exceed the maximum recommended rate 0.36 lbs a.i./A for single applications. Do not exceed more than 3.0 lbs. a.i./A/year. Rate (lbs. a.i./A) will determine the maximum

number of seasonal applications allowed; not to exceed 3.0 lbs. a.i./A/year. If required, repeat applications to the same crop may be applied at 5 to 21 day intervals.

### Bedding Plants

Topflor is effective on a wide range of bedding plants for height control. See *Table 3* for spray application rate guidelines for a variety of common bedding plants. For specific plants not identified on *Table 3*, use 0.5 - 80 ppm as the recommended *General Guideline Rates* for plugs to finished bedding plants.

**Table 3: Spray Rate Range Trial Guidelines for some Bedding Plants\***

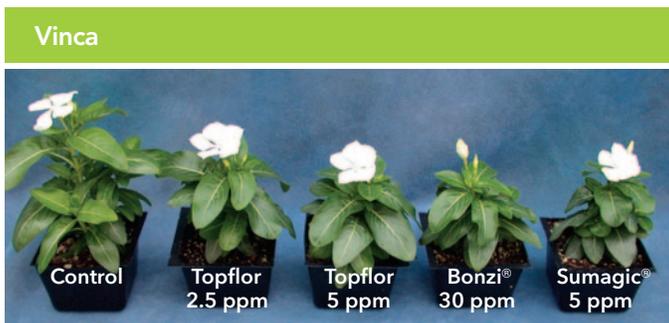
Plant	Rate Range (ppm a.i.)	Plant	Rate Range (ppm a.i.)
<i>Ageratum</i>	20 - 60	<i>Nemesia</i> <sup>1</sup>	10 - 15
<i>Celosia</i> , flame	10 - 40	<i>Osteospermum</i>	20 - 60
<i>Coleus</i> , seed	20 - 40	Pansy	2.5 - 7.5
<i>Geranium</i> , zonal	15 - 25	<i>Petunia</i>	20 - 60
<i>Impatiens</i>	20 - 60	<i>Salvia</i>	20 - 80
Marigold	20 - 60	<i>Vinca</i> <sup>2</sup>	2.5 - 10

\*These rate ranges were determined largely under mid-Atlantic conditions using medium-vigor cultivars. Rates should be adjusted to reflect the need for higher rates for vigorous cultivars and in the Sunbelt Region and lower rates in the Northern Belt Region. Topflor is not recommended for use on fibrous begonia. Overly stunted plants can result if they receive spray drift from applications to surrounding crops.

<sup>1</sup> Nemesia: A rate of 10 - 15 ppm (a.i.) is recommended for a single spray application. Alternatively, apply twice at 5 ppm (a.i.) with the second application made two weeks after the first.

<sup>2</sup> Annual vinca (periwinkle): Growers should note that black spotting may result from higher rates of spray application, especially at high temperatures.

**NOTICE TO USER:** Plant tolerance to Topflor has been found to be acceptable in research trials for the general plant species listed on this label. However, due to the large number of species of ornamental and nursery plants and their associated varieties and cultivars and due to variable growing conditions, it is impossible to test every plant and variety or cultivar for tolerance to Topflor. The Manufacturer has not determined whether Topflor can be used safely on all ornamental plants. Whereas Topflor has been shown to be safe and effective in a limited number of research trials on certain varieties or cultivars of the plant types listed, the professional user should determine if Topflor can be used safely prior to commercial use. Prior to wide-scale use, users should conduct small-scale tests under local growing conditions using the general guideline rates listed below. For species and their varieties or cultivars not specifically listed on the label, the user assumes all risk from phytotoxicity or unacceptable growth effects.



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**Drench:** Apply to uniformly moist root media. Apply at a solution concentration at *General Guideline Rates* of 0.25 - 4 ppm at the recommended volume per pot (See *Table 2, page 5*). Rates for a specific plant species/cultivar and set of use conditions should be determined in small-scale treatments prior to large-scale applications. The user should determine optimum rates noting that the listed rate range encompasses production in the warmer and cooler climates.



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### Bedding Plant Plugs

Spray applications of Topflor may be used to control the height of certain aggressive species of bedding plant plugs. Over-regulation and poor performance after transplanting the plug can occur if rates are too high or if used on overly-responsive crops.

Due to the responsiveness of bedding plant plugs to Topflor, it should only be used on Geraniums, Impatiens, Marigolds, and Petunias. Do not use Topflor on sensitive bedding plant plugs including Begonia, Pansy, Salvia and Vinca.

Differences in environmental factors and cultural practices during plug production can have a dramatic impact on plant growth regulator rates and results. Growers should conduct trials on a small scale under their growing conditions to determine the optimum rate that will provide proper efficacy while ensuring desirable growth and crop performance in the finishing stage.

A trial spray application of 5 - 8 ppm is the suggested *General Guideline Rates*, which should be adjusted based upon trial results and user observations. Application timing is suggested after the development of the first 1 - 2 true leaves. Application volume generally should be 1 gallon per 200 sq. ft. of treatment area.

### Bulb or Fibrous Root Crops

Topflor is very effective on most bulb crops. Topflor is more effective when applied as a drench rather than a spray on most bulb crops (See *Table 4*). For bulb species not listed in *Table 4*, the grower should determine the optimum rate for the species grown under their cultural and environmental conditions by running trials on a small number of plants. In general, apply a soil drench to uniformly moist rooting media approximately 2 weeks after planting when new growth reaches 1-inch.

**Table 4: Rate Range Trial Guidelines for some Bulb Crops\***

Plant	Spray Rate Range (ppm a.i.)	Drench Rate Range
		mg a.i./pot
Calla Lily	ND	1 - 2.5
Canna Lily	50 - 80	ND
Dahlia	NR	0.5 - 2
Oriental Hybrid Lily "Stargazer"	ND	0.25 - 0.5
Tulip <sup>1</sup>	80 - 100	0.5 - 1
Hyacinth	ND	0.5 - 1
Caladium	NR	0.5 - 2

\*These rate ranges were determined largely under mid-Atlantic conditions using medium-vigor to vigorous cultivars. Rates should be adjusted to reflect the need for higher rates in the Sunbelt Region and lower rates in the Northern Belt Region or for less vigorous cultivars.

<sup>1</sup>Tulip: spray for control of post-harvest stretch.  
 ND = Rates for this application technique have not been determined.  
 NR = Not a recommended use.

### Flowering/Foliage Potted Plants

Topflor is effective when applied as a spray or drench on a wide variety of flowering and foliage plants.



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**Table 5: Rate Range Trial Guidelines for some Flowering/Foliage Plants\***

Plant	Spray Rate Range (ppm a.i.)	Drench Rate Range
		mg a.i./pot
<i>Campanula</i>	10 - 30	ND
Cape Primrose ( <i>Streptocarpus hybridus</i> )	5 - 20	ND
<i>Chrysanthemums</i> <sup>1</sup>	7.5 - 25	ND
<i>Exacum</i>	25 - 50	0.01 - 0.03
<i>Geranium</i>	10 - 25	ND
New Guinea Impatiens	5 - 10	ND
Poinsettia	See the poinsettia section on pages 8 - 13	
Sunflower	30 - 50	1 - 2

\* These rate ranges were determined largely under mid-Atlantic conditions using medium-vigor cultivars. Rates should be adjusted to reflect the need for higher rates for vigorous cultivars and in the Sunbelt Region and lower rates in the Northern Belt Region.

<sup>1</sup> Chrysanthemum spray: A rate of 7.5 - 15 ppm (a.i.) is recommended for sensitive varieties and 15 - 25 ppm (a.i.) for others. Spray when the axillary shoots following the pinch are 1.5 inches long or before rapid elongation occurs. If a second application is required, it should be made two weeks after the first.

ND = Rates for this application technique have not been determined.

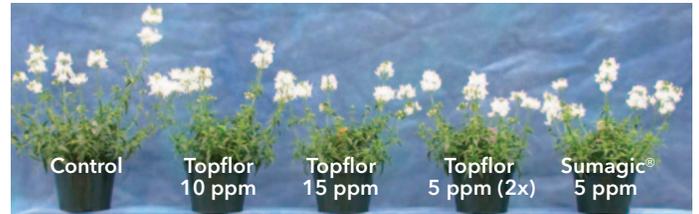
### Perennial Plants, Herbaceous

Topflor is effective in controlling height of a wide variety of herbaceous perennial plants. Rate ranges for different species and cultivars vary greatly. Trials should be conducted using a general guideline rate of 20 - 80 ppm (a.i.) for spray applications.

Examples of perennials for which the product has provided optimum height control include:

- |   |   |
|---|---|
| <i>Acalypha</i>                           | <i>Phlox</i>                                      |
| <i>Arbution</i>                           | Sage, Russian                                     |
| Butterfly bush<br>( <i>Buddleia sp.</i> ) | ( <i>Perovskia atriplicifolia</i> )               |
| <i>Coreopsis</i>                          | Sage, Mexican bush<br>( <i>Salvia leucantha</i> ) |
| <i>Fuchsia</i>                            | <i>Scabiosa</i>                                   |
| <i>Lantana</i>                            | <i>Verbena</i>                                    |
| <i>Lobelia</i>                            | <i>Veronica</i>                                   |
| <i>Pachystachys</i>                       |   |

### Nemesia



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### Woody Ornamentals

Topflor is effective in controlling the height on a wide variety of woody landscape plants using either spray or drench applications. Rate ranges for different species vary greatly. Trials should be conducted using a general guideline rate of 100 - 200 ppm (a.i.) for spray applications. Typical application rate is 1 gallon of spray mixture (up to 200 ppm) per 200 square feet of potted plants.

Examples of woody ornamental plants for which the product has provided optimum height control include:

- Abelia*
- Azalea
- Bougainvillea*
- Cotoneaster dammeri* 'Coral Beauty'
- Crape myrtle 'Natchez'
- Dipladenia*
- Euonymus kiautschovicus* 'Manhattan'
- Gardenia jasminoides* 'Mystery'
- Glory bush (*Tibouchina sp.*)
- Holly: *Ilex X attenuata* 'Fosteri' (Foster holly)
- Ilex X meserveae* 'China Girl'
- Honeysuckle 'Goldflame' (*Lonicera X heekrotti*)
- Hydrangea*
- Photinia X fraseri* (*Fraser photinia*)
- Rhododendron catawbiense* 'Nova Zembla'
- Rose

### Strobilanthes (drench)



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# Poinsettia General Use Guidelines

Height control of poinsettias can be challenging even for the most experienced growers. As poinsettia genetics continue to evolve and change, so must growers in their approach to control height. Differences in cultivars, growing environments, and grower preferences can make selecting the best Plant Growth Regulator (PGR) difficult. SePRO Corporation has now helped to make that decision easier. Topflor Ornamental Plant Growth Regulator is the clear choice for top quality poinsettias.

## Flexibility in Application Timing for Poinsettias

Topflor allows growers the flexibility to apply their PGR early or late via foliar sprays (*Table 6*) or soil drenches (*Table 7*).

### Early Foliar Sprays

Topflor sprays can be applied after plants are pinched to reduce shoot elongation. Spray applications can be made later in production schedules in the warmer production areas, but later applications should be at lower rates and used with caution. Do not apply Topflor sprays after the start of short days in the northern United States.

### Early Soil Drenches

Topflor can effectively be applied as a soil drench early in the growing cycle. Optimum drench rates before the start of short days are typically lower than those recommended for the late drenches. Apply drenches to uniformly moist root media. Rates for a specific vigor class and set of use conditions should be determined in small-scale trials.

#### Prestige Red at Finish



Topflor can be applied as an early drench at **0.05 to 0.2 ppm** prior to the initiation of short days to effectively control height with minimal impact on bract size and development. Lower rates should be used for less vigorous cultivars and poinsettias grown in the northern United States.

### Late Soil Drenches

Late soil drenches are very effective at regulating height while minimizing negative impacts on bract size or color. Topflor's excellent root activity lends itself very well for this type of application.

Late drenches should be applied as late as possible in the growing cycle to minimize reduction of bract size. Rates used for late drenches are typically too high for the early drenches described above. Rates and timing will also depend on the growing climate. The following guidelines can be used for different production regions of the country:

#### Late Soil Drenches – South

1. Topflor drenches should be applied when the plants are within 1-inch of the final targeted height
2. Bracts should be showing color.
3. Standard starting rates of **0.25 - 1 ppm** can be used in the South.
4. Remember that both concentration and amount of drench applied are important. Follow guidelines listed in *Table 2*.

#### Late Soil Drenches – North

1. Topflor drenches should be applied when the plants are within 1/2-inch of the final targeted height
2. Bracts should be showing color.
3. Standard starting rates of **0.125 - 0.5 ppm** can be used in the North.
4. Remember that both concentration and amount of drench applied are important. Follow guidelines listed in *Table 2*.

**Table 6: Foliar Spray Application† – Suggested Topflor trial rate ranges for various poinsettia cultivars**

Vigor Class	Cultivar	Trial Rate Ranges	Weeks of growth after pinch (6.5 inch pot NORTH)	Weeks of growth after pinch (6.5 inch pot SOUTH)
		Spray		
<b>Very Low</b>				
	Red Elf	2 N - 10 S	7 - 8	4 - 3
<b>Low</b>				
	Cortez Red	4 N	5 - 6	3 - 5
	Gala Red	6 N		
	Happy Christmas	6 N		
	Maren	10 N - 15 S		
	Premium Red	4 N		
	Sonora Red	6 N		
<b>Moderate</b>				
	Autumn Red	4 N - 8 N	3 - 4	2 - 3
	Coco White	60 M		
	Christmas Feelings	4 N - 10 N		
	Christmas Season	10 N		
	Early Freedom	8 N		
	Early Joy Red	12 N - 16 N		
	Early Orion	8 N - 12 N		
	Euro Glory	10 N - 12 N		
	Festival	12 N		
	Infinity	8 N - 12 N		
	Mars	12 N		
	Orion Red	5 N - 40 S		
	Olympus	8 N - 10 N		
	Prestige	4 N - 12 N		
	Red Angel	>12 N		
	Silent Night	8 N		
<b>Substantial</b>				
	Redberry Punch	10 N	2 - 3	2 - 3
	Victory Red	20 M - 30 M		
	Christmas Wish	16 N - 30 M		
	Christmas Spirit 2	8 N - 12 N		
<b>Extreme</b>				
	Monet Twilight	20 N - 40 S	2 - 3	1 - 2

† For early drench recommendations see "Early Soil Drenches" section starting on page 8.

**Table 7: Late Drench Application—Suggested Topflor trial rate ranges for various poinsettia cultivars vigor classes**

Vigor Class	Cultivar Example	Trial Rate Ranges
		Late Drench
<b>Low</b>		
	Enduring Pink	0.5 S - 1 S
<b>Moderate</b>		
	Freedom Red	1 N,S
<b>Substantial</b>		
	Red Velvet	0.5 S
	Santa Claus Marble	1 N - 2 S

These are guidelines to provide relative growth differences among cultivars. They should not be viewed as specific recommendations. Do not apply Topflor sprays after initiation of short days in the northern United States.  
 NR = Topflor not recommended for this vigor class.  
 ND = Optimal rate has not been determined. Test various rates on a small number of plants to determine optimal rates for your growing region prior to making large scale applications.  
 N = Northern Tier. Research completed at Purdue University, West Lafayette, IN.  
 M = Mid-Atlantic. Research completed at North Carolina State University, Raleigh, NC.  
 S = Southern U.S. Tier. Research completed at University of Florida, Gainesville, FL.

## Poinsettia Case Study – Early and Late Drench Applications

Plants absorb Topflor through foliage, stems, and roots. Recent research and anecdotal evidence from growers have demonstrated that Topflor provides excellent growth regulation of container ornamentals with applications made to soil media via drench or liner dips. To further investigate the soil activity of Topflor, a study was initiated at the University of Florida in the fall of 2007 with Dr. Jim Barrett to test early and late drench applications of Topflor on multiple varieties of Poinsettias.

### Methodology

Individual trials were conducted on Prestige Red, Prestige Early, Monet Twilight, and Visions of Grandeur. Treatments included early drenches of Topflor at 0.1 and 0.2 ppm and foliar sprays of Cycocel® alone or in combination with B-Nine®. All treatments received a late drench of Topflor at 0.5 or 1 ppm. Treatments were applied as needed to maintain height in accordance with the graphical tracking for each variety. Plant height was measured weekly and decisions were then determined for the treatments needed (Table 8). The chart below demonstrates the scheduling for planting, pinch, short days and target height.

Variety	Plant Date	Pinch Date	Finish Date	Target Height
Prestige Early	8/16	8/30	11/29	14 - 16 inches
Prestige Red	8/23	9/6	11/29	14 - 16 inches
Monet Twilight	8/30	9/13	11/29	14 - 16 inches
Visions of Grandeur	8/30	9/13	11/29	14 - 16 inches

### Results

Topflor early drenches provided excellent height control at finish (Table 8; see images) with 1 or 2 early drench applications at 0.1 and/or 0.2 ppm across all varieties with less bract diameter reduction and less impact on early bract development, including both size and color, compared to 3 to 5 foliar applications of B-Nine/Cycocel. Late drench treatments at 0.5 or 1 ppm were very effective at holding poinsettia height prior to finish date.

### Summary and Recommendations

**Early Drenches:** Topflor can be applied as an early drench at 0.05 to 0.2 ppm prior to the initiation of shorts days to effectively control height with minimal impact on bract size and development. Lower rates should be used for less vigorous cultivars and poinsettias grown in the northern United States.

**Late Drenches:** Topflor can be applied as a late drench at 0.125 to 0.5 ppm in the northern United States when plants are within 1/2-inch of target height and 0.25 to 1.0 ppm in the southern United States when plants are within 1-inch of target height. In both regions, bracts should be showing color prior to beginning late drench applications.

**Table 8.** Scheduling of PGR Applications of Topflor, B-Nine and Cycocel, which were applied as needed to maintain growth according to graphical tracks.

Variety	Early Treatments	Dates Early Drench Applied	Dates Late Drench Applied	Height (in) (11/29)	Bract Diameter (in) (12/13)	Approximate Chemical Cost Per 1000 Pots (6.5 in)
<b>Prestige Red</b>	Topflor 0.1 ppm	9/20 & 11/1	11/8 (0.5 ppm)	14.30 ± 0.52	11.81 ± 0.63	
	Topflor 0.2 ppm	9/20	11/8 (0.5 ppm)	16.04 ± 0.32	12.32 ± 0.18	
	B-Nine / Cycocel 1000/1000	(foliar sprays) 9/20				
	1500/1250	9/27	11/8 (1.0 ppm)	15.75 ± 0.21	9.88 ± 0.34	
	CCC 1250	10/18 & 10/25				
Control	-	-	-	20.74 ± 0.34	18.21 ± 0.36	
<b>Prestige Early</b>	Topflor 0.1 ppm	9/20 & 10/4	11/8 (1.0 ppm)	14.71 ± 0.209	13.18 ± 0.348	
	Topflor 0.2 ppm	9/20	11/8 (1.0 ppm)	15.75 ± 0.273	12.23 ± 0.585	
	B-Nine / Cycocel 1500/1250	(foliar sprays) 9/20				
	1000/1000	10/4	11/8 (1.0 ppm)	15.45 ± 0.273	11.18 ± 0.073	
	CCC 1250	10/18				
Control	-	-	-	19.63 ± 0.271	17.81 ± 0.381	
<b>Monet Twilight</b>	Topflor 0.1 ppm	9/27 & 10/4	11/8 (1.0 ppm)	16.60 ± 0.32	11.81 ± 0.63	
	Topflor 0.2 ppm	9/27	11/8 (1.0 ppm)	15.43 ± 0.37	12.32 ± 0.18	
	B-Nine / Cycocel 1500/1250	(foliar sprays) 9/27				
	1000/1000	10/4	11/8 (0.5 ppm)	15.87 ± 0.44	9.88 ± 0.34	
	CCC 1250	10/11; 10/18; 10/25				
Control	-	-	-	21.54 ± 0.30	18.21 ± 0.36	
<b>Visions of Grandeur</b>	Topflor 0.1 ppm	9/27 & 10/4	11/8 (1.0 ppm)	16.17 ± 0.51	13.09 ± 0.43	
	Topflor 0.2 ppm	9/27	11/8 (1.0 ppm)	14.27 ± 0.47	12.86 ± 0.75	
	B-Nine / Cycocel 1500/1250	(foliar sprays) 9/27				
	1000/1000	10/4	11/8 (1.0 ppm)	15.75 ± 0.31	11.14 ± 0.42	
	CCC 1250	10/11; 10/18; 10/25				
Control	-	-	-	23.50 ± 0.48	16.43 ± 0.71	

Assumes 4 fl. oz. of drench solution per pot. For spray applications, assumes 0.5 gallons of spray solution per 100 ft<sup>2</sup> with 56 pots contained per 100 ft<sup>2</sup>. Therefore, 8.85 gallons of spray solution are required for 1000 pots. Calculations also assume fair market price for the following products: Topflor - \$333.54/gallon; Cycocel - \$80.00/gallon; and B-Nine - \$43.75/pound.

**Prestige Red** Bract development of Poinsettias following PGR applications. (Images taken November 14, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

**Prestige Red** at Finish (Images taken December 5, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

**Prestige Early** Bract development of Poinsettias following PGR applications. (Images taken November 14, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

**Prestige Early** at Finish (Images taken December 5, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

**Monet Twilight** Bract development of Poinsettias following PGR applications. (Images taken November 14, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

**Monet Twilight at Finish** (Images taken December 5, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

**Visions of Grandeur** Bract development of Poinsettias following PGR applications. (Images taken November 14, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

**Visions of Grandeur at Finish** (Images taken December 5, 2007)



0.1 ppm Topflor as needed



0.2 ppm Topflor as needed



B-Nine / Cycocel as needed



Control

## Topflor. The Clear Choice for Top Quality.

### Topflor Highlights:

- Topflor can provide little to no flowering delays compared to other PGRs used in the industry
- Topflor is very versatile, providing adequate regulation to larger and more vigorous species, and slow the growth of smaller and less vigorous plants
- Topflor is highly soil active
- Topflor provides overall high quality plants that are stronger, better toned and have dark green foliage
- Topflor is economical, especially applied as a drench

### Suggested starting rate ratio for Topflor in relation to other PGRs:

Application	Topflor : Paclobutrazol	Topflor : Uniconazole
Spray	1 : 1	1.5 - 1.75 : 1
Drench	0.25 - 0.5 : 1	1 : 1
Preplant Soak	0.25 - 0.5 : 1	1 : 1



*"Late season applications of Topflor on calibrachoa are the ticket. Topflor drastically reduces bloom delay. It's a great option for use on perennials!"*

Jeff Lewis  
Head Grower  
Riverview Flower Farm



**SePRO Corporation**

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