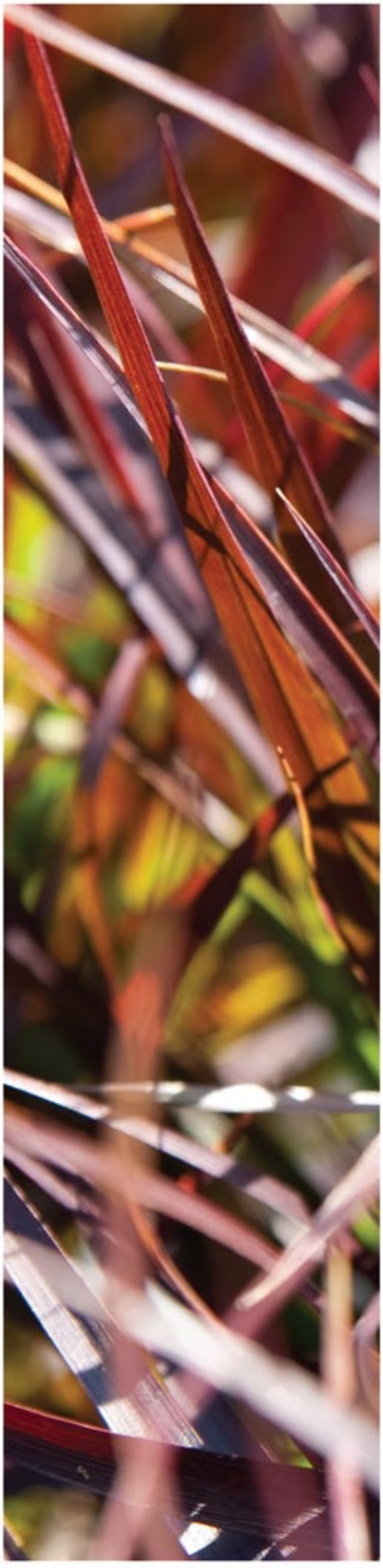


ohp Partners with solutions

OHP PGR Solutions™

Volume IV

Greenhouse and Nursery Production

ohp.com

Technical Service
800-356-4647

PGR

GENERAL USES and OVERVIEW

Plant Growth Regulators (PGRs) are plant hormone enhancers or disruptors. They can be man-made or naturally derived. Plant hormones play many roles in a plant's growth, such as root or shoot growth, flower development, fruiting, leaf drop, coloration and seed set. Many of these functions are still unknown and processes still await discovery.

Commercial horticultural PGRs have been in use since the 1960s. Most of the older PGRs worked by disrupting cell division and at times, produced undesirable responses in plants. In the past 10 to 15 years, new and better PGRs have been developed for the industry. These newer products work by inhibiting gibberellic acid production in the growing points of plants. Some work through leaf absorption (B-Nine, Cycocel) and others work through stem or root absorption (Paczol). PGRs play a key role in crop production, primarily by reducing horticultural crop heights or overall growth. More compacted growth means more bench space for plants, better plants for shipping and better plants for the consumer.

Choosing the correct PGR and then determining when and how to use it is crucial if a successful outcome is to be achieved for the intended crop.

Rooting Hormones

Rooting hormones are not generally thought of as PGRs, but since they do affect plant growth, especially root growth, they should be part of an overall PGR program. Hormodin® offers three different levels of rooting hormone for the three main classes of ornamental materials growers propagate.

Hormodin contains IBA (indole-3-butyric acid), a rooting hormone. It is used to improve root formation on cuttings during plant propagation. Three formulations of Hormodin are available. The formulation selected will depend on the type of plant being propagated.

- Hormodin® 1 is a general purpose powder designed for the home gardener or commercial grower who propagates plants such as roses, carnations, poinsettias, some shrubs and most home garden and greenhouse plants.
- Hormodin® 2 is prepared specially for propagating many woody and semi-woody plants, including some of the evergreens.
- Hormodin® 3 is prepared specially for propagating the more difficult to root varieties, including many of the evergreens and dormant leafless cuttings.

Lateral Branching Agents

Recent developments in PGR research have brought several new products to the market i.e. 6-Ba Cytokinins and OHP's Augeo. These materials focus on enhanced branching making for a thicker and fuller plant. The mode of action can differ between the products, either by increasing cell growth and division or by reducing apical dominance. The later works like a chemical pinch. Applications of these materials should be made early in the cropping cycle. Late applications are not advised as often times chlorosis or necrosis can develop. Early applications will also allow ample time for the plants to grow out of the treatment.

Which PGR?

Crops that have excessive growth — in particular, leafy growth — are candidates for products like B-Nine or Cycocel, which are taken into the plants through leaves. They are sprayed onto the leaf canopy just before run-off. This approach works well for crops such as zinnia, hydrangea, poinsettia etc.

Crops that have more exposed stem tissue or plants that can be soil drenched may be better treated with Paczol, which is easily absorbed into stems and root tissue. Paczol (triazole type PGR) also has significantly more activity than other PGRs. Drench applications tend to have very uniform results and are used at 1/10 the typical spray rate. Attention to detail is a must when using these more active PGRs.

When to apply?

The usual timing for PGR applications is around one week after transplanting into the finished pot. This allows the plant to set roots and overcome transplant shock. Other variables such as applying at first true leaf stage, or applying low-dose or late drenches allow you to tailor PGR use to your needs. The younger or earlier in the crop cycle a PGR is applied, the more receptive the plant will be (i.e. applying at plug stage rather than finish stage).

How to apply?

Foliar sprays can be done with any sprayer from a small hand-held device to a large spray rig. Application volume is 2 quarts per 100 sq. ft. or about 218 gallons per acre. This is a nice wet spray, just before run-off. Using more spray volume than this will waste material (B-Nine or Cycocel) or it may produce unwanted and significantly shorter plants (Paczol). Avoid "run-off" when using Paczol.

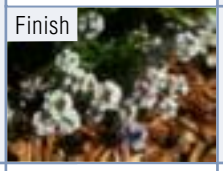
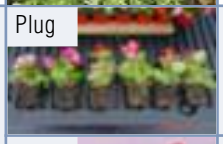
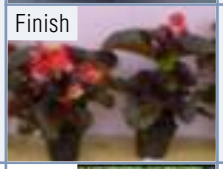
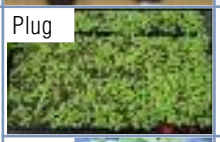
Paczol drench applications require a specific amount of drench volume into the container. Typically, this is 4 fl. oz. per 6-inch container. Plants should be watered the day before application. For larger areas use the "watering in" method where the lower rates (1/2 to 1 PPM Paczol) are injected into the watering line and applied in the same manner as a fertilizer application. This method allows for some application error and will be less likely to create an overdose response in the plants.

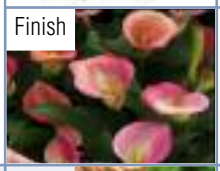
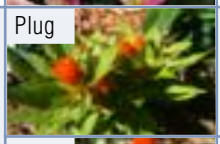
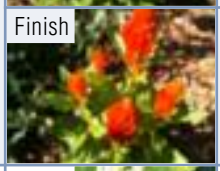
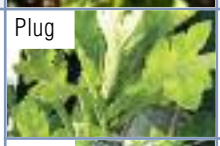
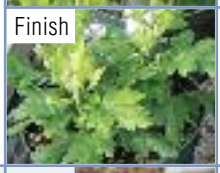
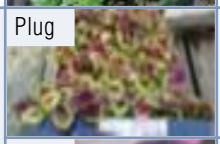
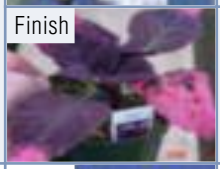
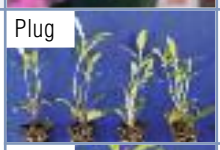
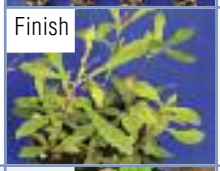
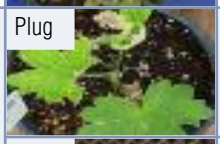
To best decide which product to use, when to use it and how to apply it, consult the labels for more information. Also, the OHP website at www.ohp.com contains data showing the results of many years of PGR research and crop use recommendations. Contact your OHP representative for further PGR support and information.

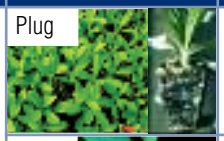
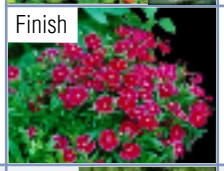
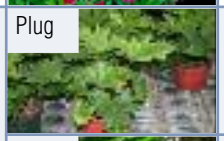
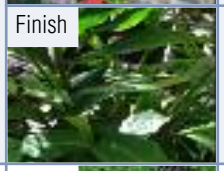
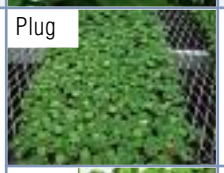
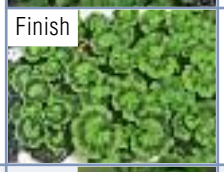
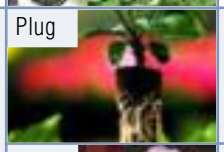
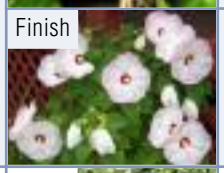
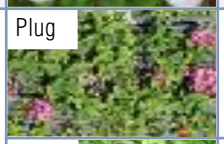
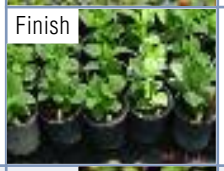
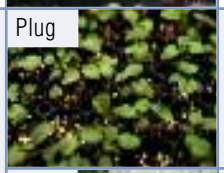
SUGGESTED PGR RATES FOR SELECTED ORNAMENTALS

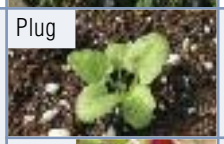
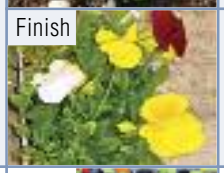
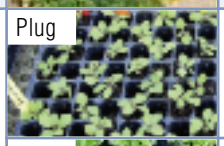
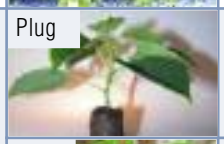
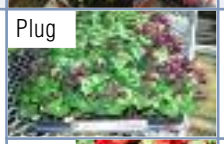
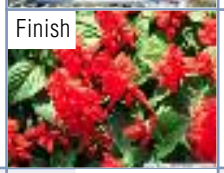
Application to either the plug stage or the finish stage.

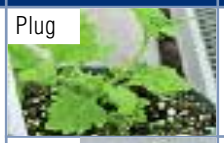
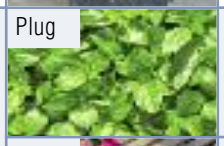
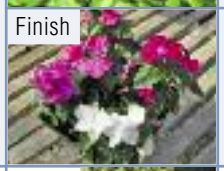
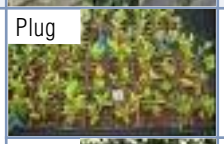
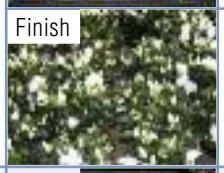
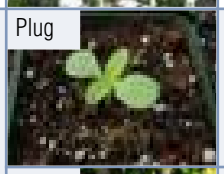
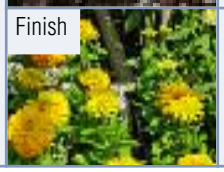
Rates will need to be fine tuned to grower situation. Growers should test PGR rates prior to any large scale application to crops. Plug production refers to small plants in plug trays. Finish is any stage from plug transplant to sale.

Plants	Plant Stage	Application Method	PGR Product	PGR Rate PPM (Respectively)	Comments
Ageratum	Plug	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	2500 ppm 800 to 1000 ppm Not tested Not tested	Spray to wet. Suggested 5 PPM to test.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 800 to 1500 ppm 2500 + 1500 ppm 5 to 45 ppm Not tested	Spray to wet few days after transplant.
Alyssum	Plug	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol		Plug testing not done.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	>7500 ppm Not tested >2500 + 1500 ppm 30 ppm Not tested	Poor response.
Argyranthemum	Plug	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	Not tested Not tested Not tested 4 ppm: 15 sec	Soil should be 50% moist to start.
		Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 1500 ppm 2500 + 1000 ppm 30 ppm 2 to 5 ppm	Spray to wet. Apply second application 2 weeks later if needed. Use correct drench volume per pot.
Begonia	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol		Plug testing not done.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	5000 ppm 1000 ppm 2500 + 1500 ppm 2 to 5 ppm *	Mild response. Very sensitive to Paczol. *Not advised.
Calibrachoa	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	2500 ppm Not tested Not tested 4 ppm: 15 sec	Spray to wet. Adjust as needed. Soil should be 50% moist to start.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 ppm 1000 ppm 2500 + 1500 ppm 20 to 50 ppm 2 to 5 ppm	Spray to wet. Apply 2nd application 2 weeks later if needed. Use correct drench volume per pot.

Plants	Plant Stage	Application Method	PGR Product	PGR Rate PPM (Respectively)	Comments
Calla Lily	Plug 	Spray Spray Spray Tuber Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	Not tested Not tested Not tested 20 ppm: 15 sec	 Soak cleaned tubers.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	No response Not tested Not tested Not recommended 8 to 12 ppm	 Apply when 1 to 2“ of growth appears.
Celosia	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol		Plug testing not done.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	5000 ppm 800 to 1500 ppm 2500 + 1500 ppm 20 ppm *2 ppm	Spray to wet. *Suggested testing rate.
Chrysanthemum General Rates	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	1000 ppm 800 to 1000 ppm 1500 to 2500 ppm ¼ to ½ ppm: 15 sec	Pre-plug dip. Apply as needed.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 3000 ppm 1000 to 1500 ppm Not tested 30 to 50 ppm 1 to 2 ppm	Apply post pinch on 1” growth up to 1 week before disbud. Use correct drench volume per pot.
Coleus	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	2500 ppm 800 to 1000 ppm Variable response 4 to 8 ppm	Spray to wet. Poor foliar uptake.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 1000 to 1500 ppm 2500 + 1000 ppm *20 to 30 ppm 2 to 4 ppm	Spray to wet. 2nd application may be needed. *Variable results.
Cosmos	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol		Plug testing not done.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 ppm 1250 ppm 2500 + 1250 ppm 5 ppm 1 ppm	Spray to wet. 2nd application may be needed.
Delphinium Elatum	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	No response Not tested Not tested Not tested	 Suggested rate of 1 to 2 ppm for plug.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	No response Not tested Not tested 20 ppm 2 to 4 ppm	 Appy at 12” tall. Apply 2nd application 2 weeks later if needed. Drench 1 week after transplant.

Plants	Plant Stage	Application Method	PGR Product	PGR Rate PPM (Respectively)	Comments
Dianthus	Plug 	Spray Spray Spray Spray	B-Nine Cycocel B-Nine + Cycocel Paczol	2500 ppm Not tested Not tested 5 ppm	Spray to wet. Spray to wet.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 800 to 1500 ppm 2500 + 1250 ppm 20 ppm ¼ to ½ ppm	Apply 2nd application 2 weeks later if needed. Use correct drench volume per pot.
Foliage	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	2500 ppm 800 to 1000 ppm Not tested Test at ½ to 1 ppm	Very little data on foliage plants, grower should test rates before large scale use.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 1000 to 3000 ppm 2500 + 1000 ppm 5 to 30 ppm ½ to 3 ppm	These are suggested test rates. Cycocel rates above 1500 ppm may cause short term yellowing. Test rates before large scale use.
Geranium	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	Not tested 1500 ppm (seed type)* Not tested Not tested	 *Apply 1500 ppm 35 & 42 days after seeding. Geranium is very sensitive to Paczol.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	Limited response 800 to 1500 ppm 2500 + 1250 ppm 8 to 15 ppm ¼ to ½ ppm	Limited activity. Apply 1 to 2 weeks after transplant. Apply 2nd application 2 weeks later as needed. Use correct drench volume per pot.
Hibiscus	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	Not tested Not tested Not tested Not tested	 Grower could test PGRs using ½ rates listed for finish.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 200 to 600 ppm 2500 + 1250 ppm 50 ppm 5 ppm	Spray to wet. Apply 2nd application 2 weeks later if needed. Use correct drench volume per pot.
Hydrangea	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	Not tested Not tested Not tested Not tested	 Grower could test PGRs using ½ rates listed for finish.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 7500 ppm test at 1500 ppm 2500 + 1000 ppm 50 ppm Not tested	Spring-low rate. Summer-high rate. Apply 2nd application 2 weeks later if needed.
Impatiens Seed Type	Plug 	Spray Spray Spray Plug Soak spray	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	Limited response Limited response Limited response ¼ to ½ ppm: 15 sec ½ to ¾ ppm	Limited activity. Soil should be 50% moist to start. Stage 3 germination.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	No response Not tested 2500+1250 ppm 15 to 30 ppm ¼ to ½ ppm	 Apply 2nd application 2 weeks later if needed. Use correct drench volume per pot.

Plants	Plant Stage	Application Method	PGR Product	PGR Rate PPM (Respectively)	Comments
Marigold	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	Poor response 5 to 10 ppm ½ to 1 ppm	
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	5000 ppm 800 to 1000 ppm 2500 + 1500 ppm 30 to 60 ppm Not tested	Variable response. French type use low rate.
Pansy	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	Poor response *1 to 5 ppm *Not tested	 *Very sensitive to Paczol. *Very sensitive to Paczol.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	>5000 ppm 1500 ppm 5000 + 1500 ppm 5 to 10 ppm Not recommend	Multiple apps needed. Lower rate in cooler temps.
Petunia	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	1000 to 2500 ppm 800 to 1250 ppm 2500 + 1250 ppm 1 to 2 ppm: 15 sec	Spray to wet. Adjust as needed. Soil should be 50% moist to start.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 ppm 800 to 1250 ppm 2500 + 1500 ppm 4 to 45 ppm 2 to 4 ppm	Spray to wet. Apply 2nd application 2 weeks later if needed. Use correct drench volume per pot.
Poinsettia General rates	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	1250 to 2000 ppm 1500 ppm Not tested Not tested	Apply to rooted cuttings to reduce stretch and maintain color.
	Finish 	Spray Spray Spray Spray Drench low dose	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2000 to 3000 ppm 1000 to 1500 ppm 2000 + 1000 ppm 15 to 30 ppm* 1/10 ppm	Apply post pinch on 1" to 2" growth. [*½ to 1 ppm late drench 1 " before finished height]. Low dose rate as needed per crop curve.
Salvia	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	2500 to 5000 ppm 800 to 1250 ppm 1250 + 1000 ppm ½ to 2 ppm: 15 sec	Spray to wet. Adjust as needed. Soil should be 50% moist to start.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 1500 ppm or higher 2500 + 1250 ppm 20 to 50 ppm 2 to 5 ppm	Spray to wet. Apply 2nd application 2 weeks later if needed. Use correct drench volume per pot.
Snapdragon	Plug	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	 800 to 1000 ppm 15 to 20 ppm Not tested	 Apply at true leaf stage. *Suggest 2 to 4 ppm soak.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	5000 ppm 1500 ppm 3000 + 1000 ppm 45 to 75 ppm Not tested	Multiple apps required. Multiple apps required. Get good stem coverage.

Plants	Plant Stage	Application Method	PGR Product	PGR Rate PPM (Respectively)	Comments
Verbena	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	2500 ppm 800 to 1000 ppm 5 to 10 ppm 8 ppm	Spray to wet.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 1000 to 1500 ppm 2500 + 1000 ppm 30 ppm 5 ppm	Spray to wet. Use correct drench volume.
Vinca	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	1250 to 2500 ppm 800 to 1000 ppm Not recommended	
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 1000 to 1500 ppm 2500 + 1500 ppm Not recommended	Spray to wet. Causes leaf spots.
Woody Landscape Plants General Rates	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel B-Nine + Cycocel Paczol	Not tested Not tested Not tested Not tested	Grower could test PGRs using ½ rates listed for finish.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	500 to 7500 ppm 1500 to 3000 ppm 5000 + 1500 ppm 100 to 150 ppm 5 to 15 ppm	Spray to wet. Apply 2nd application 2 weeks later if needed. See label recommendation. Use correct drench volume per pot.
Zinnia	Plug 	Spray Spray Spray Plug Soak	B-Nine Cycocel Paczol Paczol	1250 to 2500 ppm 800 to 1000 ppm Variable results Not tested	Spray to wet.
	Finish 	Spray Spray Spray Spray Drench	B-Nine Cycocel B-Nine + Cycocel Paczol Paczol	2500 to 5000 ppm 1000 to 1500 ppm 3000 + 1000 ppm 25 to 50 ppm	Works very well, 2nd application may be needed. Variable results.

GENERAL RATE RECOMMENDATIONS and BEST USE GUIDE for B-NINE®, CYCOCEL® and PACZOL®

(Read product label and visit ohp.com for an expanded list of plant material tested.)

Crop	Plug / Liner	Plug / Liner Comment	Finish	Finish Comment
Bedding Plants	1500-2500 ppm	B-NINE: Apply at first true leaf stage and as needed for compact growth.	1500-2500 ppm	B-NINE : Apply 3-7 days after transplant then as needed every 2 weeks to control growth.*
	500-1000 ppm	CYCOCEL: Apply at first true leaf stage and as needed for compact growth.	800-1500 ppm	CYCOCEL: Apply 3-7 days after transplant and as needed for compact growth. May increase to 3000 ppm.
	¼ to ½ ppm	PACZOL: Apply at first true leaf stage media spray, plug dip.***	1-30 ppm spray ½ to 3 ppm drench	PACZOL: Apply 3-7 days after transplant and as needed for compact growth; drench rate is ⅒ spray rate.
Perennials	1250-2500 ppm	B-NINE: Apply to early leaf stage and as needed for growth control.	2500-5000 ppm	B-NINE: Apply 7 days after transplant then as needed to control growth.*
	800-1000 ppm	CYCOCEL: Apply to early leaf stage and as needed for growth control.	1250 -3000 ppm	CYCOCEL: Apply 7 days after transplant then as needed to control growth.*
	½ - 1 ppm	PACZOL: Apply at first true leaf stage media spray, plug dip.***	10-30 ppm spray 1-10 ppm drench	PACZOL: Apply 3-7 days after transplant and as needed for compact growth.
Foliage Plants	2500 ppm	B-NINE: Apply to early leaf stage and as needed for growth control.	2500-5000 ppm	B-NINE: Apply 7 days after transplant then as needed to control growth.*
	800-1000 ppm	CYCOCEL: Apply to early leaf stage and as needed for growth control.	1000 -3000 ppm	CYCOCEL: Apply 7 days after transplant then as needed to control growth. Rates higher than 1500 may cause short term leaf yellowing.
	½ - 1 ppm (estimate)	PACZOL: Little data on foliage plug use; user should test first.	5-10-30 ppm Estimate, see comment	PACZOL: use not evaluated at this time.
Mums	1000 ppm	B-NINE: Use a pre-plant dip to rooted cuttings. Allow to dry before potting up.	2500-5000 ppm	B-NINE: Apply after pinch when shoots are 1" long, then as needed up to 1 week before disbud.
	800-1000 ppm	CYCOCEL: Apply to early leaf stage and as needed for growth control.	1000-1500 ppm	CYCOCEL: Apply after pinch when shoots are 1" long, then as needed up to 1 week before disbud.
	¼ to ½ ppm	PACZOL: Apply at first true leaf stage media spray, plug dip.***	30-50 ppm spray 1-2 ppm drench	PACZOL: Apply after pinch when shoots are 1" long.
Poinsettias	1250-2000 ppm	B-NINE: Apply to rooting cuttings to reduce stretch and maintain color. Overhead mist will reduce response.	2000-3000 ppm	B-NINE: Apply after pinch when shoots are 1½ -2" long, then 2 week intervals.**
	1500 ppm	CYCOCEL: Apply to rooting cuttings to reduce stretch and maintain color. Overhead mist will reduce response.	1000-1500 ppm	Higher rates may cause leaf yellowing. CYCOCEL: Apply after pinch when shoots are 1½ -2" long, then 2 week intervals.**
	N/A	PACZOL: Use not evaluated at this time.	15-30 ppm spray ½ ppm as late season drench	PACZOL: Apply after pinch when shoots are 1½ -2" long, then 2 week intervals** late season drench applied 1" before finish.

* Applications made near flower bud formation may delay bloom response.

** Do not apply after the beginning of short days or about 11 hours maximum of light.

*** Plug dip is using very low rates, plug tray dipping time of 15-30 sec. Plug soil should be near 50% of field moisture capacity at time of dip.

ohp Partners with solutions

Typical Questions and Answers

1. How can I mix-up a low dosage Paczol rate accurately for testing some plants?

The best method would be to use measuring equipment such as pipettes, graduated cylinders or other such tools that can measure small amounts of product.

Another method is to mix-up a larger spray solution and then dilute down the solution to the desired ppm level. As an example, let's say you need a 1 gallon, 1 ppm spray solution. Looking at the Paczol label 1 ml per gallon is 1 ppm. (There are about 30 ml per 1 fl oz .) Start by measuring out 1 fl oz of Paczol and dilute it by 30 times by adding 30 fl oz of water to this 'concentrate'. Next measure out 1 fl oz of this 'concentrated' dilution and mix into your 1 gal spray solution. You now have a 1 ppm Paczol solution.

2. My basket crops can become quite large for shipping. What can I do to hold their growth?

Many crops can become large or even over grown as they come to the end of finish. Using a low dose of Paczol can "hold" them for a longer period of time. A good example of this is to apply a drench at 4 ppm to a petunia crop once it is up to size. This late drench will not disrupt bloom development and will dramatically slow down growth. Another crop this can work on is poinsettia. Application of ½ to 1 ppm drenched in November can hold down excessive stretch.

3. I like to spray PGRs rather than drench. Which products are best for this?

OHP products B-Nine and Cycocel are very effective growth control agents when applied to leaves. These materials are well absorbed into the leaves. Therefore, both B-Nine and Cycocel can be used at much higher rates (ppm) than Paczol. This lessens the risk of over stunting the crop.

4. How can I make my foliar sprays more active?

The tank mix of B-Nine and Cycocel is synergistic and will increase the activity that results when either product is applied separately. Research has shown a ratio of about three parts B-Nine to one part Cycocel to be the most active. Based on this work, using B-Nine at 2500 plus Cycocel at 1000 ppm will increase your PGR activity more so than the two products separately.

5. Should I use a spreader sticker with my PGR applications?

This is a common question when using PGRs as well as other foliarly-applied products. The answer for PGRs is NO. Products like B-Nine and Cycocel have very good wetting agents already incorporated into the product formulation. The addition of more spreader sticker would be of little benefit. Products like Paczol also contain a wetting agent and more importantly, Paczol is absorbed into the plant in about 30 minutes.

6. When is the best time to apply PGRs?

Growth inhibiting PGRs like B-Nine, Cycocel or Paczol are usually applied 1 week after transplant into the finish pot. These same PGRs have also performed well when used in a plug or liner dip or late in finish to hold a crop.

Augeo is a different type of PGR used for branching and is best applied early in the cropping cycle (soon after transplant). Do not apply Augeo late in finish.

AUGEO™ Plant Growth Regulator

Augeo is a PGR used to reduce or break apical dominance in plant shoots and enhances lateral branching in bedding plant, nursery, trees and shrub crops. It is applied as a foliar spray to actively growing leaves early in the growth stage of the plant. Typical rates would be in the 800 to 1600 PPM range. Read the label for specific rate recommendation. Apply using 2 qt. per 100 sq. ft. of area. Do not overhead water for 6 hours after application. Chlorosis can be a common response to an Augeo application. Enhanced branching should be evident in a few weeks after treatment. Applications should be made 8-10 weeks before sale of the crop, allowing for enough re-growth time to finish. Recent research has shown positive results when applied to young liner material. These very early applications have resulted in significant lateral breaks on crops such as azalea, spirea, potentilla, erica. Suggested test rates for these liner applications would be either 400 to 800 PPM.

EXAMPLE AUGEO RATE RECOMMENDATIONS FOR ENHANCED BRANCHING

See product label for a complete listing of plant material.

Bedding Plant	Plant Stage	Application	PGR Product	PGR Rate	Comments
Azalea	Finish	Spray	Augeo	1600 ppm	Apply soon after transplant.
Begonia	Finish	Spray	Augeo	800 to 1600 ppm	Apply to 2-3 inch shoots 8-10 weeks before sale.
Calibrachoa	Finish	Spray	Augeo	400 to 800 ppm	Apply early in crop cycle. Some varieties reported not to respond.
Coleus	Finish	Spray	Augeo	800 ppm	Apply early in crop cycle. Chlorosis would be expected on dark leaved varieties.
Fuchsia	Finish	Spray	Augeo	800 to 1600 ppm	Apply at 4-6 leaf stage or min. 10 weeks before sale.
Ivy Geranium	Finish	Spray	Augeo	1600 ppm	Apply soon after transplanting plug into finished pot.
Kalanchoe	Finish	Spray	Augeo	1064 to 2400 ppm	Treat 2 days after pinch for increased branching and inflorescence.
Lantana	Finish	Spray	Augeo	800 to 1600 ppm	Apply soon after transplanting plug into finished pot.
Verbena	Finish	Spray	Augeo	800 to 1600 ppm	Apply soon after transplanting plug into finished pot.

PACZOL® Dilution Table

Below is a helpful table to calculate how much **PACZOL** should be added to a gallon of water for use with chemical injectors. A common injection ratio is 1:100 meaning one gallon of concentrate (stock solution) is evenly dispersed via injection into 100 gallons of irrigation water.

Injector Ratio

Desired Concentration	1:16	1:50	1:100	1:200
0.25 PPM	4	12	24	48
0.50 PPM	8	24	47	94
0.75 PPM	12	36	71	142
1 PPM	15	48	95	190
2 PPM	30	90	190	380
3 PPM	45	140	280	560
4 PPM	60	190	380	760
5 PPM	75	235	470	940
10 PPM	150	470	940	1880

All quantities are expressed in milliliters per gallon stock solution.

1 fl. oz. equals 29.57 ml

Example: for 1 PPM with a 1:100 injector, you would use 95 ml PACZOL (3.2 fl oz) mixed into 1 gallon of water (stock solution) and run the injector until the gallon is gone. Be sure to check that the 100 gallons used is correct for the square footage of bench space sprayed or for the number and size of pots being drenched i.e. spray at 2 qt./100 sq. ft. or 100 gal./20,000 sq. ft. Drench at 2 fl. oz. per 4 inch pot, 4 fl. oz. per 6 inch pot, etc. see label for directions.

It is advised to leave a small portion of the crop untreated so an accurate evaluation of the growth suppression may be observed.

OHP PGR Solutions™

OHP Representative: Phone _____

_____ E-mail _____

Grower and Location _____

GROWTH CONTROL PROBLEM	CROP	OHP SOLUTION

Date _____

Notes _____

_____

OHP PGR DILUTION TABLES

Augeo™

PPM Augeo Desired	Fluid Ounces per Gallon	mL per Gallon
400	¼	7.3
532	⅓	9.8
800	½	14.7
1064	⅔	19.6
1200	¾	22.1
1600	1	29.5
2132	1⅓	39.4
2400	1½	44.3
3200	2	59.1
4000	2½	73.9
4800	3	88.7
6400	4	118.2

Paczol®

PPM Paczol Desired	Fluid Ounces per Gallon	mL per Gallon
1	0.032	1.0
2	0.064	1.9
3	0.096	2.8
4	0.13	3.8
5	0.16	4.7
10	0.32	9.5
20	0.64	19.0
25	0.8	24.0
30	1.0	28.0
40	1.3	38.0
50	1.6	47.0
100	3.2	95.0
200	6.4	190.0

Cycocel®

PPM Cycocel Desired	Fluid Ounces per Gallon	mL per Gallon
200	0.22	6.4
460	0.50	14.7
800	0.87	25.7
1000	1.08	32.1
1250	1.36	40.1
1500	1.63	48.1
2000	2.17	64.2
3000	3.25	94.2
4000	4.34	128.0

B-Nine® WSG

PPM B-Nine Desired	Ounces per Gallon	Scoops or Tablespoons per Gallon
1250	0.2	1
2500	0.4	2
3750	0.6	3
5000	0.8	4

For help on PGR calculations and determining dose rate amounts, visit ohp.com to download the PGR calculator for your iPhone®, iPad® or iPod Touch®.

The PGR Calculator allows users to look up current PGR rates in PPM for spray or drench applications. The user then enters the desired dose and the size of the application area (L x W) or the number of pots for a drench and the App calculates the amounts of solution and product needed.

OHP's PGR App is available through the iTunes® Application Store.

OHP, Inc.
PO Box 230
Mainland, PA 19451
Technical Service: (800) 356-4647
ohp.com

ohp Partners with solutions