

PLANT GROWTH *Regulators*



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There are many types of Plant Growth Regulators, some shorten the internodes on a plant and slow down growth, some knock flower buds off and delay flowering and there are others that promote branching, internode and plant growth. Which one you use depends on what you need it to do. Some are only done as a foliage spray and are softer and more forgiving and others can be done as a foliage spray or as a soil drench and are stronger and control plant growth better. Below is some general information about the Plant Growth Regulators in each Group and a chart is at the bottom. Always read the label before applying any of these Growth Regulators.

Group 1:

Group 1 has a variety of plant growth regulating chemicals and they can be broken into 2 subgroups. One subgroup consisting of A-Rest, Topflor, the Paclobutrazols and Sumagic are stronger and longer lasting PGRs. They can be applied as a foliage spray or as a soil drench. These will have a stronger effect on reducing internode elongation start at the lower end on the PPM if you do not have experience with these.

The second subgroup consisting of B-Nine and Cycocel are softer and shorter lasting PGRs. They are applied as a foliage spray. These will not have as strong of an effect on internode elongation as the other PGRs above. These will be more forgiving. More applications will be needed for these to keep the plant more compact.

Drench or Foliar Applied, Longer Lasting PGRs:



A-Rest® 1qt SEPROA-REST 2.5gal SEPRO1012.225



Active Ingredient: Ancymidol

Manufacturer: SePRO

Trade Name: A-Rest

REI: 12 hrs

A-Rest® effectively reduces internode elongation, resulting in a compact plant. The sources of uptake for A-Rest would be the foliage as a spray and the roots as a drench. When applied as a foliar spray it is absorbed through the foliage and is then translocated to the terminal where it reduces internode elongation. When applied as a drench it is taken up by the roots and translocated to the terminals.



Topflor 1L SEPRO1035.42 5gal SEPRO1035.5



Active Ingredient: Flurprimidol

Manufacturer: SePRO

Trade Name: Topflor

REI: 12 hrs

Topflor effectively reduces internode elongation, resulting in a compact plant. The sources of uptake for Topflor would be the foliage and stem as a spray and the roots as a drench. When applied as a foliar spray it is absorbed through the foliage and stem and is then translocated to the terminal where it reduces internode elongation. When applied as a drench it is taken up by the roots and translocated to the terminals. It has been shown to increase the quality of plants even in the absence of growth reduction. Some of these desirable qualities include darker leaf color, higher chlorophyll content, greater leaf thickness, stronger stems, decreased water loss and minimal impact on bloom size.



Pac O 1gal OHP986192



Active Ingredient: Paclobutrazol

Manufacturer: OHP

Trade Name: Pac O (Paczol)

REI: 12 hrs

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Bonzi 1qt SYN13869 2.5gal SYN27714



Active Ingredient: Paclobutrazol **Trade Name:** Bonzi

Manufacturer: Syngenta **REI:** 12 hrs

Paclobutrazol effectively reduces internode elongation, resulting in a more desirable compact plant. The sources of uptake would be the stems as a foliar spray where it is then translocated to the terminal and reduces internode elongation and the roots as a drench, where it is translocated to the terminal and also reduces internode elongation. Drench applications generally have a longer lasting, more uniform control on height than spray applications, with little effect on flower size. Drenches are very useful late in the production period when plants have reached, or are near their desired marketable size. Drench applications should always be made to moist media, applications to dry media will result in poor distribution of the chemical.



Sumagic 1gal VAL85100.935



Active Ingredient: Uniconazole-P **Trade Name:** Sumagic

Manufacturer: Nufarm **REI:** 12 hrs

Sumagic effectively reduces internode elongation, resulting in a more desirable compact plant. The sources of uptake would be the stems as a foliar spray where it is then translocated to the terminal and reduces internode elongation and the roots as a drench, where it is also translocated to the terminal and reduces internode elongation. Sumagic is an extremely active PGR, caution must be exercised when using it. Excessive doses will result in severe growth reduction and possible negative affects on flowering, plant appearance, quality and marketability. It delivers more marketable, attractive, and compact ornamentals with an increased shelf life. Key performance benefits include: enhanced floral density and foliage color, improved stress tolerance, and increased shelf life.

Foliar Applied, More Forgiving PGRs:



Cycocel 1qt OHP981660 1gal OHP981661 30gal OHP981662



Active Ingredient: Chlormequat Chloride **Trade Name:** Cycocel

Manufacturer: OHP **REI:** 12 hrs



B-Nine WSG 1lb OHP981312 5lb OHP981318



Active Ingredient: Daminozide **Trade Name:** B-Nine WSG

Manufacturer: OHP **REI:** 24 hrs

Cycocel and B-Nine can be tank mixed as needed for enhanced activity and both effectively reduce internode elongation, resulting in a compact plant. When applied as a foliar spray the source of uptake for B-Nine would be the foliage and for Cycocel it would be the foliage and stem where they are then translocated to the terminal where they reduce internode elongation. Cycocel improves the aesthetic appeal and improves durability during shipping and handling. Plants are more compact with shorter internodes, stronger stems and greener leaves.

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Group 4:

These PGRs are extremely active and promote internode elongation, branching and overall plant growth. Always start at a lower rate with these because a little bit will go a long way. These are mainly done as a foliage spray but Fascination can be done as a soil drench.



ProGibb T&O .5gal VAL22055.911



Active Ingredient: Gibberellic Acid
Manufacturer: Mycorrhizal Applications

Trade Name: ProGibb T&O
REI: 12 hrs



Fascination .5gal VAL89020.922



Active Ingredient: Cytokinin/Gibberellic Acid
Manufacturer: Nufarm

Trade Name: Fascination
REI: 4 hrs

ProGibb and Fascination are extremely active PGRs, caution must be exercised when using them. Sources of uptake as a foliar spray would be stems and foliage. A foliar application of ProGibb or Fascination has the potential to significantly increase growth and overcome applications of a gibberellin inhibiting plant growth regulator. They promote a number of desirable affects such as: increased flower size and number, delayed leaf yellowing, increased stem elongation, uniform and prolonged flowering, and decreased time to flower. They have also been shown to decrease the minimum temperature required to initiate plant growth and overcome bud and seed dormancy.



Configure .5gal FINE19-0163D



Active Ingredient: N-(phenylmethyl)-1H-purine-6-amine
Manufacturer: Fine Agrochemicals

Trade Name: Configure
REI: 12 hrs

Configure increases lateral or basal branching and promotes flowering. It can also reduce the overall height of a plant resulting in a more compact and marketable plant. Sources of uptake as a foliar spray would be the stem and foliage.

Group 5:

Florel reduces internode elongation, knocks flower buds off and promotes branching. It is applied as a foliar spray. Can be tank mixed with other PGRs.



Florel 1pt MLGNLG4100 1qt MLGNLG4105 1gal MLGNLG4110



Active Ingredient: Ethephon
Manufacturer: Monterey Chemical

Trade Name: Florel
REI: 48 hrs

A foliar spray of Florel can be used to increase lateral branching, prevent flower initiation and development, and inhibit internode elongation in ornamentals. Sources of uptake are the stem and foliage. When applied, it enters the plant and breaks down into ethylene, which is a naturally occurring plant hormone. A foliar spray of Florel to ornamental trees and shrubs will reduce or eliminate undesirable fruit development. Use caution on using Florel immediately after transplanting plugs, it can delay root growth.

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Group 6:

These are rooting hormones that promote rooting on cuttings. These can be applied as a foliar spray or by dipping the end of the cutting into the solution.



Hormodin 1lb OHP983111



Active Ingredient: Indole-3-Butyric Acid **Trade Name:** Hormodin

Manufacturer: OHP **REI:** 0 hrs



Hortus 1gm PHT0341 1kilo PHT0337



Active Ingredient: Indole-3-Butyric Acid **Trade Name:** Hortus IBA Water Soluble Salts 20%

Manufacturer: Phytotronics **REI:** 0 hrs

Hormodin and Hortus IBA are general purpose powders that are dissolved in water to make rooting solutions. They are designed for the grower rooting annual, perennial, and woody ornamental plant cuttings. These can be applied by foliar and basal methods. Treated cuttings are expected to produce uniform roots all around the basal end.



Dip N Grow 1pt DIPNDG01612 1gal DIPNDG12804



Active Ingredient: Indole-3-Butyric Acid and 1-Napthaleneacetic Acid

Trade Name: Dip N Grow

Manufacturer: Dip N Grow **REI:** 24 hrs

Dip N Gow is an effective liquid rooting hormone that is economical and easier to use than rooting powders. It's as simple as 1, 2, 3. Mix Dip N Grow concentrate with water in the dilution cup provided. Then dip the basal end of the cutting into the solution for 3 to 5 seconds and then stick the cutting into the media.



Resources Provided By



****Use Site(s) Key:** GH = Greenhouse N = Nursery

Plant Growth Regulators (PGRs)

(By Mode of Action Group and Class)

MOA Group*	Class	Activity Level**	Common Name	Trade Name	REI	Use Site(s)***	Company
1	Pyrimidine	Medium	Ancymidol	A-Rest [®]	12	GH/N	SePRO Corp.
			Flurprimidol	Topflor [®]	12	GH/N	SePRO Corp.
	Quaternary Ammonium	Medium	Chlormequat chloride	Cycocel [®]	12	GH/N	OHP, Inc.
			Hydrazide	Daminozide	24	GH/N	OHP, Inc.
		High	Paclobutrazol	PAC O [™]	12	GH/N	OHP, Inc.
				Bonzi [®]	12	GH/N	Syngenta
3	Fatty acid	Medium	Methyl esters of fatty acids	Sumagic [®]	12	GH	Nufarm
				Off-Shoot-O	0	GH/N	Cochran Corp.
4	Gibberellin (GA)	High	Gibberellic acid (A3)	ProGibb [®] T&O	12	GH/N	Nufarm
	Synthetic Cytokinin/ Gibberellin	High	Cytokinin/ Gibberellic acid	Fascination [®]	4	GH	Nufarm
	Synthetic Cytokinin	High	N-(phenylmethly)- IH-purine-6-amine	Configure [®]	12	GH	Fine Agrochemicals, LTD.
5	Organophosphorus	Medium	Ethephon	Florel Brand Pistill	48-72	GH/N	Monterey Chemical
				Florel Brand Ethephon	48-72	GH/N	Southern Agricultural Insecticides, Inc.
6	Rooting Hormones Synthetic Auxin		IBA	Hormodin [®]	0	GH/N	OHP, Inc.
			IBA + NAA	Dip'N Grow	0-24	GH/N	Dip'N Grow, Inc.

** PGR activity varies greatly depending on product class; e.g. the triazole class is very active. The low, medium and high ratings are guides to product activity. The higher the level of activity the more care must be taken when using.

Thank you to Dr. Joyce Latimer, Virginia Tech, for help in preparing the PGR chart.

*Plant Growth Regulators Modes of Action

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|--|-----------------------|---------------------------|
| 1. Gibberellic Acid synthesis inhibitors | 4. Growth promoter | 7. ABA abscisic acid |
| 2. DNA synthesis inhibitor | 5. Ethylene generator | UN. Unkown mode of action |
| 3. Chemical pincher | 6. Rooting hormones | |