

PGR University

Branching Agents

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e-GRO Electronic Grower Resources Online **fine**


12:00 to 12:30 Eastern

BRANCHING AGENTS

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STRUCTURAL ENHANCERS
KNOWING THE TOOLS & HOW TO USE THEM EFFECTIVELY




1 INTRODUCTION

PGRs Knowing and Using

- **Growth Controllers**
 - Ancymidol
 - Chlormequat
 - Daminozide
 - Flurprimidol
 - Paclobutrazol
 - Uniconazole
- **Structural Enhancers**
 - Augeo
 - Configure
 - Ethephon
 - GA/BA

Brian Whipker covered in last presentation

Expanding PGR Toolbox

Type	Chemical	Products
Anti-GA	Ancymidol	Abide, A-Rest
	Chlormequat chloride	Citadel, Cycocel
	Daminozide	B-Nine, Dazide
	Flurprimidol	Topflor
	Paclobutrazol	Bonzi, Paczol, Piccolo, Piccolo 10XC, Downsize (<i>drenches only</i>)
	Uniconazole	Concise, Sumagic
Structural	BA	Configure
	GA	Florgib, ProGibb T&O
	BA+GA	Fascination, Fresco
	Dikegulac sodium	Augeo
	Ethephon	Collate, Florel



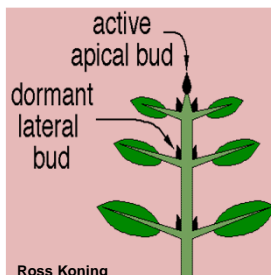
2 BRANCHING AGENTS



Chemical Approach to Branching

Goal is to improve plant architecture

- Substitute for pinching
 - Pinching labor intensive
 - Pinching delays growth and bloom
- Release apical dominance
- Increase branching and improve quality
- Finish plants more quickly



2a

AUGEO



Augeo (OHP, Inc.)

- Uptake is through leaf tissues primarily or through root uptake
- Active ingredient 18% dikegulac-sodium
- MOA
 - Induces leaky cell walls on actively growing terminals
 - Like a chemical pinch
 - Results in decreased apical dominance
- Typically causes leaf chlorosis
 - Apply early in the crop cycle to stimulate branching and allow ample time for new leaf growth to cover any yellowing or leaf necrosis
- Apply to actively growing plants and stress free
- Apply sufficient volume to wet the foliage (2 qt/100 sf)

Augeo
PLANT GROWTH REGULATOR



WOW Plants (OHP results)

- Lantana
- Fuchsia
- Calibrachoa
- Petunia
- Rates 400 to 800 ppm



Phlox paniculata 'Laura'



- 1600 ppm Augeo increased lateral branching
 - Control 13 vs. 1600 ppm 27 branches



Veronica 'Goodness Grows'

Finished liners at 3 WAT


- Augeo ↑ branches
- Augeo 1600 ppm resulted in stunting



Finished plants at 8 WAT

- Augeo ↑ branches
- stunting Augeo 800, 1600 ppm




 **Sedum 'Autumn Joy'**

Finished liners at 3 WAT

- Augeo

↑ branches 100% - 200%;
1600 ppm ↓ height, shoot wt




Untreated 400 800 1600 ppm

Finished plants treated twice


- Augeo

↑ branches 200%
↓ height, wt 800, 1600 ppm; phyto – yellowing






2b

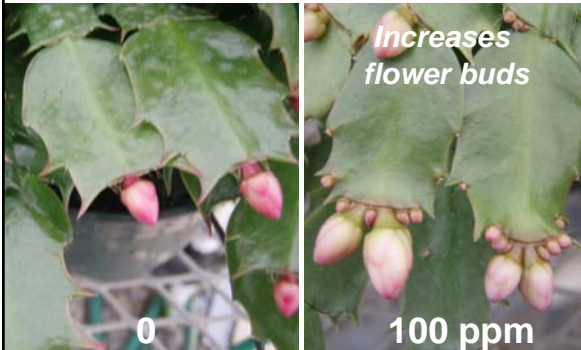
CONFIGURE

 **Configure (Fine Americas, Inc.)**

- Active ingredient is BA (10% benzyladenine)
- Labeled uses
 - Branching agent
 - Influence flowering
 - Height control
- Registered for:
 - *Hosta*, *Echinacea* and Holiday cactus.
- Stimulates - but does not cause – branching or flowering
 - Windows of opportunity
- Short period of activity (~1 week)
 - Multiple applications may be beneficial
- Complete spray coverage required
 - Not actively transported throughout the plant






 **Christmas Cactus**




Increases flower buds

0 100 ppm


 B Whipker

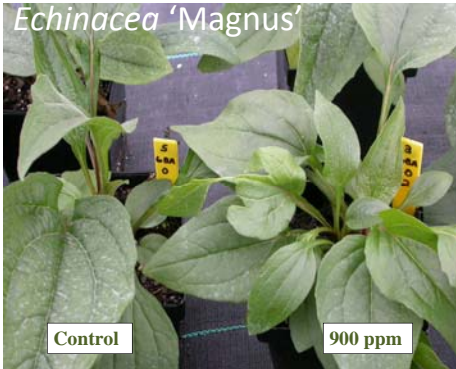
 **Hosta Production**

- BA at 1000 to 3000 ppm or multiple applications of 500 ppm, foliar spray
- Increased lateral bud break on the rhizome
- Increased divisions
- Increased sales





P. Pilon

 **Echinacea 'Magnus'**





Control 900 ppm

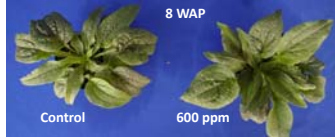



 **Branching of *Echinacea* (At 4 WAT)**


Cultivar	Control	Configure 600 ppm
Magnus	3.8	6.6
White Swan	2.4	11.4
Doubledecker	1.2	4.6
Ruby Star	4.4	11.2
Tiki Torch	1.7	4.1
Merlot	1.3	2.9
Fragrant Angel	2.6	4.4




 **Branching of *Echinacea* (At 4 WAT)**





- *Echinacea purpurea* 'White Swan'
- Improved pot fill with earlier applications


 **Configure: Key Points for *Echinacea***

- Spring applications:
 - In plug flat or within 3 weeks after planting plugs
 - Actively growing with good root growth
 - Single application of 600 ppm or **multiple applications of 300 to 600 ppm at 2-wk interval**
- Summer/Fall applications:
 - As above with multiple (2-3 at 2-wk intervals) applications of 300 to 600 ppm
 - Repeat Configure application(s) in Spring


 **Herbaceous Perennials**





- Substitute for pinching/ shearing
- Looking for better and faster pot fill along with better plant architecture

 **Configure on Perennials (600 ppm; $p \leq 0.05$)**

Crop	Untreated	BA	WAT
Gaura 'Siskiyou Pink'	29.8	39.4	4
Euphorbia 'Chameleon'	13.5	20.0	6
Gaillardia 'Dazzler'	23	153	4
Heuchera x 'Raspberry Ice'	11.8	18.1	4
Lobelia cardinalis	7.3	12.9	4
Penstemon 'Husker Red'	6.2	7.7	4
Lychnis 'Vesuvius'	3.1	5.3	4
Veronica 'Icicle'	2.5	3.6	2
Coreopsis 'Zagreb'	43.2	98.8	2
Leucanthemum x 'Alaska'	9.5	14.9	2

 **Configure on Perennial Liners**



Configure on Perennial Liners

- Generally improves branching during liner production
- Apply after rooting, just after off mist
- Phytotoxic effects on some crops (aster, cosmos)
- Has short-term activity in some crops; multiple applications effective (liner stage and again shortly after transplanting to finished containers)
- Minimum 2 week interval between applications
- For photos of additional crops, visit our website:
 - <http://www.hort.vt.edu/floriculture/presentations.html>

2c

ETHEPHON



Ethephon

- **Floral Brand Pistill** (Monterey Chemical)
 - 3.9% active ingredient
- **Collate** (Fine Americas, Inc.)
 - 21.7% active ingredient
- Can have a range of effects on crops, including abortion of flowers & buds, increase branching, and inhibit stem extension
- Applications
 - Sprays: 250 to 500 ppm (on label)
 - Drench: 250 to 500 ppm
 - Liner Soaks: 125 to 500 ppm
- Responses can be variable and less predictable
- Generally inexpensive



Ethephon – Keys to Use

- A cost effective method of controlling growth and increasing branching
- Must pay attention to application details
 - Acidify the solution to final solution pH of 4 to 5
 - Allow the solution to dry slowly over 4 hours to enhance uptake
 - Avoid applications to stressed plants - ethephon can enhance stress
- Must manage timing to avoid flower delay – 6 wk before sale
- Drench applications increase the options for using ethephon
- Species and cultivars vary in response – conduct your own rate trials!



Shoot Number



Increase in shoot number observed with 500 ppm Ethephon



Collate on *Veronica* 'First Love'




- No effect on liners at 2 WAT but at 8 WAT Collate increased number of leaders and branches
- Pinching decreased leaders but same number of branches


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 Collate Drench - *Veronica*

Veronica 'Goodness Grows' at 8 WAT



0 50 100 150 200 250 500

----- Drench (ppm, 10 fl. oz./pot) ----- Spray (ppm)

- Treatment applied one week after transplanting
- All ethephon drenches increased shoot production with a maximum effect at ~100 ppm
- Spray application did not significantly increase branching

3 **GA/BA**
GROWTH PROMOTERS


 GA/BA Growth Promoters

- **Fascination** (Valent)
- **Fresco** (Fine Americas)




Active Ingredients:

- Gibberellins (GA_{4+7}) + Benzyladenine
- Prevention of leaf yellowing and to delay flower senescence of lilies
- Increase leaf and bract size on poinsettia
- Increase stem length
 - Plants are too short (cut flowers)
 - To counter a PGR overdose


 Effects of Fascination on Poinsettia Bract Size (E. Runkle, MSU)


Control without Bonzi Control with Bonzi 3 ppm Fascination applied 30 days after a Bonzi drench




Average Bract Area (in²):


214	146	193
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 Suggested Uses of Fascination or Fresco on Poinsettia (E. Runkle)

- A single spray application of Fascination at 3 to 5 ppm can increase plant height by 1" to 2" and promote bract expansion
- To increase plant height, apply before or soon after first bract color
- To increase bract size, apply 20 to 30 days after first bract color
- <http://www.flor.hrt.msu.edu/assets/Uploads/Fascinationonpoinsettia.pdf>



 *Phlox paniculata* 'Franz Schubert'



Control 300 ppm 600 ppm 900 ppm 1200 ppm

- Fresco, 6 WAT
- Excessive height with higher rates, early increase in branching that did not persist



Overdose in the Plug Flat



Reversal of Retardant Effects



- Start with low rates of Fresco or Fascination, 1 to 3 ppm
- Thorough coverage required
- Soil active, take care with volume
- Repeat in 5 days, if necessary

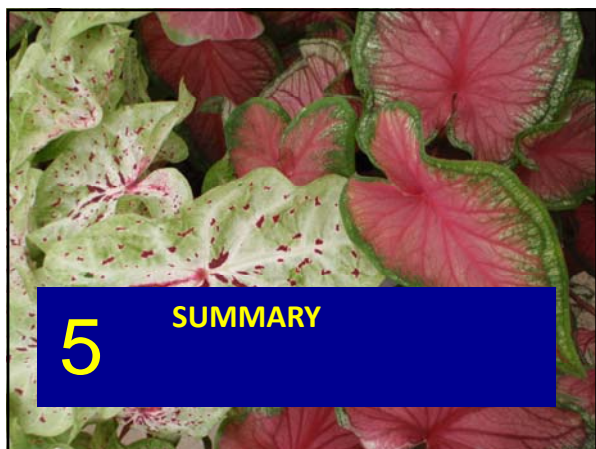


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GA₃ – FLOWERING

PGRs for Flowering

- Active ingredient - GA₃
 - **Florgib** (Fine Americas)
 - **ProGibb** (Valent)
- Breaking dormancy
- Timing and rate critical
- Earlier, more uniform flowering
- Azalea, cut flowers
- Potent growth promoter – follow label carefully



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SUMMARY



Expanding PGR Toolbox

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	BA+GA	Fascination, Fresco
	Dikegulac sodium	Augeo
	Ethephon	Collate, Florel

Questions

Thanks for Coming!

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Coming Up Next:
12:30 to 12:55 Eastern
Lunch Break

Time	Topic
12:55 to 1:00	Welcome Back/Questions
1:00 to 1:25	Application Methods: Sprays and Liner Soaks
1:30 to 1:55	Application Methods: Drenches and Bulb Soaks
2:00 to 2:30	Other Considerations When Using PGRs
2:30 to 2:45	Questions and Wrap Up