PGR University

Sponsored by:

e-GRO Electronic Grower Resources Online

fine

2:00 to 2:30 Eastern

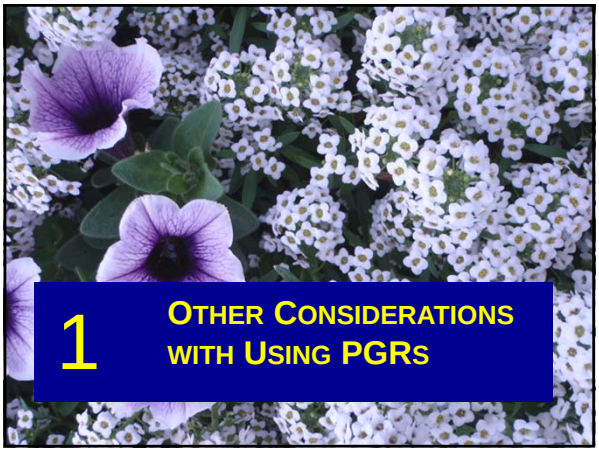
OTHER CONSIDERATIONS WHEN USING PGRs

Joyce Latimer
Floriculture Extension and Research
jlatime@vt.edu

Virginia Tech Floriculture

THE ADVANCED COURSE:

OTHER CONSIDERATIONS WITH USING PGRs



1 OTHER CONSIDERATIONS WITH USING PGRs

1a ACIDIFICATION

Not a Chemistry Lesson!

- Chemical form of many of our PGRs depends on the pH of the solution
- PGR activity depends on chemical form
- Common concern with other pesticides

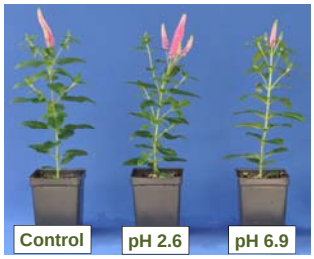
PGR*	Optimum spray water pH	Comments
Ancymidol	5.5 – 6.5	Not critical, avoid high pH
Benzyladenine	5.0 – 6.5	pH must stay below 8.0
Chlormequat Cl	3.0 – 7.0	
Daminozide	5.0 – 9.0	Product is acidic – pH 3.0
Dikegulac sodium	6.0 – 9.0	pH must stay above 5.5
Ethephon	5.0	Keep pH below 5.0
Flurprimidol	pH not a factor	
GA3	5.5 – 6.5	pH should stay btwn 5 and 7
GA/BA	5.5 – 6.5	pH should stay btwn 5 and 7
Paclobutrazol	4.0 – 9.0	No degradation at these pHs
Uniconazole	5.5 – 6.5	pH should stay btwn 5 and 7

*Adapted from Yates & Brubaker, 2007, Griffin GH & Nursery Supplies

Ethephon (Collate, Florel)

- Under high pH conditions, chemical form changes, releasing ethylene before the ethephon is absorbed by the plant
- Products have acidifiers; spray solution must have pH less than 5.0; prefer pH 3.5 to 4.5
- Final pH is affected by the **alkalinity** of your water
- Under high alkalinity conditions, add a buffering solution to reduce water pH to 5.0 before adding ethephon to the spray tank

Collate Efficacy



- Veronica 'First Love'
- 500 ppm Collate, photo 2 WAT
- No effect with high pH

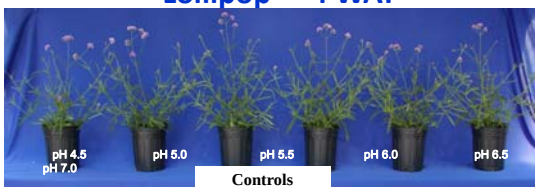
Plant damage with low pH

- Veronica 'First Love' 500 ppm Collate, pH 2.6
- Low alkalinity water can result in pH too low

Treatments and Rates

- Controls: Acidified water drench to media adjusted to pH of 4.5, 5.0, 5.5, 6.0, 6.5 and 7.0
- Treated: 100ppm Collate drench applied to media adjusted to pH of 4.5, 5.0, 5.5, 6.0, 6.5 and 7.0
- Treatments applied ~one week after transplant

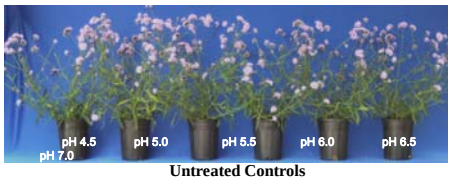
Results: *Verbena bonariensis* 'Lollipop' – 4 WAT



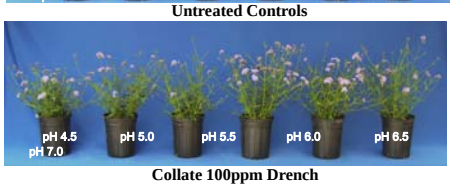
Controls

Collate 100ppm Drench

Results: *Verbena bonariensis* 'Lollipop' – 6 WAT



Untreated Controls



Collate 100ppm Drench

1b USE OF VOLUME

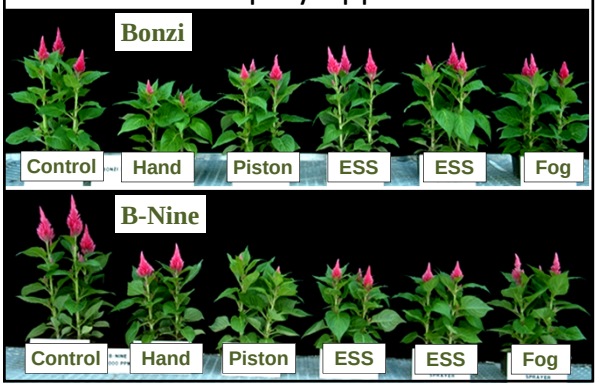
Application Uniformity = Uniform Crop!

- Apply evenly to the area not to plants
- Use a constant volume – monitor equipment

Spray Application Techniques

- Spray droplet size/volume affects results

Volume: Spray Applications



Notes on PGR Volume – Soil ACTIVE PGRs

- Volume depends on application method
- It is critical to control volume
  - Uniformity of application and response
- Volume is a application tool
  - Increasing volume increases the dosage
  - Increasing volume increases root zone availability

1c DRYING CONDITIONS

Environmental Factors that Improve Absorption

- Low drying conditions after application
- Cloudy days, early morning or late afternoon for foliar applications
- Moderate temperatures
- High relative humidity
- Limited air movement

Relative Absorption Time of Foliar Applications

PGR	Trade Names	Chemical Absorption (hours)
Ancymidol	Abide / A-Rest	**0.5 to 1**
Chlormequat	Citadel / Cycocel	**4**
Daminozide	B-Nine / Dazide	**18 to 24**
Ethephon	Collate / Florel	**12 to 16**
Flurprimidol	Topflor	**0.5 to 1**
Paclobutrazol	Bonzi / Paczol / Piccolo	**0.5 to 1**
Uniconazole	Concise / Sumagic	**0.5 to 1**

BWhipker

Configure Phytotoxicity

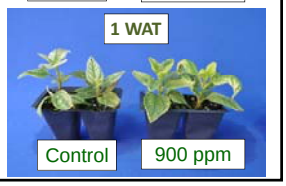
Heliopsis helianthoides

April 2013 Application conditions:

Relative humidity 38 to 32%
Temperature: 80 to 85F

July 2013 Application conditions:

Relative humidity 92%
Temperature: 72F

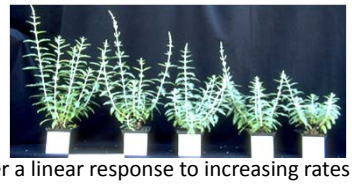


Notice Application/Drying Conditions

- Longer drying times increases absorption.
- May be good or may be bad
- Pay attention and record environmental conditions at time of application and during the drying of the spray

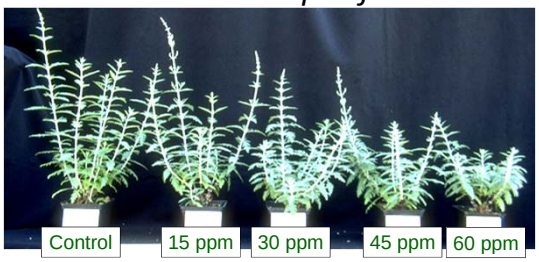
1d SATURATION OF RESPONSES

Plant Responses to PGRs



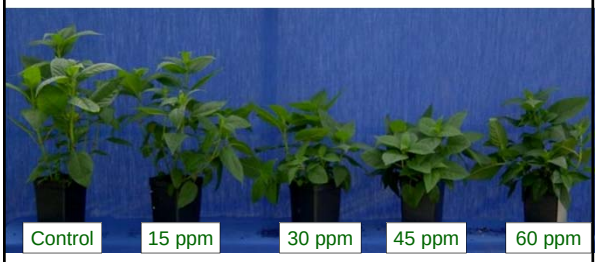
- Prefer a linear response to increasing rates
- More common to get a saturation response

Perovskia atriplicifolia



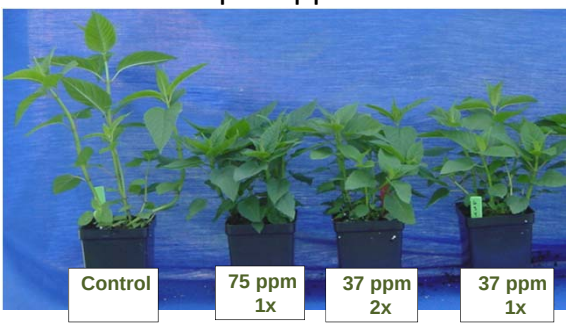
- Sumagic foliar spray, 4 WAT
- Linear growth response to increasing rate

Monarda 'Jacob Cline'



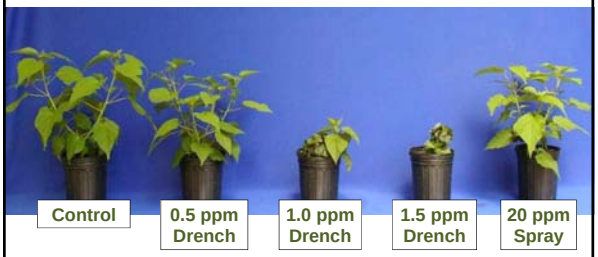
- Topflor foliar spray, 4 WAT
- Saturated response

Multiple Applications



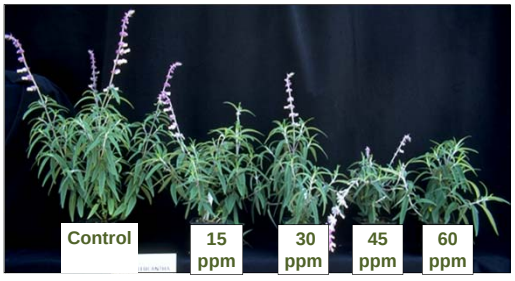
- Topflor on *Monarda didyma* 'Jacob Cline'

Hibiscus moscheutos 'Grenache'



- 6 WAT, Sumagic saturated response between 0.5 and 1.0 ppm drench (10 fl.oz.per pot)

Salvia leucantha

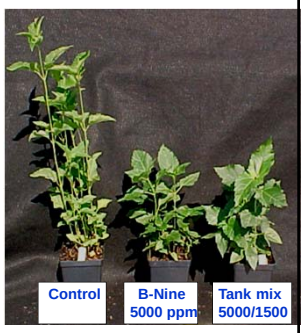


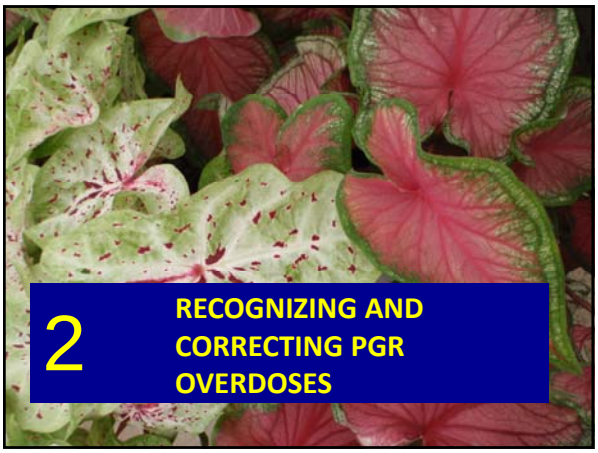
- Sumagic, 5 WAT
- Saturated height response

Landscape Persistence with 60 ppm Sumagic

Heliopsis 'Sun Ray'

- Nursery grown, 4 WAT
- B-Nine, 2x, excessive control
- B-Nine/Cycocel Tank Mix, 1x, excessive control





Overdoses

- PGRs are excellent tools for managing plant growth.
- Sometimes the rate of PGR applied exceeds the optimum and growth is excessively stunted.
- It is important to be able to recognize overdose symptoms and distinguish them from other problems.
- If an overdose occurs, what can be done to correct it?

Getting the Rate Right

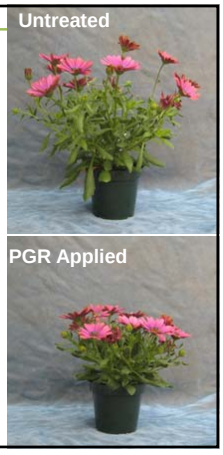
- Rate recommendations are available for most crops.
- An online tool for calculating mixing rates is also available to avoid errors.

PGRCALC

http://extension.unh.edu/Agric/AGGHFL/AGGHFL.htm

Optimal Rates

- Control plant stretch
- Plants proportional to pot size
- Allow for tighter plant spacing
- Plants darker green and use less water



Excessive Rates

- If the rate is too high, growth control can be excessive.
- Problems include:
  - Stunted plants
  - Lack of leaf expansion
  - Flower delay and/or smaller size?
  - Poor establishment in the landscape

Control a little high

Untreated PGR Applied

Control a little high

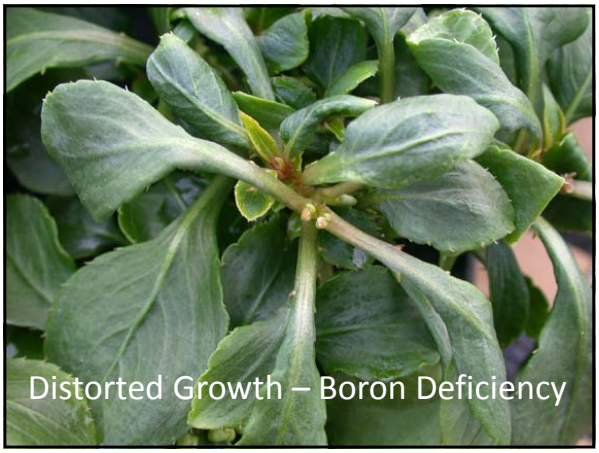
Control a little high

Untreated PGR Applied

Flower size not always affected

Consistent Effect

Uneven PGR Drench Application



Distorted Growth – Boron Deficiency

Distorted Growth – Broad Mites

Options

- Increase the fertilization rate
  - –Especially ammoniacal-nitrogen and phosphorus
- Increase the growing temperatures
- Apply a growth stimulating PGR

BA + GA

- BA (6-Benzyladenine)
  - – Configure (Fine Americas)
- GA [Gibberellic acid (GA_3)]
  - – Florgib 4L (Fine Americas)
  - – ProGibb T&O (Valent)
- BA + GA_{4+7} combination
  - – Fascination (Valent)
  - – Fresco (Fine Americas)

Balloon Flower - Stalled Growth

Optimal GA rate can be difficult to determine

Plant Growth Promotion

- Consider using a combination GA and BA product such as Fascination or Fresco.
  - – *Conduct trials on a small number of plants initially using 1 ppm unless previous experience warrants higher use rates. Following assessment of plant response, and if desired results are not evident, reapplication or an increase in rate may be warranted.*

Overcoming PGR Overdoses

- Double check your math and application volume to help get the correct dose.
- Be able to recognize and differentiate distorted plant growth symptoms among the possible causes.
- If a corrective action is required, use the tools of fertilization, temperature and growth promoting PGRs to help overcome stalled growth.