Plant Growth Regulators – Application Methods

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Timing of Application
- Goals:
  - Growth control (short stocky plant)
  - Affect plant development
  - No delay in flowering
- Match goal to stage of development
  - Prior to stretch
  - Sufficient plant for branching
  - Before flowering

Selecting the Dosage
- Rate selected depends on:
  - Method of application (volume)
  - Type of growing medium
  - Stage of root development
  - Stage of shoot development
  - Irrigation method and practices
  - Cultural practices

Cultural Practices
- Spacing
  - Light is best PGR
- Shearing/pinching
- Growing temperatures
  - Less if cooler
- Light levels
  - Less if higher

When to make an application?
Plugs are more responsive than older plants in finish and the rates are much lower for plugs.

Selecting the Dosage
- PGRs w/ No or Limited Soil Activity
  - Dosage = rate (ppm of solution)
- Soil Active PGRs
  - Dosage = ppm & volume

Ancymidol 10ppm UTC Paclobutrazol 10ppm

Sprays to post budded or pre-blooming plants, in general, is a risk of bloom delay or flower size.

"If you see flower buds you should be concerned"
Dr. J. Barrett.
Application Techniques

- Sprays
- Sprenches
- Drenches
- Dips

Foliar Sprays and Sprenches

Sprays
- Most economical
- Apply evenly to area not to plants
  - Impacts DOSAGE
- Constant volume
  - Impacts DOSAGE
  - pressure gauge and pressure regulator
- Spray droplet size

Selecting the Dosage
- PGRs w/ No or Limited Soil Activity
  - Dosage = rate (ppm of solution)
- Soil Active PGRs
  - Dosage = ppm & volume

Soil Active = Volume is Critical!!
- Increased volume increases PGR effect

Spray Application Techniques
- Spray droplet size/volume affects results

50 ppm Bonzi

Control 1 gal/200 sf 2 gal/200 sf
Spray Applications – droplet size

Media Sprays
- Soil media is treated pre or post seeding to help reduce growth of emerging hypocotyl.
- Paczo (Triazoles) 5-15 PPM
- Snapdragons, Marigolds, Cosmos etc.
- Media should be moist, @ 50% field capacity.

Sprences
- Hybrid of spray and drench
- 2-4 times the recommended spray volume
- Uses rate between spray and drench (one-half to one-quarter the spray rate)
- Can be more effective than spray

Bonzi Sprences
- Perovska atriplicifolia
- Sprenc at 4x volume (4 gal/ 200 sq.ft.)
- 4 WAT

Bonzi Watering In Application
- Watering-in: low rates with frequent waterings
Summary PGR Volume

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

Monarda didyma 'Jacob Cline'

- Sumagic, multiple applications, 4 WAT

Echinacea 'Ruby Star'

- Topflor <45 ppm foliar spray
- Multiple appl of 20 to 25 ppm

Drenches

(Soil active PGRs)

- Provides more uniform growth control
- Can apply late season low doses with limited or no affect on flowering
- Amenable to chemigation (paclobutrazol, ancymidol)
- If by hand, more time/labor to treat plants; generally used on larger containers or baskets

Drench Dose

- **Dose based on:**
  - Measuring out a known amount of chemical
  - Adding it to a known volume of water
  - Applying a known volume to each pot

\[
\text{Concentration } \times \text{ Volume } = \text{DOSE}
\]
**Drench Volume Increases with Pot Size**

Bar graph showing fluid ounces per pot.

- B. Whipker

**Bonzi Spray vs. Drench on Delphinium elatum ‘Blue Bird’**

- Bonzi drench at 10 fl. oz. per pot, persistent response to drenches
- 4 WAT

**Veronica ‘Icicle’ – 4 WAT**

- Bonzi sprays, 4 WAT, little control

**Bonzi Spray vs. Drench Hemerocallis ‘Hyperion’**

- Bonzi drenches, 4 WAT, moderate control

**‘Hyperion’ Daylily – Drench vs. Spray**

- Bonzi sprays 45, 90, 180 ppm
- Control 2, 4, 8 ppm
- 9 WAT
Ultra Low Dose Applications

- Started 2005
  - Poinsettia trials with Barcel, Runkle, Hammer, Barrett
- As effective as traditional applications
- Works on a variety of crops.
- Very low doses, 0.1 PPM (1/10th PPM)
- Applied as needed as a drench

Cutting and Liner Dips

- Labeled use of B-Nine
- Dip unrooted cuttings (foliar application) prior to sticking
- Early control of vigorous cvs

Rooted Liner Dips/Soaks

- Early control of vigorous crops
- Flexibility of treatment (REI)
- Dip root ball in PGR solution
  - Soil active PGRs only
- Plugs ready for irrigation = “dry” plug
  - Wet plugs take up less PGR

Liner Soaks

- Soak the plugs in a PGR solution.
How to treat a Color Bowl?

Red Flash Paclo. Liner dip
8 ppm 16 ppm

Control 2 ppm 4 ppm 6 ppm 8 ppm 10 ppm
Paclobutrazol Uniconazole
LINER dips

Control 1 ppm 10 ppm
Uniconazole Paclobutrazol

Perovskia atriplicifolia

Paco Liner Dip
5 WAT

Perovskia atriplicifolia

Paco Liner Dip
8 WAT
Liner Dip – Soak Times

- **Rudbeckia triloba**
  - 0.5 ppm Sumagic at 4 WAT
  - No soaking time effect

Coreopsis ‘Sweet Dreams’

- Paczol liner dip
- “Dry” plugs, 2 min., 4 WAT

Phlox paniculata ‘David’

- Concise liner dips on hard to control crops
- “Dry” plugs, 2 min.; 6 WAT

Calamagrostis ‘Karl Foerster’

- Sumagic spray, 6 WAT, no significant effect

Calamagrostis ‘Karl Foerster’

- Concise liner dips on hard to control crops
- “Dry” plugs, 2 min., 6 WAT

Miscanthus sinensis ‘Gracillimus’

- Concise liner dips, 6 WAT
- “Dry” plugs, 2 min.
**Liner Dips/Soaks (UFL Study)**
- Plugs ready for irrigation = “dry” plug
- Time not critical – 30 sec to 2 min
- Plant immediately or wait up to 10 days
- Older cuttings less responsive than younger cuttings
- No loss of effectiveness of dip solution

**Concise on Rudbeckia ‘Goldsturm’**

**Spray 4 WAT**
- Control
- 15 ppm
- 30 ppm
- 45 ppm
- 60 ppm

**Drench 4 WAT**
- Control
- 0.5 ppm
- 1 ppm
- 1.5 ppm
- 2 ppm

**Liner Dip 6 WAT**
- Control
- 1 ppm
- 2 ppm
- 3 ppm
- 4 ppm
- 5 ppm

**Preplant Bulb Soaks**
- Cost effective alternative to treat bulbs.
- Topflor is **VERY** effective as a preplant bulb soak.
- Typically:
  - Mix the solution in buckets
  - Soak bulbs 2 to 5 minutes
  - Let drain
  - Plant

**Successful PGR Use**
- **Learn** about PGRs
- **Plan** to use PGRs
  - Do your own research and testing
- PGRs are **tools** just like fertilizer and water
  - Know your plant materials
  - Adjust rates and timing to environmental conditions and cultural practices

**Successful PGR Use**
- **Practice** using PGRs
  - Use proper rate and volume
- **Read the label**
- Pay close attention to equipment to apply proper volume
- **Keep records** to refine your skill/art
Calibration

Plot size 10’ X 10’ = 100 ft²
How many qts per 100 ft²?

Effect of Spray Volume on Activity

<table>
<thead>
<tr>
<th>Spray Volume (qts./100 ft²)</th>
<th>Paczal 50 PPM</th>
<th>B-Nine 5000 PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 qt</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>2 qt</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>3 qt</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>4 qt</td>
<td>25</td>
<td>10</td>
</tr>
</tbody>
</table>

PGR Time Line

Garden performance?

For more information

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