Drenches and Bulb Soaks
Brian Whipker, NCSU

APPLICATION METHODS:
DRENCHES AND BULB SOAKS

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1:30 to 1:55 Eastern

1. Substrate Drenches

Drenches

- Application of a PGR solution to the substrate
- PGR binds to substrate and is released over time
- Suitable for PGRs absorbed by roots

PGR Drenches

<table>
<thead>
<tr>
<th>Type</th>
<th>Chemical</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-GA</td>
<td>Ancymidol</td>
<td>Abide, A-Rest</td>
</tr>
<tr>
<td></td>
<td>Chlormequat chloride</td>
<td>Citadel, Cycocel</td>
</tr>
<tr>
<td></td>
<td>Daminozide</td>
<td>B-Nine, Duzide</td>
</tr>
<tr>
<td></td>
<td>Flurprimidol</td>
<td>Topflor</td>
</tr>
<tr>
<td></td>
<td>Paclobutrazol</td>
<td>Bonzi, Paczo, Piccolo, Piccolo 10X, Downsize (drenches only)</td>
</tr>
<tr>
<td></td>
<td>Uniconazole</td>
<td>Concise, Sumagic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Structural BA</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BA</td>
<td>Configure</td>
</tr>
<tr>
<td></td>
<td>BA+GA</td>
<td>Fascination, Fresco</td>
</tr>
<tr>
<td></td>
<td>Orlagulic sodium</td>
<td>Augen</td>
</tr>
<tr>
<td></td>
<td>Ethephon</td>
<td>Collate, Florel</td>
</tr>
</tbody>
</table>

Advantages

- Increased uniformity
- Long-lasting control
- Low dose, late season drenches offer control without affecting flowering.

Disadvantages

- Increased labor
- Reduced efficacy with substrate containing bark
- Can be preventative
BMP Drenches

- Identify the proper volume needed for pots
- Apply when substrate is not completely saturated
- Increase concentration by ~25% if bark is in the substrate
- Sub-irrigation use ~50% of a rate.

### Drench Volume

<table>
<thead>
<tr>
<th>Pot Diameter (inches)</th>
<th>Drench Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fl. oz./pot</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>12</td>
<td>40</td>
</tr>
</tbody>
</table>

Adapted from J.G. Latimer (2009, Selecting and Using Plant Growth Regulators on Floricultural Crops).

### 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 an application tool
  - Increasing volume increases the dosage
  - Increasing volume increases root zone availability

### Pot Sunflower: Pacino (Topflor)

<table>
<thead>
<tr>
<th></th>
<th>0.5</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foliar Spray</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drench</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

### Monarda ‘Jacob Cline’ – 3 WAT

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Spray</th>
<th>Drench 8 ppm</th>
<th>Drench 16 ppm</th>
<th>Drench 32 ppm</th>
<th>Drench 64 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piccolo 10 XC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Monarda ‘Jacob Cline’ – 6 WAT

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Spray</th>
<th>Drench 8 ppm</th>
<th>Drench 16 ppm</th>
<th>Drench 32 ppm</th>
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<tr>
<td>Piccolo 10 XC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PGR University**

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**Topflor Drenches (mg ai)**

<table>
<thead>
<tr>
<th>Concentration (mg ai per pot)</th>
<th>Summertime Sunset</th>
<th>Sun Charme</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mg ai</td>
<td>$2.79</td>
<td>$2.79</td>
</tr>
<tr>
<td>0.25 mg ai</td>
<td>$6.69</td>
<td>$6.69</td>
</tr>
<tr>
<td>0.5 mg ai</td>
<td>$14.76</td>
<td>$14.76</td>
</tr>
</tbody>
</table>

**Concise Drenches**

- mg active ingredient per pot

0, 0.24, 0.32, 0.40

**Caladium: Topflor Drenches (mg a.i.)**

<table>
<thead>
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<th>Concentration (mg a.i.)</th>
<th>Summertime Sunset</th>
<th>Sun Charme</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$2.79</td>
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</tr>
<tr>
<td>1</td>
<td>$6.69</td>
<td>$6.69</td>
</tr>
<tr>
<td>2</td>
<td>$14.76</td>
<td>$14.76</td>
</tr>
</tbody>
</table>

**Dahlia (tuberous): Drench of 1 to 2 mg a.i. Topflor**

Control 1 2 3

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NC State University
### Ethenphon Substrate Drenches

- Ethenphon: Collate (Fine Americas) and Florel (Southern Ag)
- Optimal rates appear to be between 125 to 500 ppm.
- Apply with similar volume of water as you would any other drench.
- DO NOT APPLY to plants under stress.
- Currently not labeled, a label for Collate is being submitted.

### Substrate Drenches (ppm)

**Cultivar: Pretty Much Picasso**

- Florel drenches at 500 ppm caused leaf yellowing.
- Florel drenches controlled growth at 500 ppm.

### Plants at bloom

**Collate Substrate Drenches**

- ‘Vista Bubblegum’

- Plants at bloom

**Collate Substrate Drenches**

- ‘Americana Dark Red’
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**Collate Substrate Drenches**

- Test to determine optimal rates
  - Species / Cultivar
  - Start with 125 to 500 ppm
  - Apply with similar volume of water as you would any other drench (ie 4 oz per 6 inch pot)
  - DO NOT APPLY to plants under stress
- Collate label change to include drenches is being submitted.

**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

\[
\text{Concentration} \times \text{Volume} = \text{DOSE}
\]

- mg active ingredient / pot (mg ai/pot)
- ppm

**Drenches**

- mg active ingredient per pot
  - Takes into account volume difference.
  - Example: the dose stays the same across pot sizes as the amount of water increases
- ppm
  - Does NOT take into account volume differences
  - Example: the dose increases with the pot size
**Drenches**

- ppm is mg per liter (mg/L)
  - If you mix a solution at 50 ppm, then a liter (1000 ml) contains 50 mg of chemical.
  - Thus if you add:
    - 10 ml per pot, the plant receives 0.5 mg
      \[ \frac{10 \text{ ml}}{1000 \text{ ml}} \times 50 \text{ mg} = 0.5 \text{ mg} \]
    - 100 ml per pot, the plant receives 5 mg
      \[ \frac{100 \text{ ml}}{1000 \text{ ml}} \times 50 \text{ mg} = 5 \text{ mg} \]
    - 1000 ml per pot, the plant receives 50 mg
      \[ \frac{1000 \text{ ml}}{1000 \text{ ml}} \times 50 \text{ mg} = 50 \text{ mg} \]
  
  - So the volume matters with ppm drench recommendations!!

**Summary: Drenches**

- Recommendations based on:
  - ppm
    - Must know the number of fluid ounces per pot to be applied.
    - mg active ingredient per pot
  - Either way you will then accurately know the per pot dose.

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**Bulb Soaks**

- Cost effective alternative to treat bulbs.
  - Typically:
    - Mix the solution in buckets
    - Use room temperature water (not cold)
    - Soak bulbs 2 to 5 to 10 minutes
    - Let drain
    - Can pre-treat before planting (for REI)

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<td>Ciprol, Optrel</td>
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<tr>
<td></td>
<td>Dazimide</td>
<td>B Nine, Oazide</td>
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<td>BA</td>
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<td>GA</td>
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<td>BA+GA</td>
<td>Fascination, Fresco, TopGibb</td>
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<td>Dipyridyl</td>
<td>Regolo, Resgro</td>
</tr>
<tr>
<td></td>
<td>Diflubenzuron</td>
<td>Regolo, Resgro</td>
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**Flurprimidol Pre-plant Soaks**

Lilium lancifolium "Orange Tiger"

5 minute soak (mg/L)
**PGR University**

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**Topflor Pre-plant Bulb Soak**

![Topflor Pre-plant Bulb Soak](image)

Soak treatments effective.

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**Tete a Tete**

![Tete a Tete](image)

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**Easter Lilies**

![Easter Lilies](image)
Key Points: Preplant Soaks

- Most active options:
  - Topflor / Uniconazole / Paclobutrazol
- Topflor is **VERY** effective as a preplant bulb soak.
  - Activity is similar to, or greater than, Uniconazole.
  - Economically effective on a wider range of crops than Paclo.