Nutrition
- Requires overall high rates.
- Nitrogen (CLF)
  - 225 to 300 ppm N overhead irrigation.
  - 100 to 225 ppm N subirrigation.
  - 25% less for dark-leaved cultivars.
  - Keep ammonium below 30% of N and eliminate the last 3-4 weeks.

Nutrition
- Phosphorus – 40 ppm
- Potassium – equal to or 25-50% less than nitrogen

Nutrition
- Calcium – low levels cause several problems.
  - Leaf edge burn
  - Bract edge burn
  - Keep media pH 5.5 or higher and spray 200 to 400 ppm calcium chloride starting with first bract color.

Nutrition
- Magnesium - High requirement of 40 to 50 ppm CLF or monthly drenches of 8-16 oz./100 gal. of magnesium sulfate.
- Boron – Sensitive to toxic and deficiencies.
- Molybdenum – high requirement of 0.1 ppm CLF or one drench of sodium molybdate.

Nutrition – B and Mg Deficiency

Nutrition – Fe Deficiency
Soluble Salts
- Pourthru
  - 1.9-2.6 dS/m during establishment
  - 2.8-4.1 during growing phase
  - 1.9-2.7 during finishing
- 1:2 dilution – 0.75 to 1.5 dS/m.
- Lower EC with dark-leaved cultivars.

Low EC Problems

High pH problems

Media
- Well-drained, yet retain water.
- pH 5.8 to 6.3.

Height Control
- Cultivar
- Culture
  - ↑ or ↓ days from pinch to start of short days.
  - Nutrition
  - ‘Dry’ or ‘wet’ growers
- DIF/DROP
- Chemicals – apply starting approx. 2 weeks after pinch, stop by early Oct. in NC, one last opportunity in early Nov.

Chemical Height Control
- Cycocel – 1000 to 1500 ppm, occ. phytotoxic
- B-Nine – rarely used alone – not effective, used as tank mix with Cycocel, 750-2500 ppm B-Nine/1000-1500 Cycocel
- Bonzi – 5-20 ppm spray, 0.5 to 3 ppm drench, only PGR acceptable for late-season control in early Nov.
- Sumagic – 2-5 ppm spray
Spacing
- Maximum space possible.
- Delayed spacing will increase height.
- 12 x 12 inches now common for 6 or 6 ½ inch pots

Pinching
- Pinched vs unpinched plants
- Plants pinched when roots are visible at the edge of the media, typically 10 to 14 days after potting.
- Premature or delayed pinching – poor branching
- Number of shoots = nodes – 1

Pinching
- Soft pinch – apex removed above immature leaf.
- Hard pinch – apex removed above most recently mature leaf.
- Soft pinch with leaf removal – remove leaf blades of immature leaves.

Support
- Rings commonly used for higher quality crops.
- Support rarely used for mass market crops.

Marketing Periods
- Pre-Thanksgiving – most rapidly ↑
- Thanksgiving to Dec. 10 – primary
- Dec. 10 to Dec. 25
Schedule

<table>
<thead>
<tr>
<th>Cultural Step</th>
<th>Weeks</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prop. cuttings</td>
<td>3.5-5</td>
<td>mid July</td>
</tr>
<tr>
<td>Pot cuttings</td>
<td>1.5-2</td>
<td>late Aug.</td>
</tr>
<tr>
<td>Pinch plants</td>
<td>1.5-2</td>
<td>Early/mid Sept.</td>
</tr>
<tr>
<td>Start SD</td>
<td>8-12</td>
<td></td>
</tr>
<tr>
<td>Finish</td>
<td>13.5-21</td>
<td>mid Nov. – early Dec.</td>
</tr>
</tbody>
</table>

Schedule

- Select proper response group
- Use LD or SD to manipulate schedule

Insects

- Whiteflies
  - Often shipped in with cuttings
- Fungus gnats
- Others: Lewis mites, thrips, spider mites, mealybugs, caterpillars

Diseases

- Stem and root rot
- Botrytis blight
- Bacterial stem and leaf rot
- Powdery mildew
- Fungal blight and leaf spots
- Viruses

Diseases

- Bract necrosis
- Leaf edge burn
- Stem breakage
- Cycocel damage

Physiological Disorders
Physiological Disorders
- Leaf drop
- Splitting
- Leaf distortion
- Center bud drop

Postharvest
- Increase by reducing temperature to 55F last 1-3 weeks.
- Do not use ammonium or urea after mid-late Oct.
- Harvest when at least one cyathium shows pollen.
- Keep storage and shipping as short as possible and temps above 50F.
- Unpack, unsleeve, and water as soon as possible