

# **Technical Poinsettia Webinar Series - PART 3**

## **Bract Development and the Final Stages of Poinsettia Production:**

**This session includes late height control, final bract development, insect and disease control, and other topics related to finishing a strong poinsettia crop.**

# Topics

- Finishing Environment
  - Bract development and expansion
  - Humidity control and importance
  - Cold Finishing
- Moisture Management
- Fertility
  - Soil pH and EC management
  - Combating bract edge burn
- Disease Control
- Late IPM
- Late PGR control
- Planning for next year

## Finished Environmental Factors



- Temperature
- Light
- Humidity



# Temperatures



- Day temps: Ideally 70F(21C) to 78F(26C)
- Night temps: 66F(19C) to 70F(21C)
  - **Above 72F(22C) night temp will delay flowering!!**
- ADT crucial for bract development
  - ADT is the average of 24 hour temperature
  - Poinsettia timing based on ADT of 68F
  - Fastest flower development around 75F ADT
  - 68 -73 ADT is a good target
  - Bract temperature more important than air temperature



## Temperature Impact on Bract Development

- Night temperatures have a big impact on ADT
- Be sure your night temp set point is adequate for your timing
- Pictures are the same variety (Christmas Day) taken on week 46 at the same location
- Three different compartments with different night temp set points
- Market-ready poinsettias can be held at 55F
  - Watch humidity at this temp





# Light



## Light levels and daylength are decreasing rapidly, especially in the North

- Bract temperature is important for flower development and bract expansion
- Lower light = less ventilation = fewer air exchanges
- Unpaint your roof if needed
- Last few weeks of production can be the darkest weeks of the year

# Humidity



- Late Summer/Fall tends to be the lowest humidity you will get during production
  - High transpiration rates = great chance to put a lot of fertilizer and Ca into the plant
- Humidity tends to steadily increase as you get closer to finish date
  - You will need a plan for humidity control
  - Disease pressure and reduced transpiration are both factors to consider as humidity increases



# Humidity Control



- Maintain a dehumidification strategy when bracts are developing and weather is changing
- Dehumidification program should include
  - Heating compartment
  - Ventilating humid air from greenhouse
  - Don't hit your dew point temperature
    - Open/Close curtain at right time
  - End of day should be closely monitored
  - Have a plan when irrigating

## Environmental To Do's



- Hit your ADT targets
- Night temps are important
- Watch humidity closely and have a plan
- Air movement is important
  - HAF
  - Ventilation and air exchanges



## Define Cool Finish

- Reduced night temps during October and November
- Monitor ADT
- Higher Vent temps(in North) during daylight hours to maximize sunny days
- Reduce Heating Costs



## Key factors

- Scheduling
- Establish early growth
- Capitalize on Sunny Days in October
- Don't go too cold
- Night temps from 60F -62F
- Day Vent Temps at 78F (North)
- Avoid Dew Point (dehumidify)

# Strategies

- Early Start
- Use compatible red varieties
- Good environmental control needed
- Managing the DIF
- Walk before you run

# Variety Choices

- Best with Reds
- Limited Variety options
- Delay
- Bract reduction
- Botrytis sensitivity
- Nutrition uptake



**All 3 varieties are 8 weeks on paper**



# Challenges

- Height Management
- Dew Point (Botrytis)
- Low temp problems
  - Nutrition including high pH
  - Bract reduction
  - Pythium sensitivity
  - Delay
  - Droop



## Cold sensitive variety(delay, reduction)





# Whites are a challenge

Most White Poinsettia will have smaller and off color bracts when finished cool

Can impact color of bracts



# Moisture Management Do's and Don'ts

## Focus on.....

- Staying in the middle of the road
- Protecting your roots to improve shelf life
- Salt build up can be a problem so watch EC and don't be afraid to leach
- Humidity

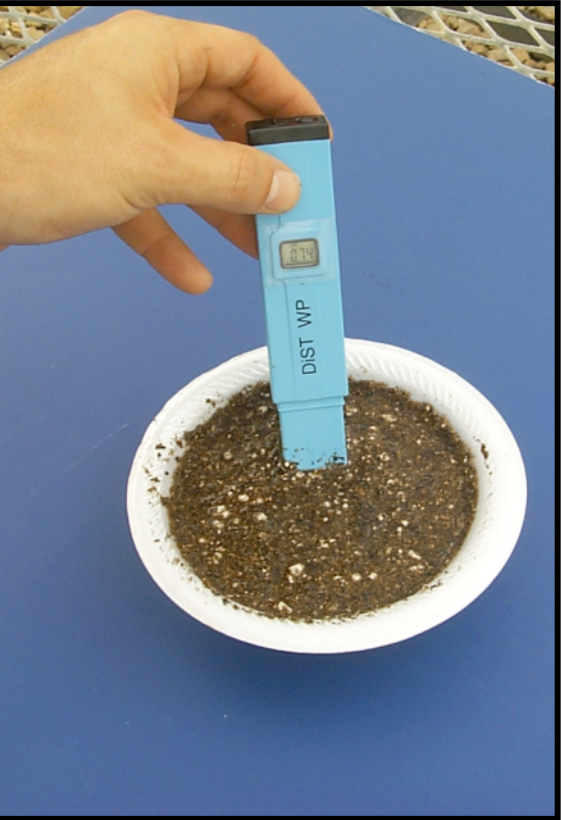
## Avoid....

- Growing "dry" to avoid root diseases
- Watering late in the day, even with drip or flood
- Guessing when and how much to water
- Any type of overhead irrigation





## Finished Media Testing



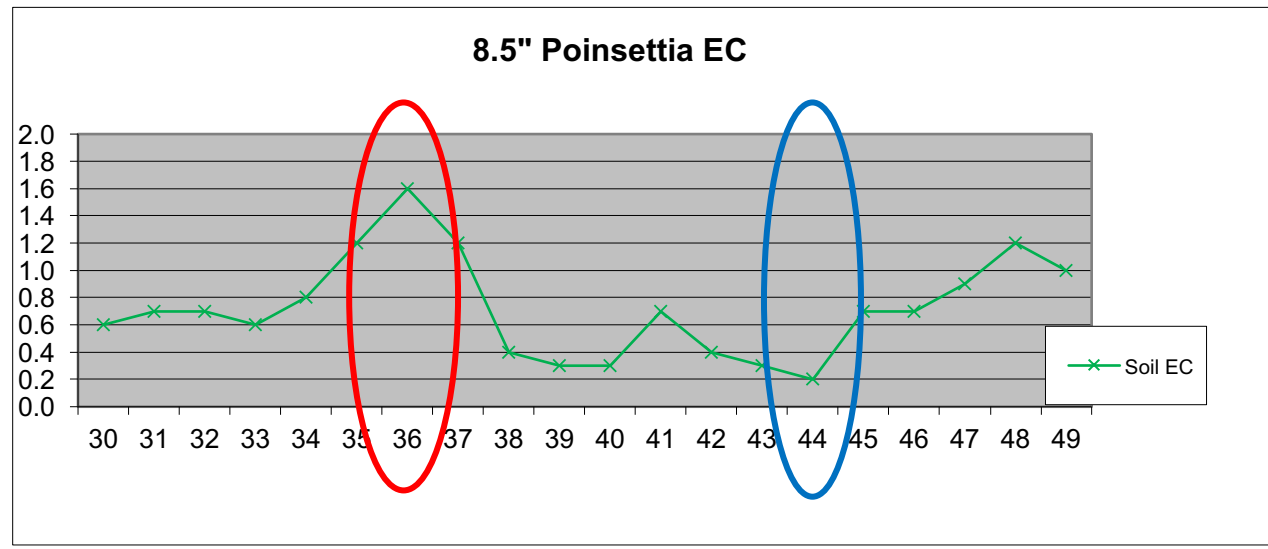
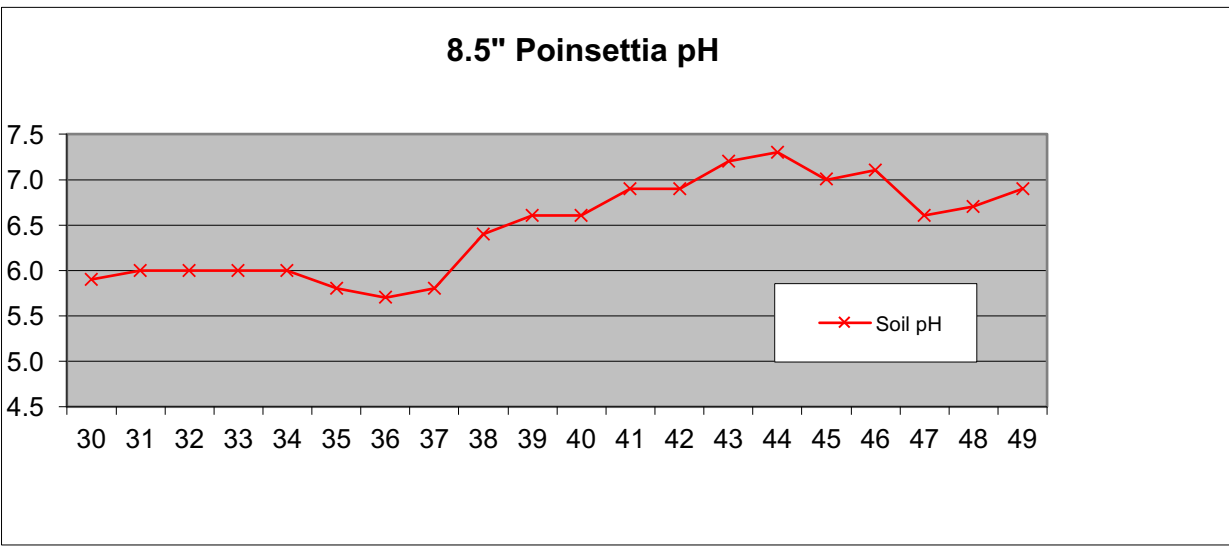
- Continue to monitor pH and EC until shipping
  - Media pH 5.9 – 6.6
  - Media pH will tend to rise late in crop cycle
- Plant will start to use less fertilizer as they mature
  - Start to pull back on ppm N in mid to late October
  - Switch to higher Ca fertilizer if needed to help with bract development and edge burn
- Do not completely stop fertilizing

# Finishing Media pH and EC Management

Media pH and EC have an inverse relationship

**As media EC rises, pH will fall**

Week	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
<b>pH</b>	5.9	6.0	6.0	6.0	6.0	5.8	5.7	5.8	6.4	6.6	6.6	6.9	6.9	7.2	7.3	7.0	7.1	6.6	6.7	6.9
Week	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
<b>EC</b>	0.6	0.7	0.7	0.6	0.8	1.2	1.6	1.2	0.4	0.3	0.3	0.7	0.4	0.3	0.2	0.7	0.7	0.9	1.2	1.0





# Combating Bract Edge Burn

## Lack of calcium is connected to bract edge burn on poinsettias

- Ca moves in water so high transpiration rates are important
- Make sure to supply Ca in fertilizer, not all “balanced” feeds have Ca
- Many growers utilized calcium chloride sprays starting in mid-to-late October
  - Apply 200-400ppm Ca weekly
  - Use laboratory grade  $\text{CaCl}_2$
  - Some growers are using calcium chelate sprays
  - Spray as a fine mist to wet the bracts but not to run-off
  - Apply in the morning to avoid high leaf temperatures and wet bracts going into the evening



# Finished Disease Control





# Rhizoctonia

- Attacks at or just above the soil line
- Often misdiagnosed as Pythium
- Rootshield WP/Rootshield Plus
- Actinovate
- Cleary's 3336
- Medallion
- Heritage/Empress





# Botrytis

- Can attack pre-space when canopy is closed
- Usually starts with leaves but in a closed microenvironment can attack stems
- Cease
- Phyton 27 (phyto, interactions)
- Pageant
- Palladium
- Medallion (Finish)
- Decree (Caution @ Finish)
- Cleary's 3336



# Pythium

- Often follows Fungus Gnat infestations
- Avoid cycling moisture from wet to dry
- Sloughing roots
- Rootshield/Rootshield Plus.
- Subdue Maxx (watch resistance)
- Segway
- Terrazole/Truban
- Heritage
- Aliette





# Powdery Mildew

- Can attack pre-space when canopy is closed
- See more every year
- Actinovate (spray)
- Cease
- Pageant
- Eagle
- Milstop
- Phyton 35





# Disease Control Chemicals Poinsettia

Product	Active Ingredient	Rate range/100gal	Diseases controlled	Chemical Class	Safe on Bracts	Notes
Daconil	Chlorothalonil	16 - 22oz	Botrytis	5	No	
Chipco 26019	Iprodione	16 - 32oz	Botrytis	2	No	Foliar Spray rate listed. Drench rate is different/read label
26GT	Iprodione	32 - 80oz	Botrytis	2	No	
Pagaent Intrinsic	Pryaclostrobin + Boscalid	12 - 18oz	Botrytis	7 + 11	Yes	Do not combine with organosilicone-based adjuvants (Capsil)
Medallion	Fludioxonil	2 - 4oz	Botrytis	12	Yes	
Milstop	Potassium Biocarbonate	20 - 80oz	Botrytis	NC	Yes	Use lower rates on bracts
Decree	Fenhexamid	12 - 24oz	Botrytis	17	Yes	Will leave some residue on bracts; some sensitivity possible
Veranda O	Polyoxin D	4 - 8oz	Botrytis	19	Unknown	
Pagaent Intrinsic	Pryaclostrobin + Boscalid	12 - 18oz	Rhizoctonia	7 + 11	Yes	Do not combine with organosilicone-based adjuvants (Capsil)
Medallion	Fludioxonil	1oz	Rhizoctonia	12	Yes	Sprench/drench rate is 1oz/100 gallon water
Clearys 3336/OHP 6672	Thiophanate Methyl	16 - 20oz	Rhizoctonia	1	No	
Daconil	Chlorothalonil	16 - 22oz	Rhizoctonia	5	No	
Pagaent Intrinsic	Pryaclostrobin + Boscalid	6 - 12oz	Powdery Mildew	7 + 11	Yes	Do not combine with organosilicone-based adjuvants (Capsil)
Milstop	Potassium Biocarbonate	20 - 80oz	Powdery Mildew	NC	Yes	Use lower rates on bracts
Phyton 35	Copper Sulfate Pentahydrate	15 - 35oz	Powdery Mildew	M1	Yes	Adjust pH to 5.5-6.5
Daconil	Chlorothalonil	16 - 22oz	Powdery Mildew	5	No	
Zyban	Thiophanate Methyl, dithiocarbamate, zinc, manganese	24oz	Scab	1 + M3	No	
Spectro 90 WDG	Chlorothalonil/Thiophanate Methyl	16 - 32oz	Scab	1 + M5	No	
Heritage	Azoxystrobin	1 - 4oz	Scab	11	Yes	
Terrazole L	Etriazole	2.5 - 7oz	Pythium	14	No	Remember to apply appropriate amount of solution based on soil volume of container. The rates listed are oz/gallon of stock solution at a 1:100 ratio.
Fenstop	Fenamidone	7 - 14oz	Pythium	11	No	
Subdue	Mefenoxam	0.5 - 1oz	Pythium	4	No	
Segway	Cyazofamid	1.5 - 3oz	Pythium	21	No	

# Biological disease control for Poinsettia

Control Agent	Active Ingredient	Rate range/100gal	Diseases controlled	Safe on Bracts	Notes
Actinovate SP	Streptomyces lydicus	6-12oz	Botrytis	Trial First	Used as a foliar spray
Cease	Bacillus subtilis	64 -256oz (2-8qts)	Botrytis	Trial First	
Milstop	Potassium Bicarbonate	20-80oz	Botrytis	Yes	Use lower rates on bracts; trial first
Actinovate SP	Streptomyces lydicus	4-6oz/100 of finished solution	Rhizoctonia	Trial First	This would be a 4-6oz per gallon of stock solution using a 1:100 injector
Rootshield Plus WP	Trichoderma	3-8oz	Rhizoctonia	Trial First	Can use granular inplace of WP(see label for rates)
Actinovate SP	Streptomyces lydicus	6-12oz	Powdery Mildew	Trial First	Used as a foliar spray
Cease	Bacillus subtilis	64 -256oz (2-8qts)	Powdery Mildew	Trial First	
Milstop	Potassium Bicarbonate	20-80oz	Powdery Mildew	Yes	Use lower rates on bracts; trial first
Actinovate SP	Streptomyces lydicus	4-6oz/100 of finished solution	Pythium	Trial First	This would be a 4-6oz per gallon stock solution using a 1:100 injector
Rootshield Plus WP	Trichoderma	3-8oz	Pythium	Trial First	Can use granular inplace of WP(see label for rates)
Cease	Bacillus subtilis	64 -256oz (2-8qts)	Erwinia/Bacteria	Trial First	
Zerotol	Hydrogen Dioxide + Peroxyacetic Acid	42-128oz (1:100 - 1:300)	Erwinia/Bacteria	Trial First	No residual. Many peroxide products to choose from

# Fungus Gnats/ Shore Flies

**FLIES**  
Darkwinged Fungus Gnats\*

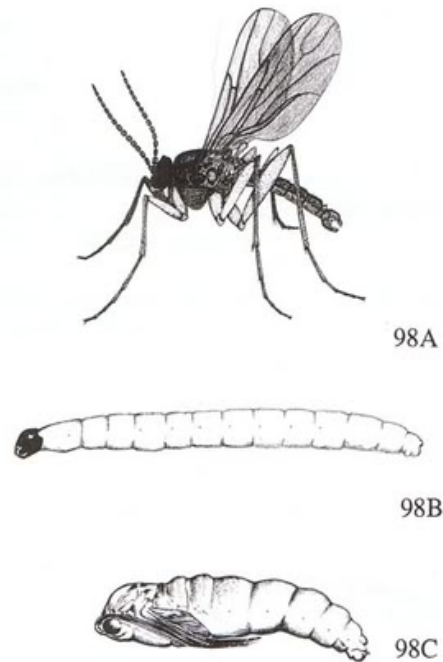


Fig. 98 Darkwinged fungus gnats. A, Adult. B, Larva. C, Pupa.

**FLIES**  
Shore Flies\*

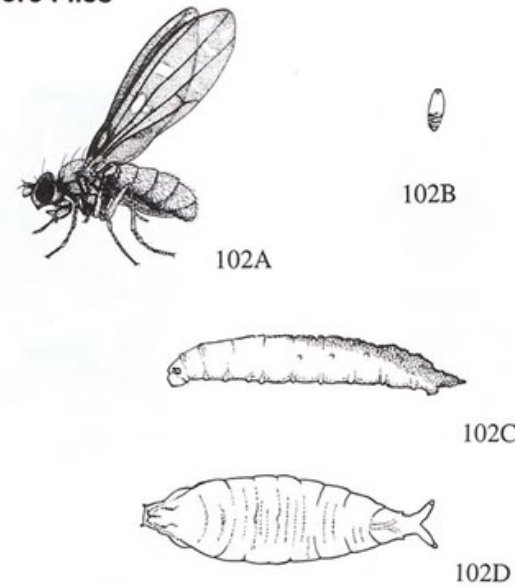


Fig. 102 Shore fly. A, Adult . B, Egg. C, Larva. D,





# Fungus Gnats

- Larvae feed on roots and callus
- Vector for pythium
- Best control sanitation
- IGR insecticides early



# Whitefly

- Bemisia tabaci/Sweet Potato Whitefly/Silver leaf
- Bemisia tabaci/Sweet Potato Whitefly/Silver leaf (Q/B Biotype)
- Greenhouse Whitefly
- Banded Wing Whitefly

## Non neonicotinoid options being used

- Biological control for whitefly are being used more every year.
- Very effective with low to moderate pressure
- Monitor carefully
- Start clean to stay clean





## Non neonicotinoid options being used

- Mainspring drench late September or early October
- Rycar spray for rapid knock down
- Sanmite(Dynomite)/Avid tank mix spray



## Insecticide recommendation for Poinsettia

Product	Active Ingredient	Rate range/100gal	Pest controlled	Chemical Class	Safe on Bracts	Notes
Rycar	Pyrifluquinazon	1.6 - 3.2oz	Whitefly	Unknown	Trial First	
Mainspring	Cyantraniliprole	1 - 8oz (foliar);12oz (drench)	Whitefly	28	Trial First	Drench rate is 12oz/gallon stock solution at 1:100 ratio
Judo	Spiromesifen	2 - 4oz	Whitefly	23	Trial First	
Safari	Dinotefuran	4 - 8oz (spray); 12 - 24oz(drench)	Whitefly	4A	Yes	1-3 weeks after pinch for best control. Drench rate is 12 - 24oz/gallon stock solution at 1:100 ratio (Neonicotinoid)
Kontos	Spirotetramat	1.7 - 3.4oz	Whitefly	23	Trial First	
Flagship	Thiamethoxam	2 - 4oz	Whitefly	4A	Trial First	Neonicotinoid
Endeavor	Pymetrozine	2.5 - 5oz	Whitefly	9B	Trial First	
Sanmite	Pyradaben	4 - 6oz	Whitefly	21A	Trial First	
Xxpire	Isoclast Active + Spinetoram	2.75oz	Whitefly	4C + 5	Trial First	
Avid	Abamectin	8oz	Whitefly	6	Trial First	
Avid	Abamectin	4oz	Mites	6	Trial First	
Kontos	Spirotetramat	1.7 - 3.4oz	Mites	23	Trial First	
Judo	Spiromesifen	1 - 4oz	Mites	23	Trial First	
Sanmite	Pyradaben	4oz	Mites	21A	Trial First	
Overture	Pyridalyl	8oz	Thrips	Unknown	Trial First	
Pylon	Chlorfenapyr	5.2 - 10oz	Thrips	13	No	Label states that can cause phyto on poinsettias
Avid	Abamectin	8oz	Thrips	6	Trial First	
Conserve	Spinosad	11 - 22oz	Thrips	18	Trial First	
Azatin	Azadiractin	8oz/gallon @ 1:100 ratio	Fungus Gnats	Unknown	Trial First	IGR. Target larvae in top third to half of soil profile
Citation	Cyromazine	2.66oz/gallon @ 1:100 ratio	Fungus Gnats	17	Trial First	IGR. Target larvae in top third to half of soil profile
Safari	Dinotefuran	12 - 24oz/gallon @ 1:100 ratio	Fungus Gnats	4A	Trial First	Neonicotinoid. Use as curative when larvae causing damage
Parasitic Nematodes			Fungus Gnats			Steinernema feltiae

# Biological Control for insects on poinsettia

Control Agent	Active Ingredient	Rate range/100gal	Pest controlled	Safe on Bracts	Notes
Botaniguard ES	Beauveria bassiana	16 - 32oz	Whitefly	<b>NO</b>	<b>Label states: Do Not Apply after Poinsettia Bract Formation</b>
No Fly WP	Paecilomyces fumosoroseus	28oz	Whitefly	Unknown	
Met52 EC	Metarhizium anisopliae	8-32oz	Whitefly	Unknown	Do not apply at pressures above 200psi.
Amblyseius swirskii	Predator		Whitefly		
Delphastus pusillus	Predator		Whitefly		
Encarsia formosa	Parasitoid		Whitefly		
Eretmocerus eremicus	Parasitoid		Whitefly		
Eretmocerus mundus	Parasitoid		Whitefly		
Amblyseius andersoni	Predator		Spider Mites		
Amblyseius californicus	Predator		Spider Mites		
Feltiella acarisuga	Predator		Spider Mites		
Phytoseiulus persimilis	Predator		Spider Mites		
Botaniguard ES	Beauveria bassiana	32-64oz	Thrips	<b>NO</b>	<b>Label states: Do Not Apply after Poinsettia Bract Formation</b>
No Fly WP	Paecilomyces fumosoroseus	28oz	Thrips	Unknown	
Met52 EC	Metarhizium anisopliae	8-32oz	Thrips	Unknown	Do not apply at pressures above 200psi.
Amblyseius andersoni	Predator		Thrips		
Amblyseius swirskii	Predator		Thrips		
Hypoaspis miles	Predator		Thrips		
Steinernema feltiae	Parasitic Nematode		Thrips		
Orius insidiosus	Predator		Thrips		
Hypoaspis miles	Predator		Fungus Gnats		
Steinernema feltiae	Parasitic Nematode		Fungus Gnats		
Atheta coriaria	Predator		Fungus Gnats		
Gnatrol	Bacillus thuringiensis		Fungus Gnats		



# PGR for finishing

- Spray vs Drench
- Use only spray until shoots are 5cm(2in)in length
- Cycocel spray 1000 – 1500 ppm
- B-9/Cycocel tank-mix spray 1000/750
- Paclobutrazol(Bonzi) Drench very low rate! Only apply after breaks are established and even, use Cycocel and/or B-9/Cycocel sprays early
- **Stop PGR applications by Oct 10** (natural season crop) except for Micro drenches of Paclobutrazol(Bonzi)
- Late PGR for shelf life improvement:  
Paclobutrazol(Bonzi) drench of ½ ppm at full color

## Cycocel Spray vs Bonzi Drench

All plants pinched on 8/23, sprayed with Cycocel 750 ppm 3 applications weekly Sept 1,8,15



Cycocel 750 ppm spray October 5 on Left Plants. Bonzi 1/10 ppm drench October 5 plants on right.



## PGR for finishing Drench techniques



Preferred method is controlled volume drip irrigation



## PGR for finishing Drench techniques

- When using very long drip runs (over 150 ft) be conscious of the lag time in drip line over distance
- To mitigate this, reduce the rate by  $\frac{1}{2}$  and double the volume
- If wanting to apply  $1/10^{\text{th}}$  ppm drench @ 6 fl/oz, adjust to  $1/20^{\text{th}}$  ppm @ 12 fl/oz





## PGR for finishing Drench techniques

- As a general guideline, use 1fl/oz of volume per inch diameter of pot
- 6 fl oz per 6 inch pot.....8fl oz per 8 inch pot etc
- Make sure your injector is calibrated properly
- Extreme caution with high volume drippers
- Train employees carefully for hand drenching



# Cycocel Spray vs. Bonzi Drench

All plants pinched on 8/23, sprayed with Cycocel 750 ppm 3 applications weekly Sept 1, 8, 15



Cycocel 750 ppm spray October 5 on left plants. Bonzi 1/10 ppm drench October 5 on right plants.

## Paclobutrazol Application at Finish



- Applying Paclobutrazol as a spray or a drench can help retain cyathia post harvest
- Application must be timed carefully for best result
- **Apply at First sign of pollen**
- Bracts must be fully expanded
- Reduces color fade post harvest
- 1 ppm drench or 5-7 ppm spray



# Herbicide

- Poinsettia are very sensitive to herbicide
- Open greenhouses or shade
- Brush Killing Herbicides drift
- Extremely low exposure
- 2,4-D AMINE most common

## Herbicide Damage





# Improving Shelf Life



- Protect your roots
- Cool down towards the end
- Humidity control
- Bract botrytis management
- Utilize calcium chloride sprays
- Late Bonzi (paclobutrazol) drench?
- Feed to the end.....but reduced concentrations
- Store and ship cool....50-55F



## Planning For Next Year



- Make notes while it is fresh in your mind
- Evaluate from prop to postharvest
- Keep graphs and growth detail including height measurements
- Keep ADT records
- Take plenty of pictures
- Look for solutions through genetics
- Book early to get what you want on the week you want

# THANK YOU!

Questions?  
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