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Technical Poinsettia Webinar Series - Part 1

From Stick Through Pinch

Best management practices from propagation through the pinch.

June 2017

Propagation

- Sanitation
- Unrooted cuttings
- Media
- Stages of propagation
- Growing techniques
- Disease and insect control

Sanitation Strategy

- Sanitation starts before the first cuttings arrive
- Disinfest or clean all surfaces in cutting handling areas and propagation areas
- Worker hand sanitation
- Foot baths entering the propagation area
- Disinfect all surfaces in the propagation house including benches, floors, ceilings, etc.
  - Use quaternary ammonium based disinfectants, peroxide, or chlorine dioxide or other oxidizing agent
- Create a written sanitation protocol

Unrooted Cuttings have arrived

- Open boxes quickly and stick or cool cuttings
- Unpacking in a cooler 50F (10C) is ideal
- Keep cuttings moist, cool and turgid while handling
- If cuttings arrive warm, open bag, moisten, and cool overnight at 50F (10C)
- Do not store cuttings in boxes in warehouse or greenhouse conditions

Propagation Media

- Loose-filled liner trays
  - Pick right media….no plug mixes!
- Stabilized media Ellepot, Oasis
- Direct stick

Stage 1 From Stick to Callus

- Get cuttings stuck and under mist ASAP to avoid wilt
- Apply rooting hormone to base of cutting
- Keep mist high including some at night from day 1 thru 4
- Cutting starts forming roots in 7-8 days after sticking

Stage 1 Environment

- Shade greenhouse to lower light levels during to <2,000FC
- Soil temperature at 68 – 72F; Air Temp 65 – 80F
- Maintain high relative humidity >85%, especially first 4-5 days
- Keep concrete floors wet to help maintain humidity
- Minimize air movement but vent as needed to keep temps below 85F
- Start to pull mist back around day 5-7 as cuttings start to callus; start with night mist and early mornings

Try Not To Overmist

- Minimize pooling on leaves
- If using overhead misters, cycle on for shortest time possible
- If using booms, balance the speed with moisture needs on leaf surface
- Utilize Capsil or other foliar wetting agent to make mist more efficient

Stage 1 Moisture Management

- Be sure that soil moisture is a priority during propagation
- If propagating in liners, ensure that media is well drained because high mist frequency can quickly lead to saturated soil
- If direct sticking, work to maintain a level 4 moisture
  - Too dry = unneeded moisture stress on newly stuck cuttings
  - Too wet = slow and uneven rooting and pest/disease challenges
- Soil moisture is most critical at the end of stage 1; days 5-8 as the cutting is callusing and starting to initiate roots

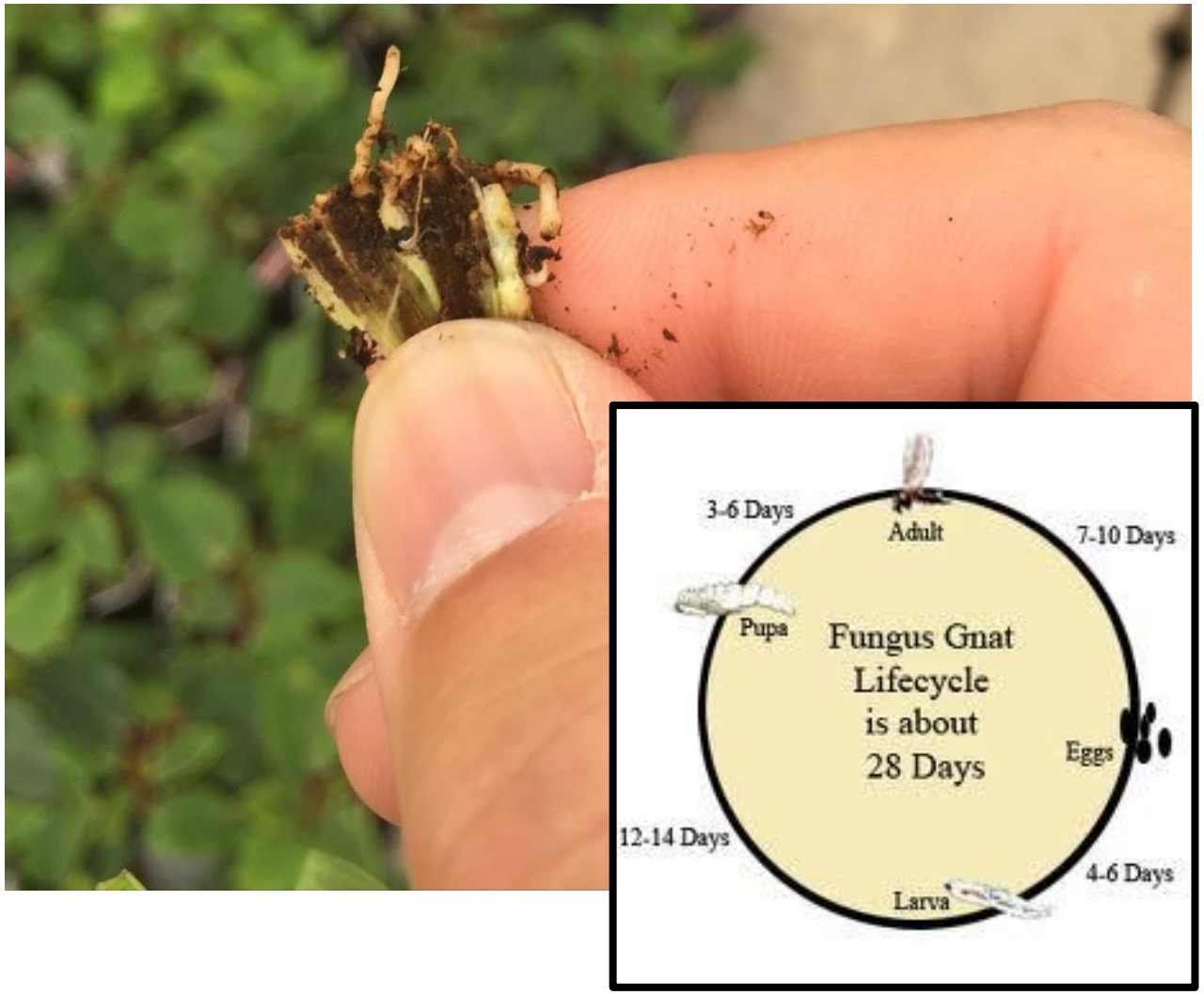
Direct Stick Moisture Management

Stage 1 Fertility

- Fertility needs are not big in stage 1
- Heavy leaching from propagation = little or no media EC at time of initiation
- Build media EC back up by day 5-7 but be careful not to saturate soil
- Foliar fertilization can help but mostly to provide EC to soil and root initiation
  - Use ~50ppm N with a low or no P fertilizer

Stage 1 Insect Control

- Fungus Gnats are your primary concern in this stage
- Cultural controls should be first line of defense
  - Algae free prop zone
  - Sticky cards for monitoring
  - Moisture Management!
- **Preventative** control measures are best
- Apply to upper half of media in direct stick or entire media for liner production
- Larvae are the target for chemical and biological control
- IGRs are great for controlling larvae
- Biological control also works well



Insect Management: Chemicals for use in propagation

Fungus Gnats

Product	Active Ingredient	Rate range/100gal	Pest controlled	Chemical Class	Safe on Bracts	Notes
Azatin	Azadiractin	8oz/gal @ 1:100 ratio	Fungus Gnats	Unknown	Trial First	IGR. Target larvae in top third to half of soil profile
Citation	Cyromazine	2.66oz/gal @ 1:100 ratio	Fungus Gnats	17	Trial First	IGR. Target larvae in top third to half of soil profile
Safari	Dinotefuran	12 - 24oz/gal @ 1:100 ratio	Fungus Gnats	4A	Trial First	**Neonicotinoid. Use as curative when larvae causing damage**
Parasitic Nematodes			Fungus Gnats			Steinernema feltiae

Whitefly

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	

*****These are recommendations and as with all chemical applications should be used only after trialing for plant safety. Always read the product label and always trial a few plants first when applying to bracts.**

Insect Management: Bio Control for use in propagation

Fungus Gnats

Control Agent	Active Ingredient	Rate range/100gal	Pest controlled	Safe on Bracts	Notes
Hypoaspis miles	Predator		Fungus Gnats		
Steinernema feltiae	Parasitic Nematode		Fungus Gnats		
Atheta coriaria	Predator		Fungus Gnats		
Gnatrol	Baccilus thuringiensis		Fungus Gnats		

Whitefly

Control Agent	Active Ingredient	Rate range/100gal	Pest controlled	Safe on Bracts	Notes
Botaniguard ES	Beauveria bassiana	16 - 32oz	Whitefly	**NO**	**Label states: Do Not Apply after Poinsettia Bract Formation**
No Fly WP	Paecilomyces fumosoroseus	28oz	Whitefly	Trial First	
Met52 EC	Metarhizium anisopliae	8-32oz	Whitefly	Trial First	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		

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Stage 1 Disease Control

- Botrytis and erwinia are primary challenges
- Preventative chemical controls are good option
- Balance mist

Disease Management: Chemicals for use in Propagation

Botrytis

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 Instrinsic	Pryaclostrobin + Boscalid	12 - 18oz	Botrytis	7 + 11	Trial First	Do not combine with organosilicone-based adjuvants (Capsil)
Medallion	Fludioxonil	2 - 4oz	Botrytis	12	Trial First	
Milstop	Potassium Biocarbonate	20 - 80oz	Botrytis	NC	Trial First	Use lower rates on bracts
Decree	Fenhexamid	12 - 24oz	Botrytis	17	Trial First	Will leave some residue on bracts; some sensitivity possible
Veranda O	Polyoxin D	4 - 8oz	Botrytis	19	Trial First	

Erwinia/Bacteria

Product	Active Ingredient	Rate range/100gal	Diseases controlled	Chemical Class	Safe on Bracts	Notes
Phyton 35	Copper Sulfate Pentahydrate	15 - 35oz	Erwinia/Bacteria	M1	Trial First	Adjust pH to 5.5-6.5
Junction	Mancozeb + Copper Hydroxide	28oz	Erwinia/Bacteria	M1 + M2	No	Be sure spray solution is above pH 6.5 or phyotoxicity is likely
Zerotol	Hydrogen Dioxide + Peroxyacetic Acid	42 - 128oz (1:100 - 1:3	Erwinia/Bacteria	NC	Trial First	Don't apply in combination with metal-based chemicals

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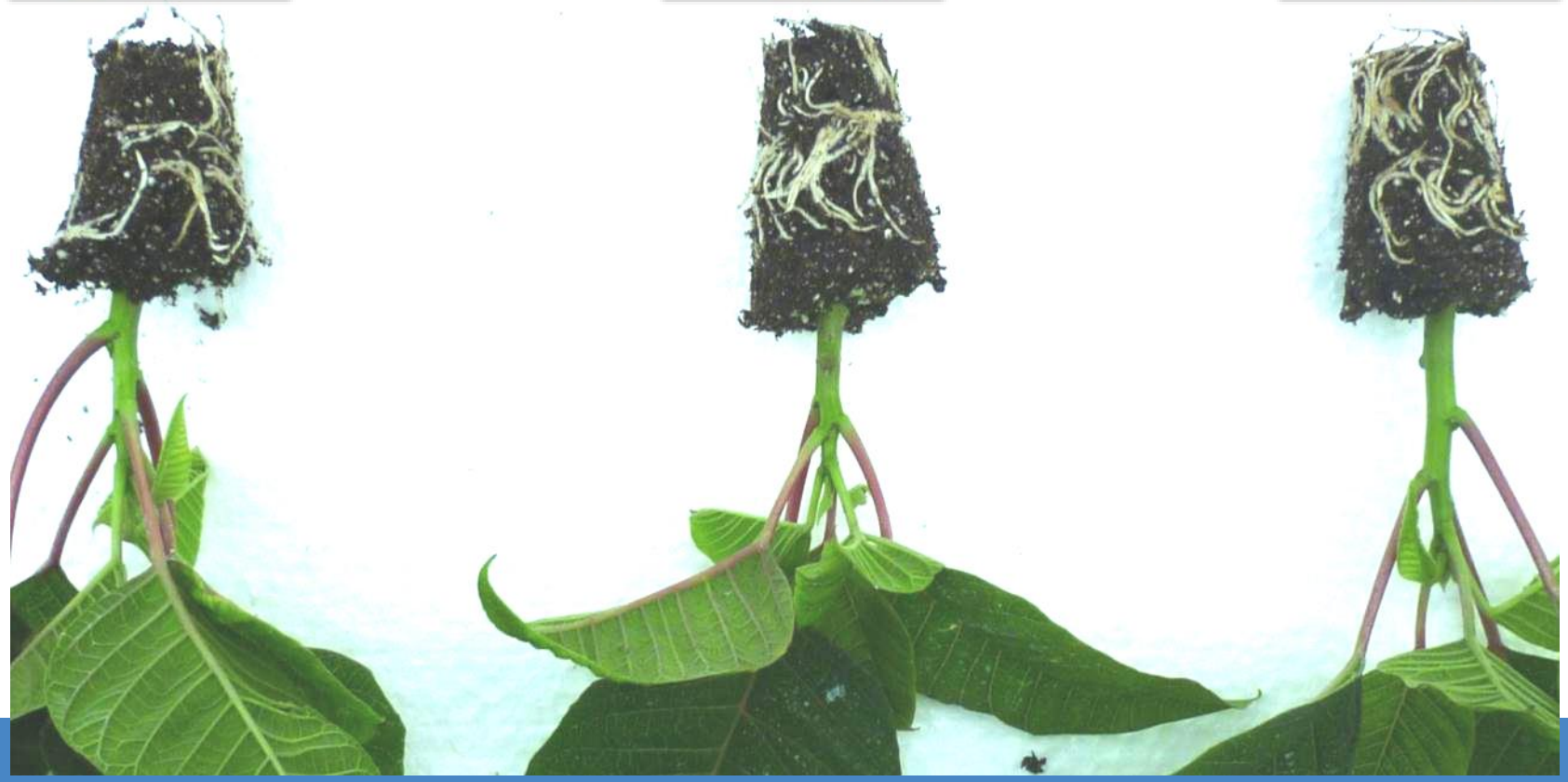
Christmas Beauty Red
Comparing different rooting hormone concentrations
14 days after sticking callused cutting

1500 ppm	2000 ppm	3000 ppm



Rooting Hormone

Poinsettia Rooting Hormone Recommendations			
Product	**Recommended Rate**	**Application method**	**Notes**
Hortus IBA Water Soluble Salts	500-1000ppm IBA	Basal stem dip or spray just prior to sticking cuttings	Mix solution to desired PPM and dip only bottom 1" of the stem. Be careful not to let solution touch leaves, upper stem or growing point.
Hortus IBA Water Soluble Salts	75-150ppm IBA	Course spray applied after sticking cuttings	Spray to runoff so that solution drips down stem toward the base of the cutting. Will likely cause some leaf distortion or curling but plants normally grow out of it. Higher rates = more leaf curl. Trial first.
Rhizopon AA #1	1,000ppm IBA	Basal stem dip or spray just prior to sticking cuttings	Mix solution to desired PPM and dip only bottom 1" of the stem. Be careful not to let solution touch leaves, upper stem or growing point.
Dip N Grow	1,000ppm IBA + 500ppm NAA	Basal stem dip or spray just prior to sticking cuttings	Mix solution to desired PPM and dip only bottom 1" of the stem. Be careful not to let solution touch leaves, upper stem or growing point.

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Nice white callus 8 days after stick

Callused Cuttings

Unrooted Cutting (Left) Callused Cutting (Right)

Cuttings are stuck in a propagation environment at the farm and are brought to callus, just prior to root formation. 8-12 days depending on variety.

The cuttings are conditioned and require much less mist than an unrooted cutting.

Callused Cuttings

- Upon receiving the callused cutting, treat the cutting prior to stick as you would an unrooted.
- No hormone required
- Mist only to keep the foliage turgid and not rolling over.
- Can be done in normal greenhouse temperatures.
- Requires less humidity than an Unrooted Cutting
- Does not require full mist system
- Avoid overwatering in Direct stick as very wet media will inhibit roots.
- Should be well rooted and off mist within 1 week.

Plants fully rooted and pinch-able day 14-18

Christmas Beauty Red Rooted and pinched after 2 weeks

Callused Cuttings after 2 weeks

Unrooted (left) Callused (right)

Fully rooted after 14 days in both direct stick and liners. 2 weeks ahead of URC.

Stage 2 Rooting Out

- Begin fertilization program in earnest
- Moisture management is crucial in this stage
- Reduce mist as available to force root growth. Don’t overmist!!
- Visible roots by day 8-10
- Off mist completely by day 14

Stage 2 Environment

- Begin increasing light levels if possible
- Soil Temp at 68 – 72F; Air Temp 65 – 80F
- Increase air exchanges
- Start reducing relative humidity especially early and late in the day
- Night mist should be off completely
- Goal to be completely off mist by day 14

Stage 2 Fertility and Moisture Management

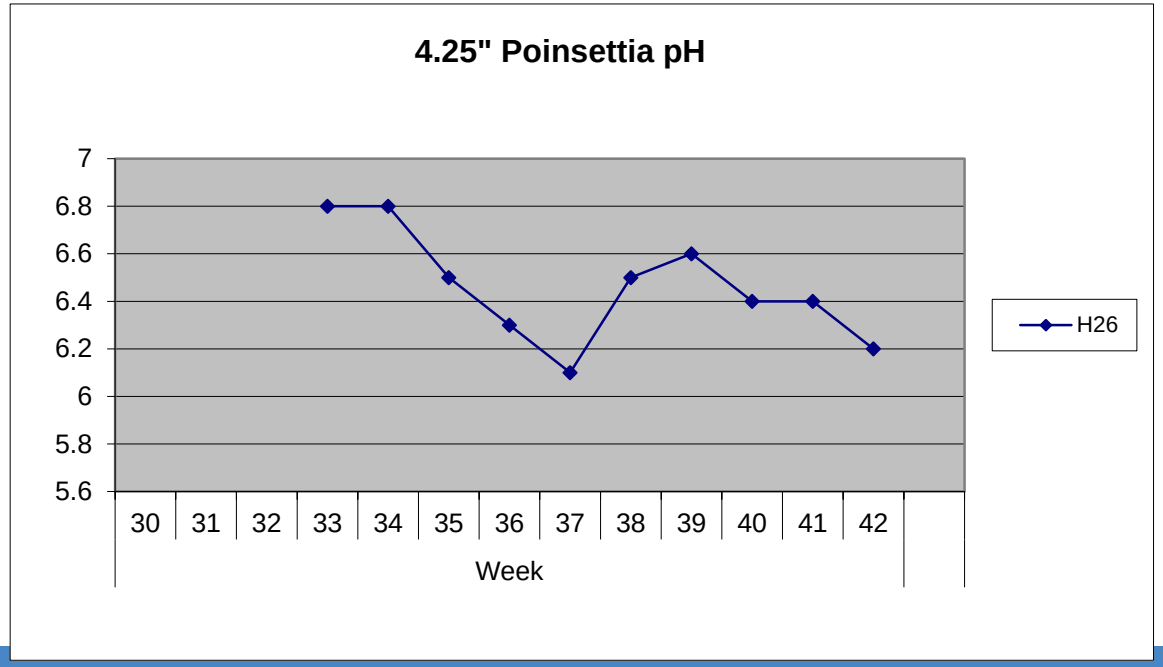
- Crucial that we quickly build media EC back up in this stage
- Be careful not to fully saturate the soil when fertilizing in Stage 2
- Allow soil moisture try dry down to a level 3 and then fertilize back up to a level 4 or 5
- Use a well balanced, neutral Cal/Mag fertilizer with a full complement of micros at 100-150ppm N
- Know your media pH coming out of prop, especially if direct sticking
  - Media pH can quickly change with high alkalinity water
  - Adjust fertilizer strategy if needed to correct

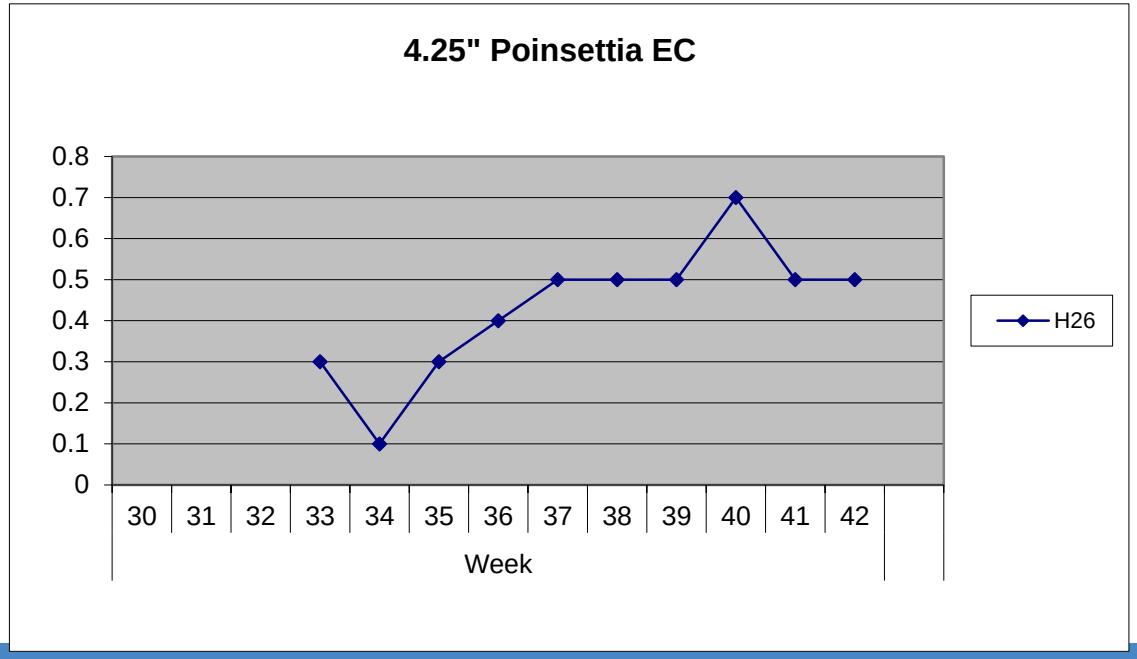
Stage 2 Media pH and EC

Direct stick 4.25” crop

- Crop stuck week 32
- First media test week 33
- Media EC is almost zero after one week

pH													
	Week												
	30	31	32	33	34	35	36	37	38	39	40	41	42
H26				6.8	6.8	6.5	6.3	6.1	6.5	6.6	6.4	6.4	6.2
EC													
	Week												
	30	31	32	33	34	35	36	37	38	39	40	41	42
H26				0.3	0.1	0.3	0.4	0.5	0.5	0.5	0.7	0.5	0.5





Stage 3 Finished Propagation

- Change the environment!
- Continue to build media EC with balanced fertilizer program…..150-200ppm N
- Maintain disease control
- Treat for fungus gnats, whitefly if present
- Begin PGR applications:
  - Cycocel 750ppm
  - In warmer conditions B-9 1000ppm/Cycocel 500ppm tank-mix
  - First application around day 16 and again on around day 22.
- Ready to plant day 23-28

Stage 3: Ideal Environment

Active Environment

Light Levels

Fertility

Temperature

Humidity

Stage 3 Disease and Insect Control

- Fungus gnats can still be problematic
- Whitefly now take priority as primary pest to monitor and control
- Weekly scouting and monitoring of sticky cards
- Disease control shifts to roots but stems and leaves are still important
- Pythium and rhizoctonia control in this stage
- Moisture management is best control for pythium
  - Protect your roots!

Stage 3 Disease Control

Disease Management: Chemicals for use in Propagation

Pythium

Product	Active Ingredient	Rate range/100gal	Diseases controlled	Chemical Class	Safe on Bracts	Notes
Terrazole L	Etradiazole	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	

Rhizoctonia

Product	Active Ingredient	Rate range/100gal	Diseases controlled	Chemical Class	Safe on Bracts	Notes
Pagaent Instrinsic	Pryaclostrobin + Bos	12 - 18oz	Rhizoctonia	7 + 11	Trial First	Do not combine with organosilicone-based adjuvants (Capsil)
Medallion	Fludioxonil	1oz	Rhizoctonia	12	Trial First	Sprench/drench rate is 1oz/100 gallon water
Clearys 3336/OHP (	Thiophanate Methyl	16 - 20oz	Rhizoctonia	1	No	
Daconil	Chlorothalonil	16 - 22oz	Rhizoctonia	5	No	

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Disease Management: Bio Control products in Propagation

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 Bicorbonate	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	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

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Transplanting Liners

- Plant into moist media.
- Irrigate to make sure that the rooting media is moist, not just the media in the finished container. This is more of a challenge with Oasis or other foam media than others.
- Maintain this irrigation level until the roots are growing freely into the pot.
- Shade and elevated humidity can help reduce the transplant shock.

Finishing Environment

- Day temp ideals 24C(75F) to 30C(86F)
- Night temps 16C(61F) to 22C(72F)
- High Humidity Strategies
- Irrigation method. Drip highly recommended
- High temperature challenges most common
- Laying foundation for successful crop

Finished Crop Growing Media

- High porous potting plant media pH adjusted with limestone
- Must keep pH lower than 6.7 in media
- Have you tried wood fiber?
- Coco fiber issues pH?

Water Quality and Fertility

- Maintain a media pH of 5.7 – 6.3
- Poinsettia should be grown with a constant liquid feed program of 200-250 ppm N
- CalMag feed is recommended as they need a good source of Calcium
- Know your water quality to choose correct fertilizer and better manage media pH

Finished Crop Growing Media

- Maintain a media EC of 1.5-2.0 from a pour-through or 0.9-1.3 for a 1:2
- A healthy and active growing poinsettia will consume a lot of fertilizer
  - If consistently fertilizing and media EC is still low, that is ok
  - Utilize tissue and analysis to ensure nutrition is adequate
- Don’t forget the Moly!

PGR Applications and Pinching

- PGR application prior to pinching
- When to pinch
- PGR after pinch

Florel application Prior and Post-pinch. (Florel Sandwich)

- Applications of Florel 5 days prior and 5 days after the pinch is a technique that has been used to help ensure good branching in varieties and conditions where branching can be inhibited.
- Can cause a “PGR effect” that will continue through the crop cycle (see photo)
- Rates from 200 ppm to 400 ppm
- Not necessary on many new very free branching varieties.

Pinching: Key tips

- Application of PGR (cycocel) in late propagation and after transplant will reduce internode length. This contributes to even branching.
- Pinch plants about 12-14 days after transplant and are rooting out into pot
- Plants need not be rooted out fully to the pot edge just actively growing roots and tip.
- Pinch to leaf count based on finished specs (6-7 leaves after the pinch to produce a plant with 6 primary Bracts)

Pinching: Key tips

- Don’t leave too many leaves. Know your specs!
  - This can cause wide plants and smaller bracts.
- The growing environment just prior to, through two weeks after the pinch, is critical.
- High humidity is needed to develop the branching evenly.
  - Misting, quick boom passes, wetting floors, etc. are all useful tools to achieve this higher humidity environment.

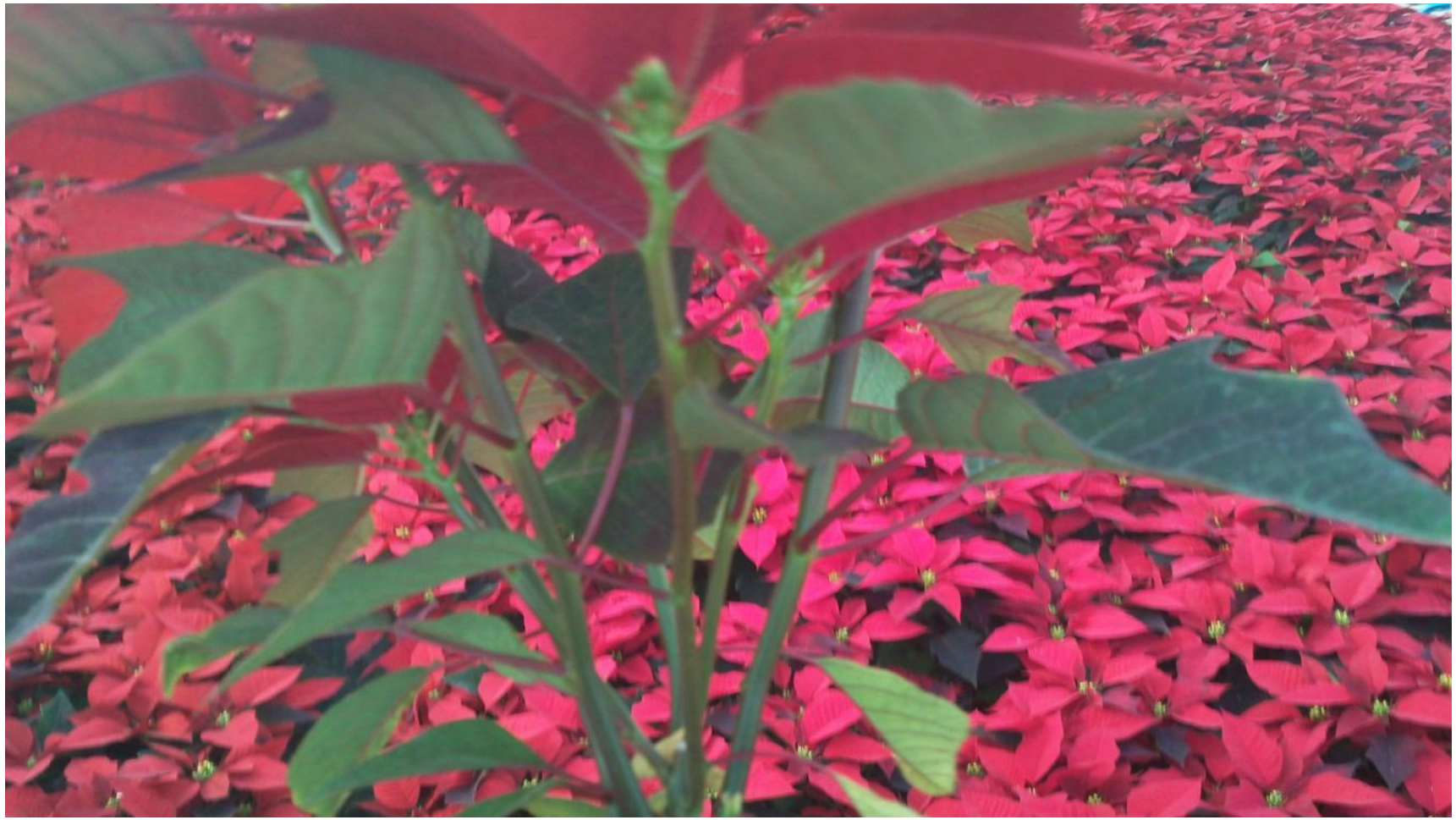
Ready to pinch (13 days after transplant)

Pinched (13 days after transplant)

7 days after pinch

7 days after pinch

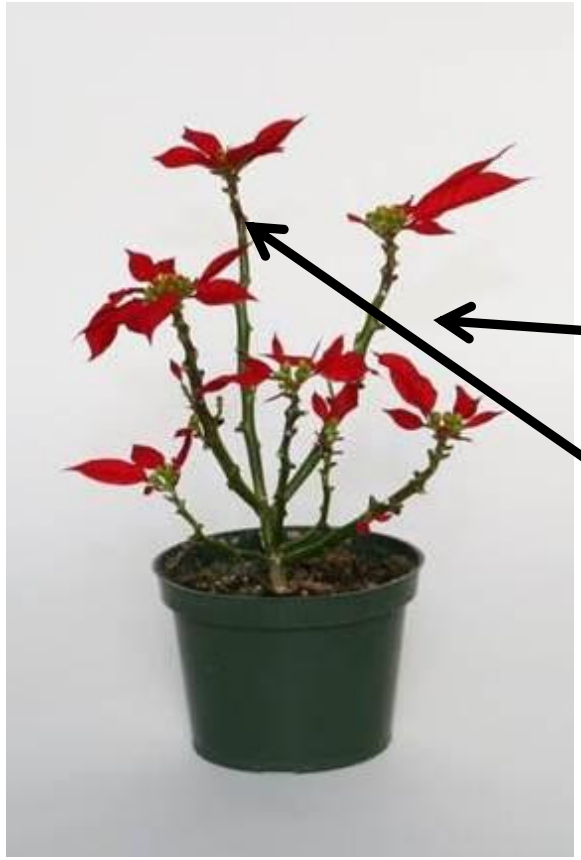
Even branching from correct pinching and early PGR



Early PGR applications

- Cycocel 500-1000 ppm spray for cooler regions.
- B-9 1000 ppm/Cycocel 500 ppm can be used in warmer climates.
- PGR can be applied after the pinch when branches are 1 inch in length or longer.
- After pinching the use of PGR of Cycocel spray and or B9/Cycocel spray are preferred as they will focus their response on the shoots with most growth(leaf surface).
- Avoid PGR drenches and Bonzi at this stage as they are absorbed by roots and stems and have an effect on all the shoots
  - A drench at this stage will result in less uniform branching than Cycocel or B9/Cycocel sprays

Branching Response



- Branching Response Comparison .
- Uneven response(left)

Apical dominance

- Even Response (right)

Incorrect PGR pre and post pinch can result in the uneven branching response

Hope to see you again August 15!

Technical Poinsettia Webinar Series - PART 2

From Pinch to Bract Development
Focus on making your specs, covering all aspects of poinsettia culture, including fertility, light, temperature, height control, and insect & disease management.

THANK YOU!

Questions?
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