

SUMMARY:

- Final presentation from summer internship at Costa Farms on fertilizer performance investigation
- Presented to research team and company executives

NOTE:

- Potentially sensitive information has been blocked-out with black rectangles
- Slides 6 and 7 include videos that cannot be viewed in pdf format



EXPANDING FERTILIZER OPTIONS

Isaiah Guenther - Summer Intern 2023

AGENDA

1 Big Picture

2 Methods

3 Results

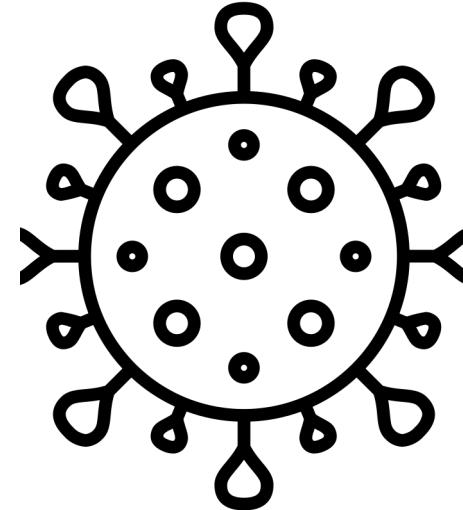
4 Takeaways



SCOPE

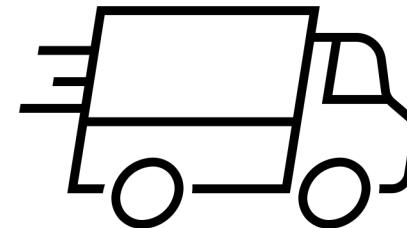
Problem:

- COVID supply chain issues
- Only fertilizer supplier in [REDACTED]

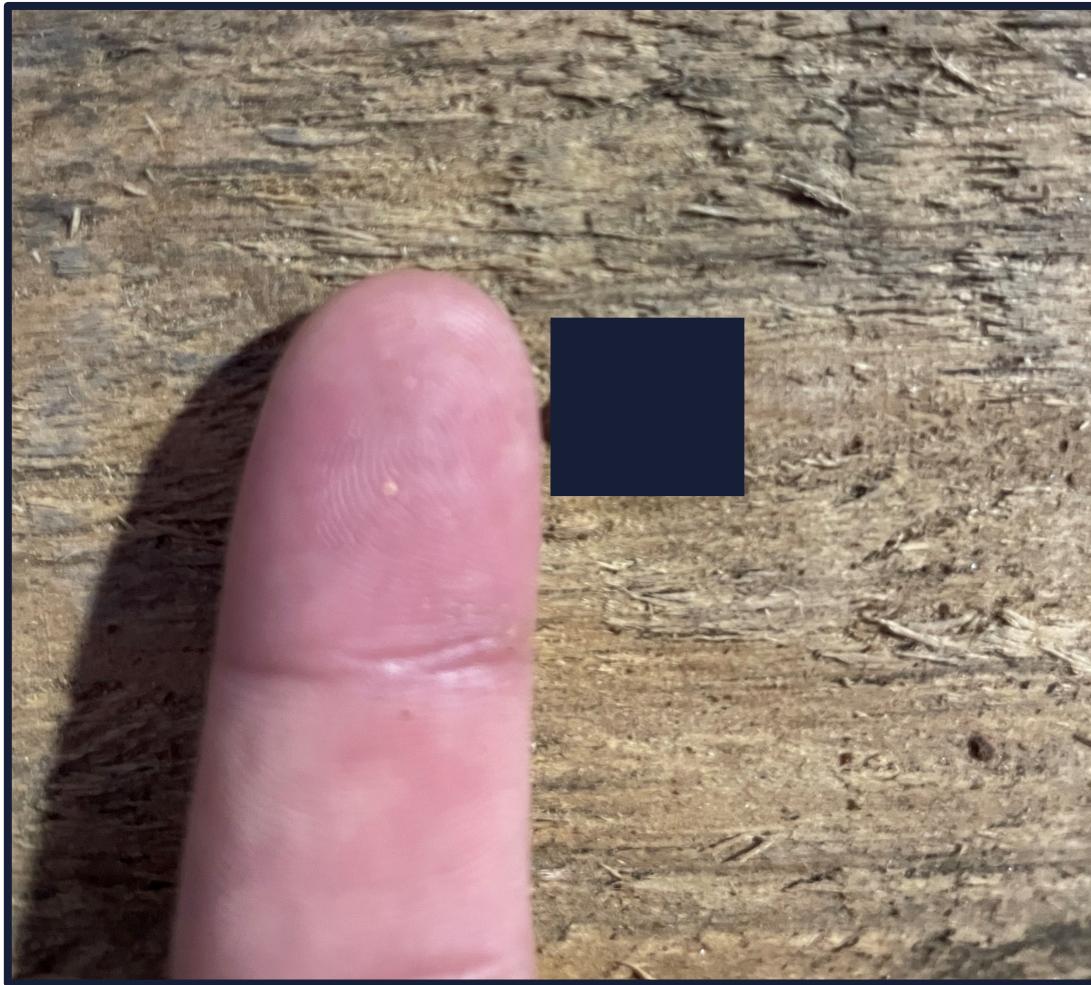


Solution

- Find more options



FERTILIZER AT COSTA COLOR



FERTILIZER AT COSTA COLOR



MIXED INTO SUBSTRATE

- Potting line
- Different amount/types for different plants
- Top dress if needed



WHY TRIALS?

- Extreme conditions in Florida
- Need trial data

LONGEVITY / RELEASE - UP TO:

3-4 MTHS

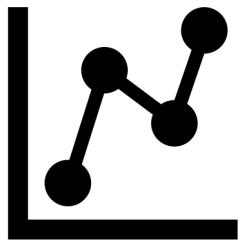
Average Median Temperatures					
60° F		70° F		80° F	
150	5	120	4	90	3
Longevity in Days & Months (up to)					

AGENDA

- 1 Big Picture
- 2 Methods
- 3 Results
- 4 Takeaways



OBJECTIVES



- Characterize performance of various fertilizers
- Identify viable alternatives

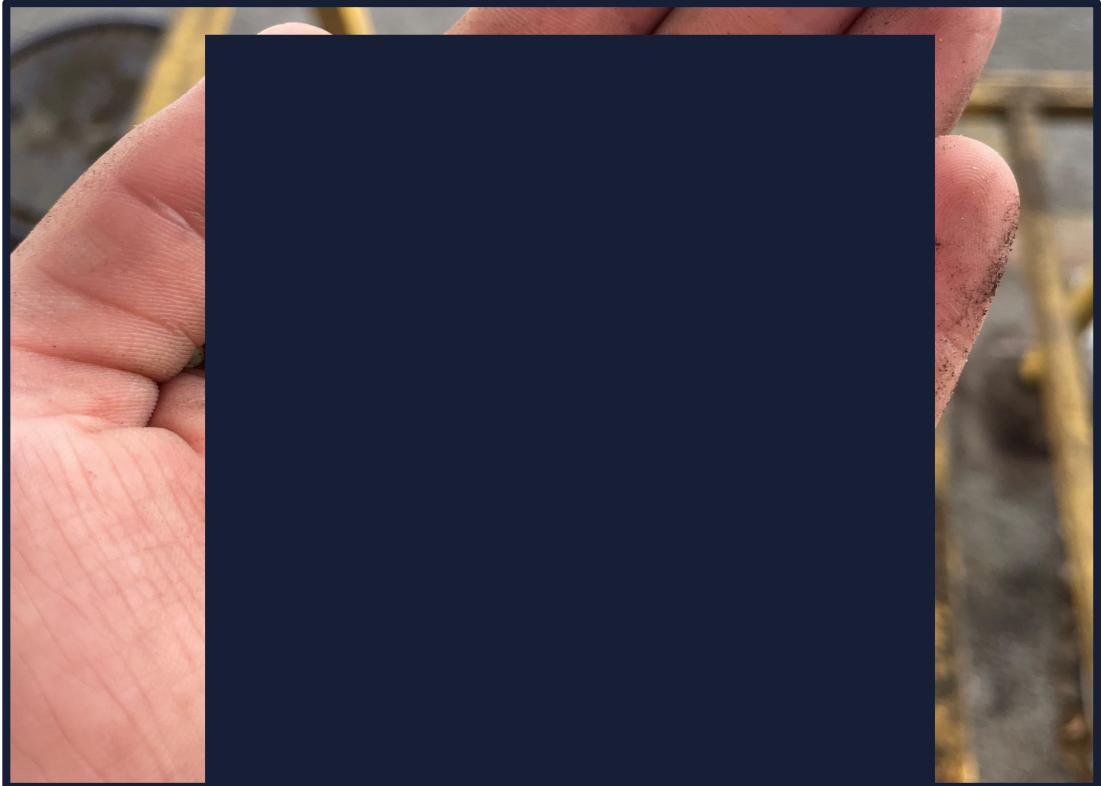




- Main fertilizer
- From [REDACTED]
- Thermoplastic resin coating
 - Ethylene-vinyl-acetate and polyethylene

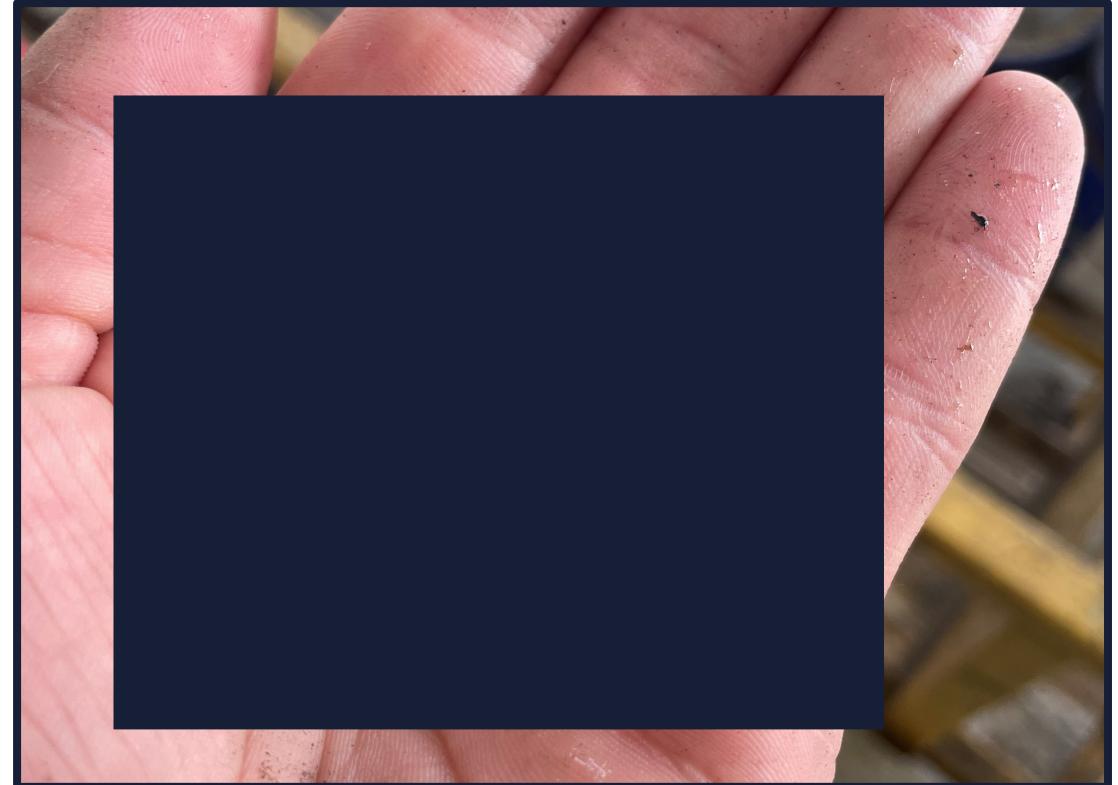
- Initial backup
- From [REDACTED]
- Polyon Reactive Layer Coating (RLC)
 - Polyurethane
- Smaller diameter





- New option
- From [REDACTED]
- Same coating as [REDACTED]

- New option
- From [REDACTED]
- [REDACTED] - thermoplastic resin coating
 - Polyurethane



FIELD IDENTIFICATION



- Control
- A-tags

- B-tags as control
- D-tags as trial

- New
- E-tags

- New
- F-tags

SETUP

- 25 total trials
- 1 control, 2-4 treatments,
- Potting line procedure
- Regular growers



DATA COLLECTION

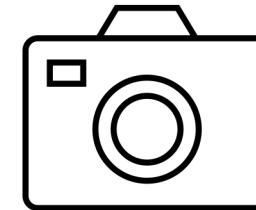
- pH, EC, plant height, pot coverage
 - 5 per treatment per week
- Nutrients (NO₃, Ca, K)
 - First week, weeks 29/30
- Pour-Thru, LAQUAtwin sensors



ANALYSIS



- Statistics in R software
- Image analysis in Canopeo
- Grower inspection



AGENDA

- 1 Big Picture
- 2 Methods
- 3 Results
- 4 Takeaways





TRIAL 1

- 1.50GL Catharanthus - Vinca, Black Cherry
- Grower: [REDACTED]
- SW: 24
- FW: 29

FIELD IDENTIFICATION



- Control
- 5lb (14-4-14) 70d
- 20 pots

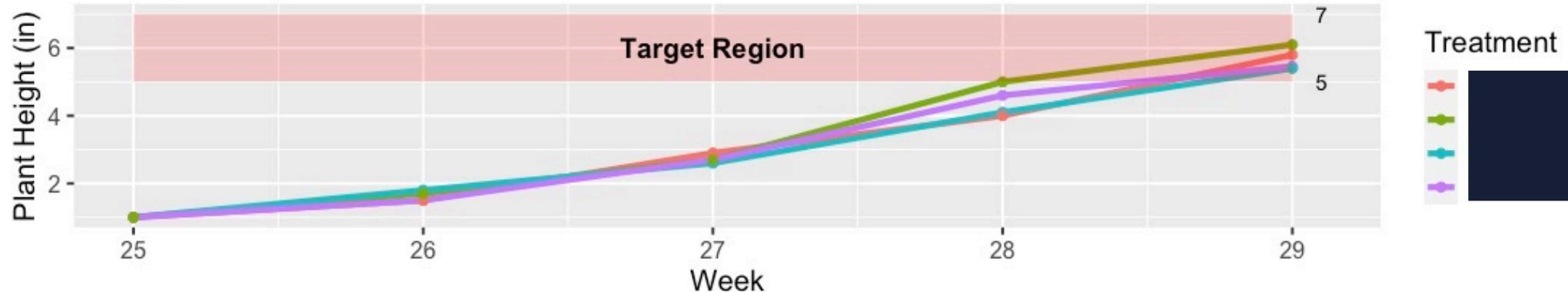
- Trial
- 5lb (16-6-12) 3-4m
- 20 pots

- Trial
- 5lb (16-5-11) 90d
- 20 pots

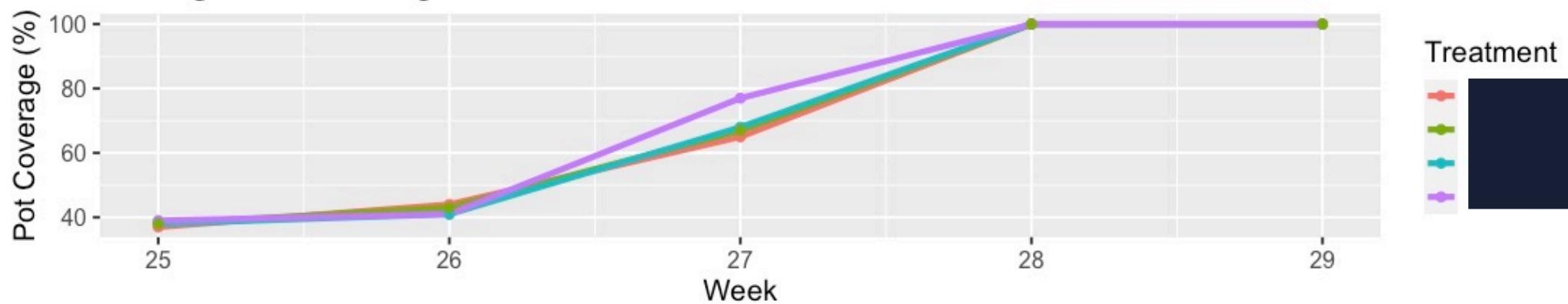
- Trial
- 7lb (14-6-16) 70d
- 20 pots

PLANT HEIGHT AND POT COVERAGE

Average Height vs Week



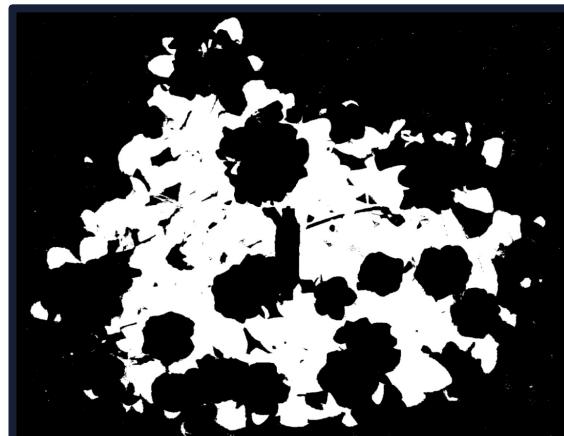
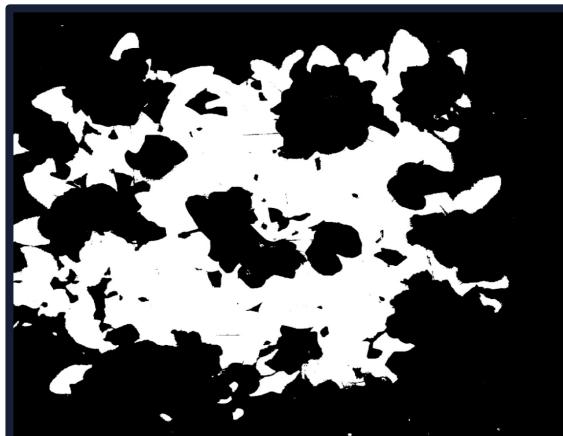
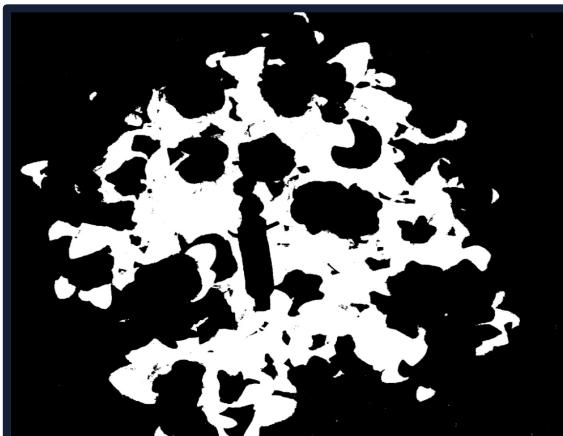
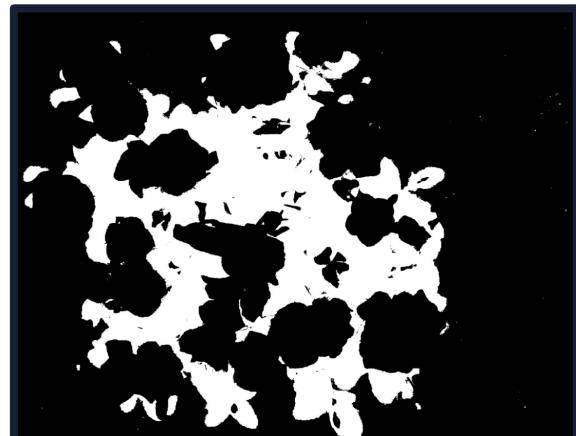
Average Pot Coverage vs Week



PH AND EC



VISUAL - WEEK 29



22.30%

26.20%

30.85%

27.33%



TRIAL 2

- 1.50GL Catharanthus - Vinca, Cherry Red Halo
- Grower: [REDACTED]
- SW: 24
- FW: 29

FIELD IDENTIFICATION



- Control
- 5lb (14-4-14) 70d
- 20 pots



- Trial
- 5lb (16-6-12) 3-4m
- 20 pots

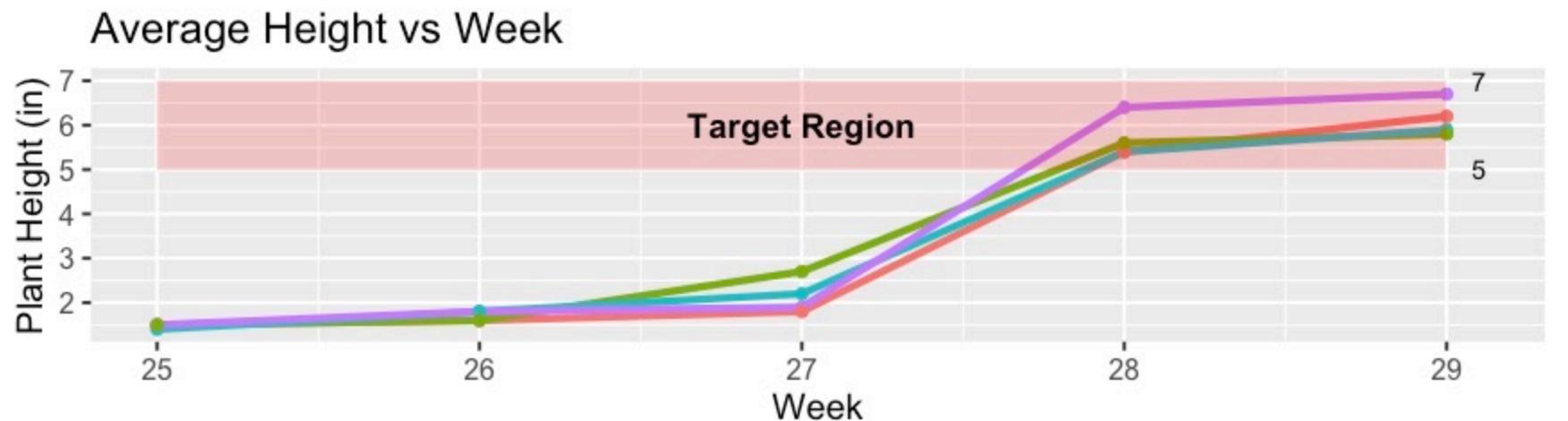


- Trial
- 5lb (16-5-11) 90d
- 20 pots



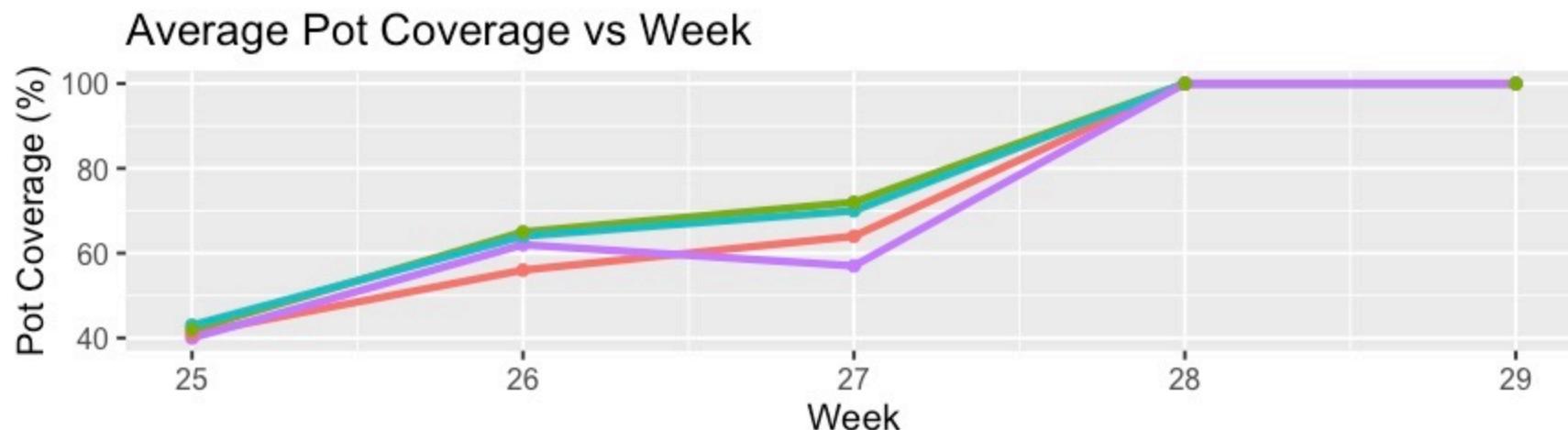
- Trial
- 7lb (14-6-16) 70d
- 20 pots

PLANT HEIGHT AND POT COVERAGE



Treatment

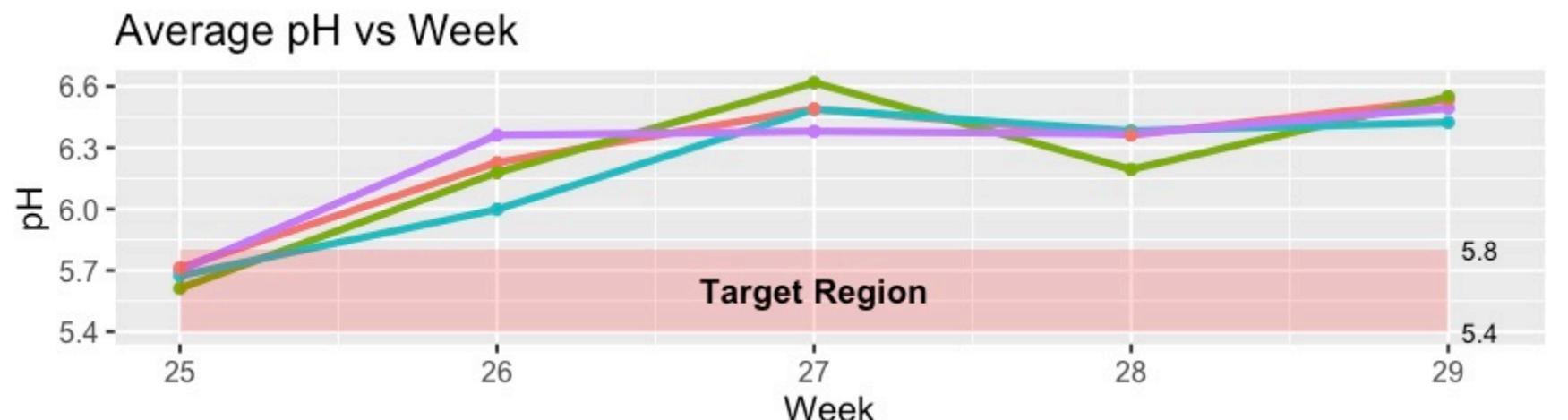
- Red
- Green
- Blue
- Purple



Treatment

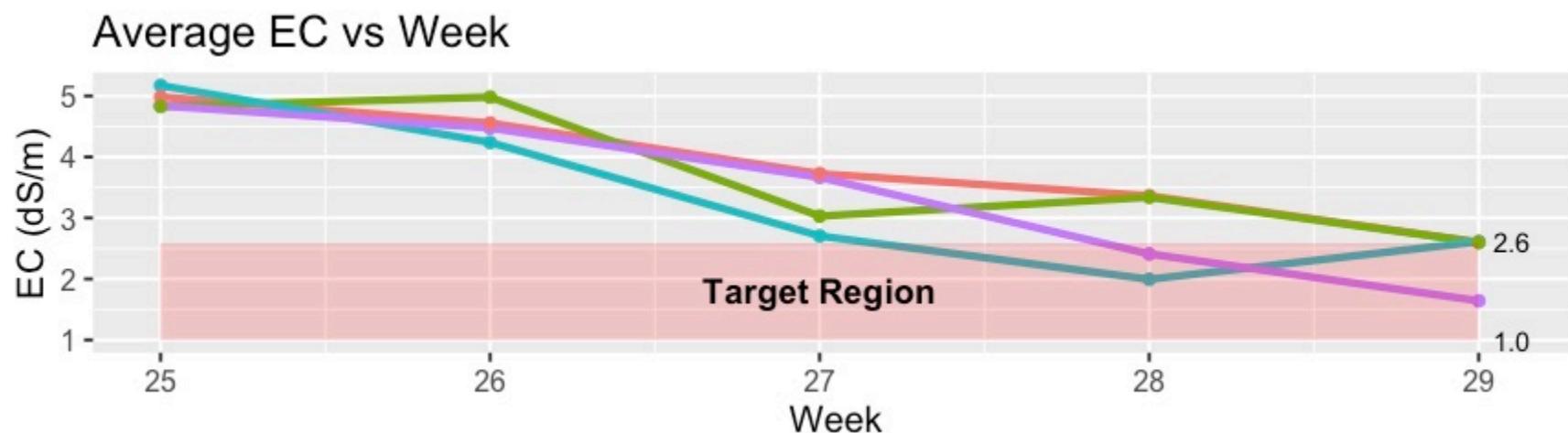
- Red
- Green
- Blue
- Purple

PH AND EC



Treatment

- Red
- Green
- Cyan
- Purple



Treatment

- Red
- Green
- Cyan
- Purple

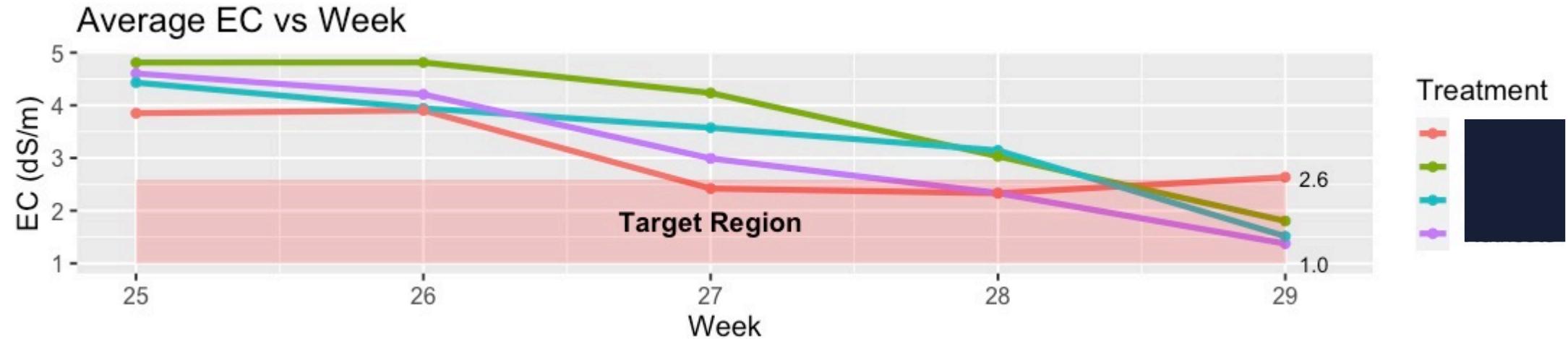
GROWER SAYS...



Week 26

- [Redacted] (F.1) grew fast
 - Needed extra PGR
- Other plants similar
- Same for 1.00PT

KRUSKAL WALLIS TEST - TRIAL 1

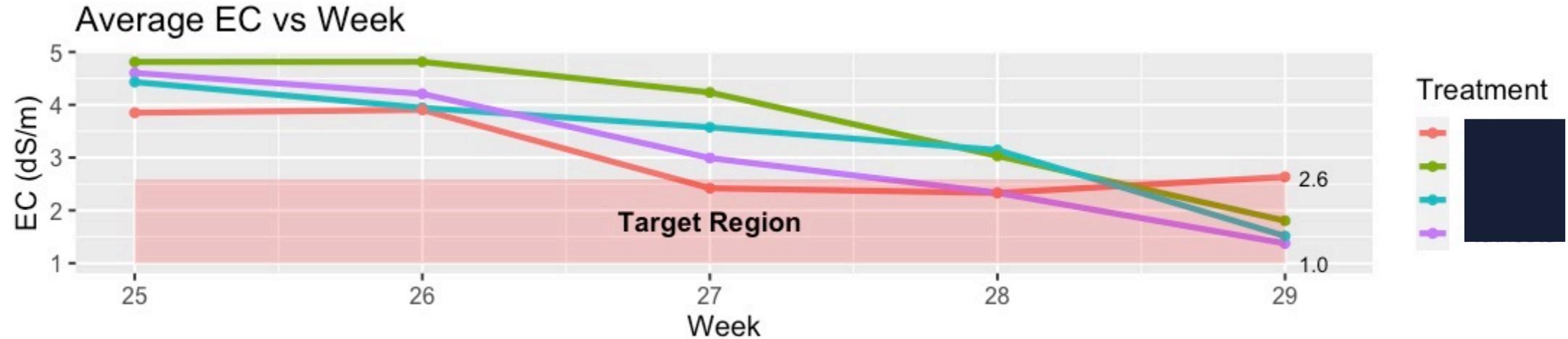


Week 26: Not Significantly Different ($p = 0.46 > \alpha = 0.05$)



Week 27: Are Significantly Different ($p = 0.02 < \alpha = 0.05$)

WILCOX TESTS - WEEK 27

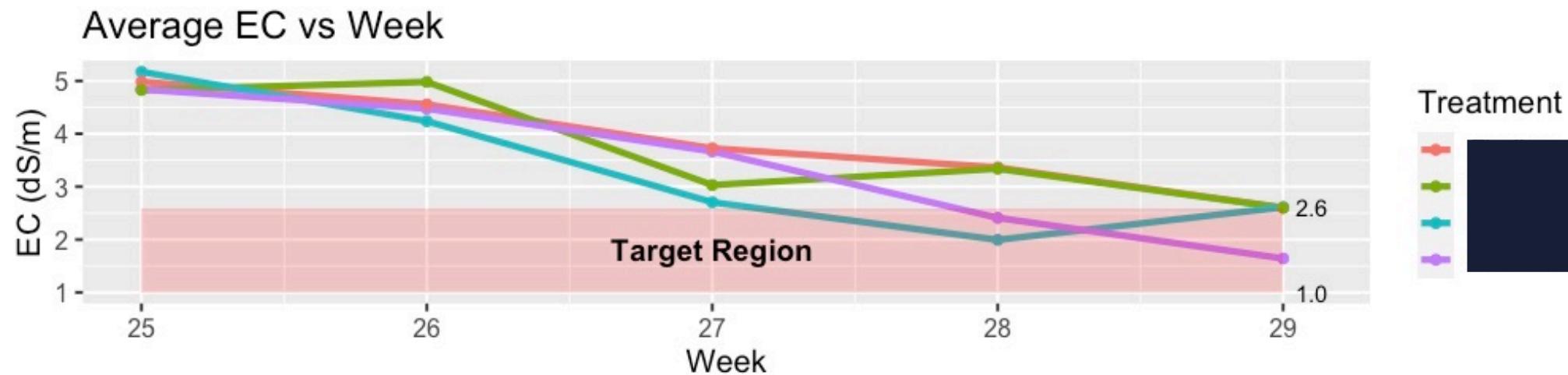


✗ [REDACTED] is Not Significantly Different from [REDACTED] ($p = 0.03 > \alpha = 0.05/4$ tests = 0.0125)

✓ [REDACTED] is Significantly Different from [REDACTED] ($p = 0.008 < \alpha = 0.05/4$ tests = 0.0125)

✓ [REDACTED] is Significantly Different from [REDACTED] ($p = 0.008 < \alpha = 0.05/4$ tests = 0.0125)

ANOVA - TRIAL 2



Week 26: Not Significantly Different ($p = 0.769 > \alpha = 0.05$)



TRIAL 3

- 1.00PT Celosia - Feather, Castle Yellow
- Growers: [REDACTED]
- SW: 24
- FW: 28

FIELD IDENTIFICATION



- Control
- 5lb (14-4-14) 70d
- 36 pots

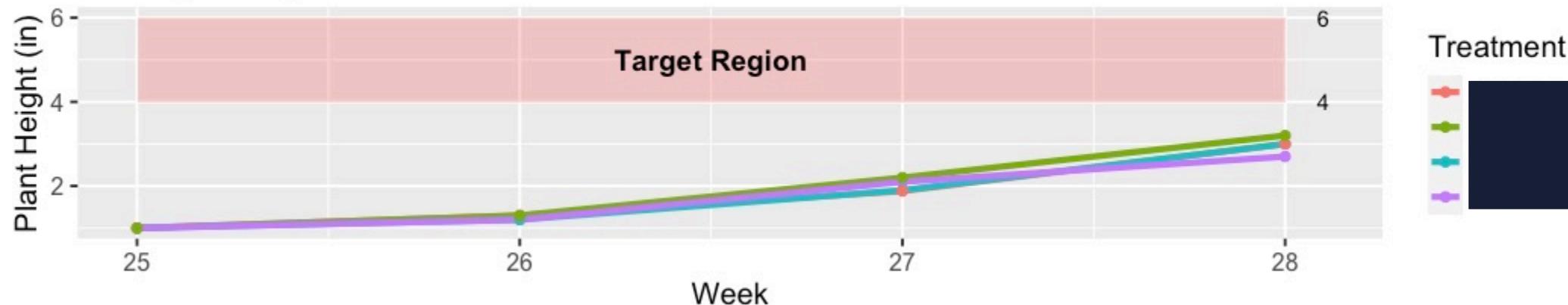
- Trial
- 5lb (16-6-12) 3-4m
- 36 pots

- Trial
- 5lb (16-5-11) 90d
- 36 pots

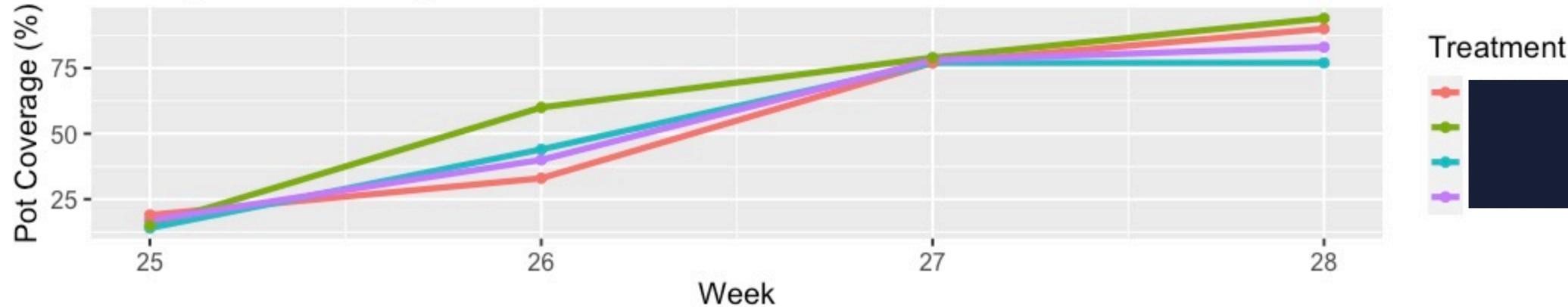
- Trial
- 7lb (14-6-16) 70d
- 36 pots

PLANT HEIGHT AND POT COVERAGE

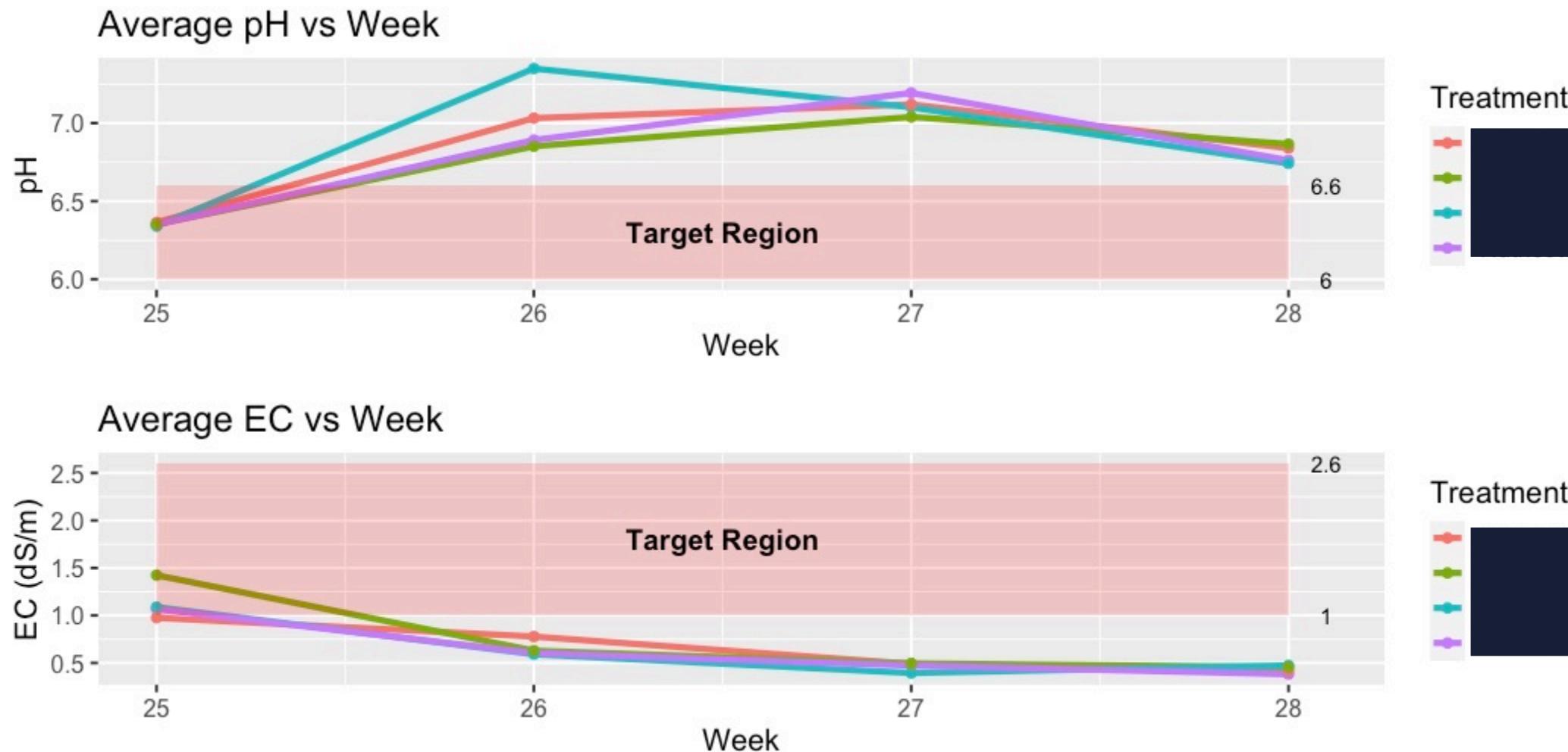
Average Height vs Week



Average Pot Coverage vs Week



PH AND EC



GROWERS SAY...



- [REDACTED] (E.1), [REDACTED] (D.1) -
best performance
 - More compact, fuller
- [REDACTED] (A.1), [REDACTED] (F.1) -
still acceptable

Week 28



TRIAL 4

- 1.00PT Tagetes - French Marigold, Hot Pak Fire
- Growers: [REDACTED]
- SW: 25
- FW: 29

FIELD IDENTIFICATION



- Control
- 7lb (14-4-14) 70d
- 36 pots

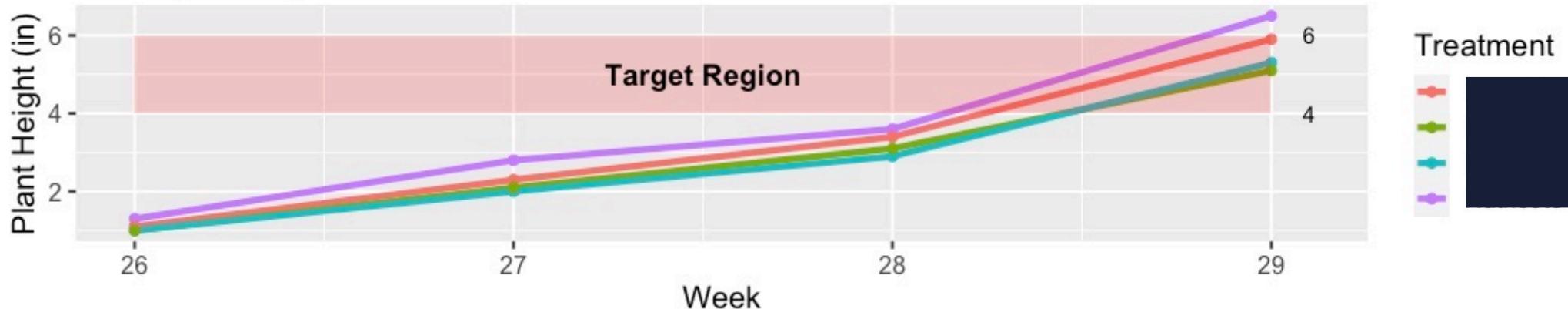
- Trial
- 6lb (16-6-12) 3-4m
- 36 pots

- Trial
- 7lb (16-5-11) 90d
- 48 pots

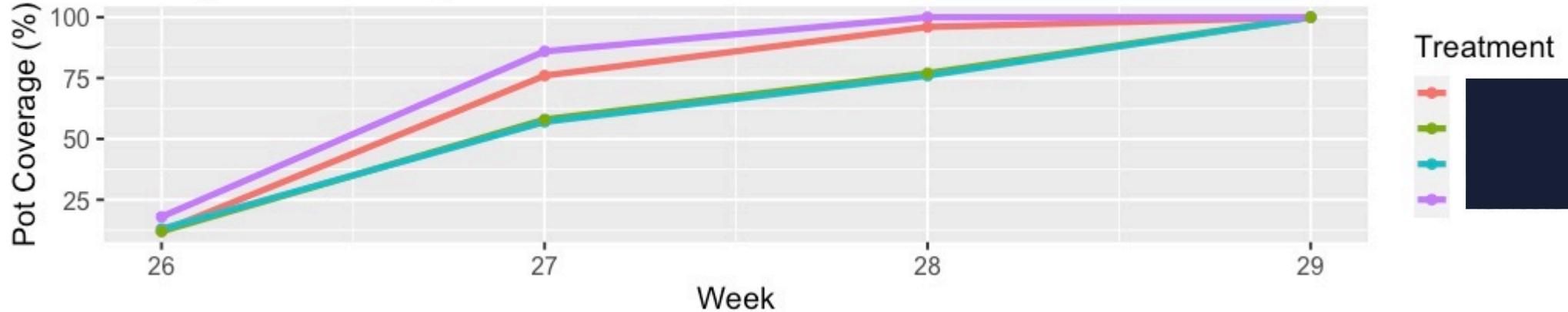
- Trial
- 7lb (14-6-16) 70d
- 36 pots

PLANT HEIGHT AND POT COVERAGE

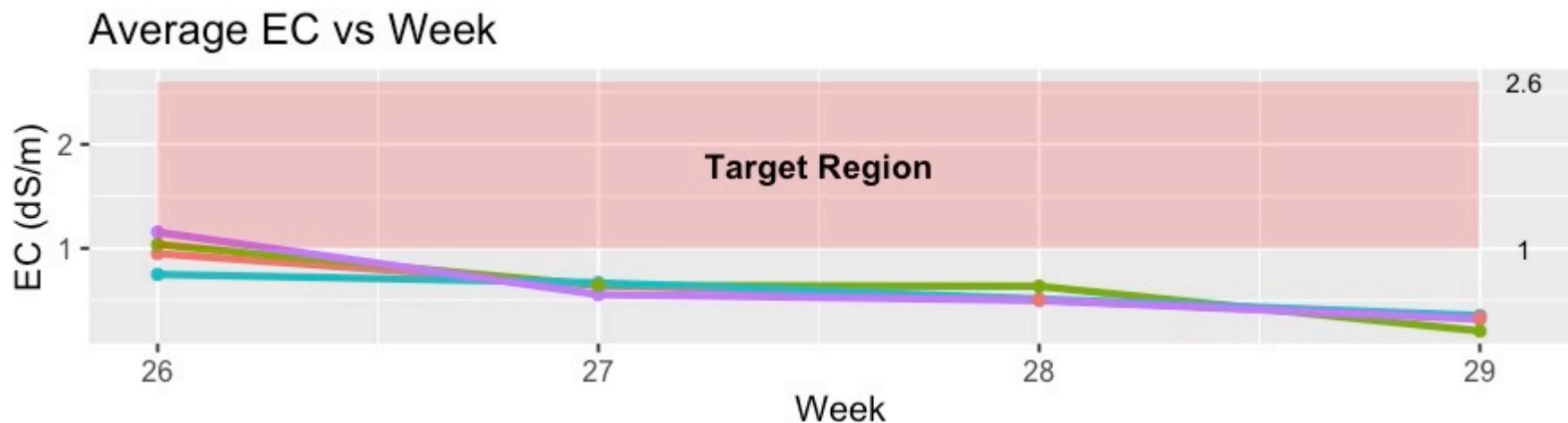
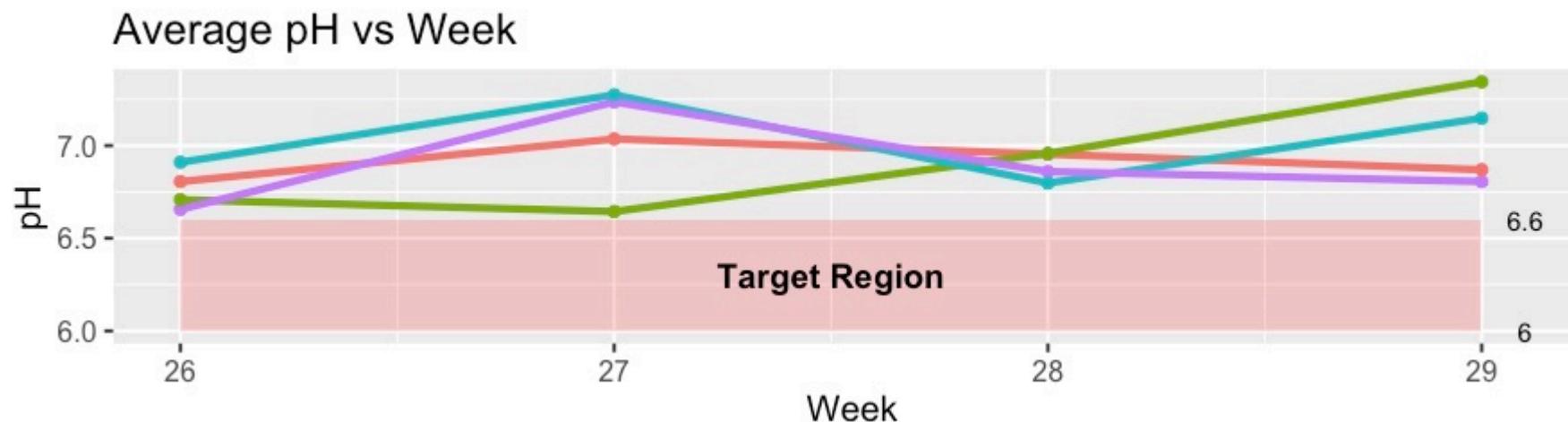
Average Height vs Week



Average Pot Coverage vs Week



PH AND EC



GROWERS SAY...

- (E.2), ■ (A.3) - best performances
 - Flowering, fullness, color
- (F.1), ■ (D.4) - weaker



Week 29

AGENDA

- 1 Big Picture
- 2 Methods
- 3 Results
- 4 Takeaways



IMPORTANT NOTES

Organization

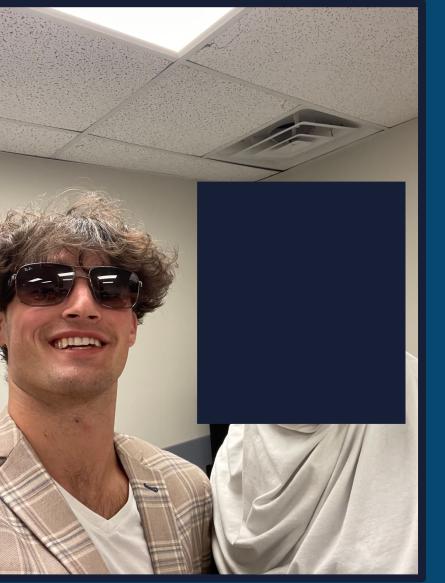
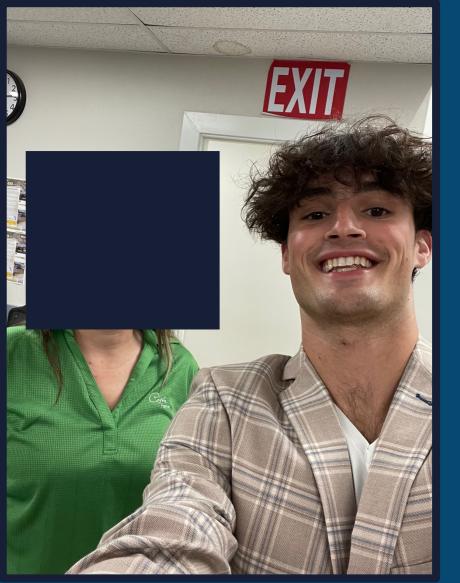
- Some trials sold
- Some trials moved
- Unprepared at potting line

Consistency

- Differing poundage in trials
- All potting at end of week

Moving Forward

- More photos
- Work in nutrient data
- Obtain accurate pricing



THANK YOU!



SOURCES

- <https://app-knovel-com.proxy.library.cornell.edu/kn/resources/kpCRFSA004/toc>
- [Purdue EC, PH SUBTRATE CONTAINER](#)
- <https://www.css.cornell.edu/courses/260/Media%20testing.pdfCROPS.pdf>



costa
FARM S[®]

GROW WITH US[®]
costafarms.com

