



# Superior Potassium Power



ADVANCED AGRONOMY  
**BOOTCAMP**

# Potassium... Why do we need it?

## Why Apply Potassium?




- 💧 Water Uptake and Utilization
- 💧 Nutrient Transport
- 💧 Growth in adverse environmental conditions
- 💧 Fruit and Nut Quality (size, shape, taste, storage)
- 💧 Decrease disease and insect pressure
- 💧 Photosynthetic rate

## Why Potassium Acetate?

- 🏆 Superior Solubility
- 🏆 **Greater uptake as a foliar or soil application than other potassium sources**
- 🏆 Carbon-based molecule has biostimulant effects in the plant and soil
- 🏆 **Drought resistance**
- 🏆 Stalk and cell wall strength
- 🏆 Lowest salt and deliquescence



# Current Products

			
Potassium Content	24%	16%	19%
Other Nutrients		11% N	6% Sulfur
% KA	100%	100%	55%
Common Rates	1-10 GPA	1-5 GPA	1-5 GPA



# Why KILO?

## **Superior Source of K**

KILO is 100% potassium acetate and manufactured by Wilbur-Ellis

## **Superior Solubility**

The most soluble K-source with the lowest salt index and deliquescence

## **Not Just Potassium**

Carbon source of Acetate drives additional plant and soil benefits

## **Proven**

Increases more than yield – Brix, Quality, Storability, Stalk strength

## **Rapid Uptake & Use**

Increases tolerance to frost, heat, and drought by regulating acetate biosynthesis pathway

## **Bio Support**

Boosts soil microbial activity and supports energy production within the plant





# How Much Water Does it Take?

K Source	g/100 mL	Relative Amount of Water
Potassium Acetate (FOLI-GRO KILO)	286.6	
Potassium Hydroxide	121.0	2.4 Times More
Potassium Carbonate	112.6	2.5 Times More
Potassium Sulfite	107.0	2.7 Times More
Potassium Thiosulfate	96.1	3.0 Times More
Potassium Chloride	34.3	8.4 Times More
Potassium Nitrate	31.6	9.1 Times More
Potassium Magnesium Sulfate	24.4	11.7 Times More
Potassium Sulfate	11.1	25.8 Times More

# Why is Potassium Critical?

**S. Perrenoud reviewed more than 2,400 research projects demonstrating the positive effect of adequate K nutrition on diseases/insect infestation and effects on crop yield.**

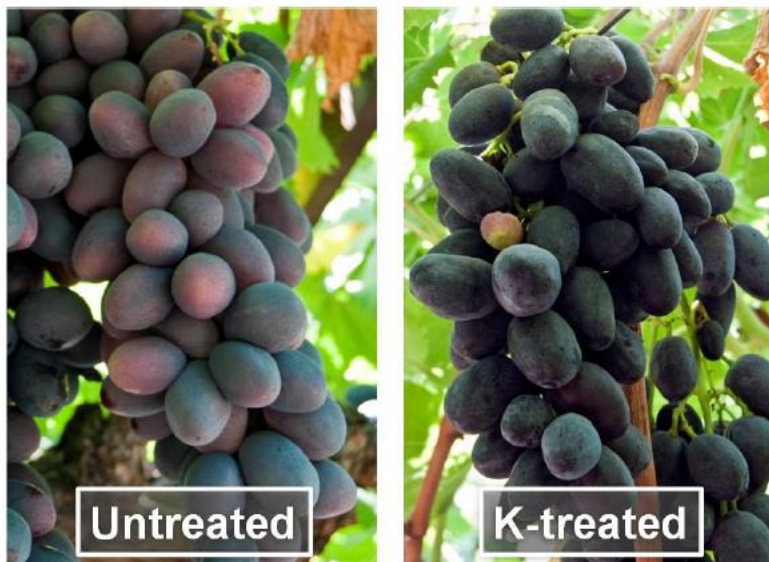
Disease/Pest	% decrease in incidence	% increase in crop yield
Bacterial	-69	+57
Fungal	-70	+42
Insect	-63	+36
Viral	-41	+78



# Why is Potassium Critical?

**“Influence of cluster-directed applications of potassium salts and other compounds before harvest on postharvest quality and decay of table grapes.”**

**Joseph L. Smilanick, Monir Mansour, Franka Mlikota Gabler, Dennis Margosan, Gabriel Verduzco, USDA-ARS, Research Plant Pathologist USDA ARS San Joaquin Valley Agricultural Sciences Center 9611 S. Riverbend Ave., Parlier, CA 93648 and Jennifer Hashim, (formerly) UCCE Farm Advisor Kern County, 1031 South Mount Vernon Avenue, Bakersfield CA. 93307**



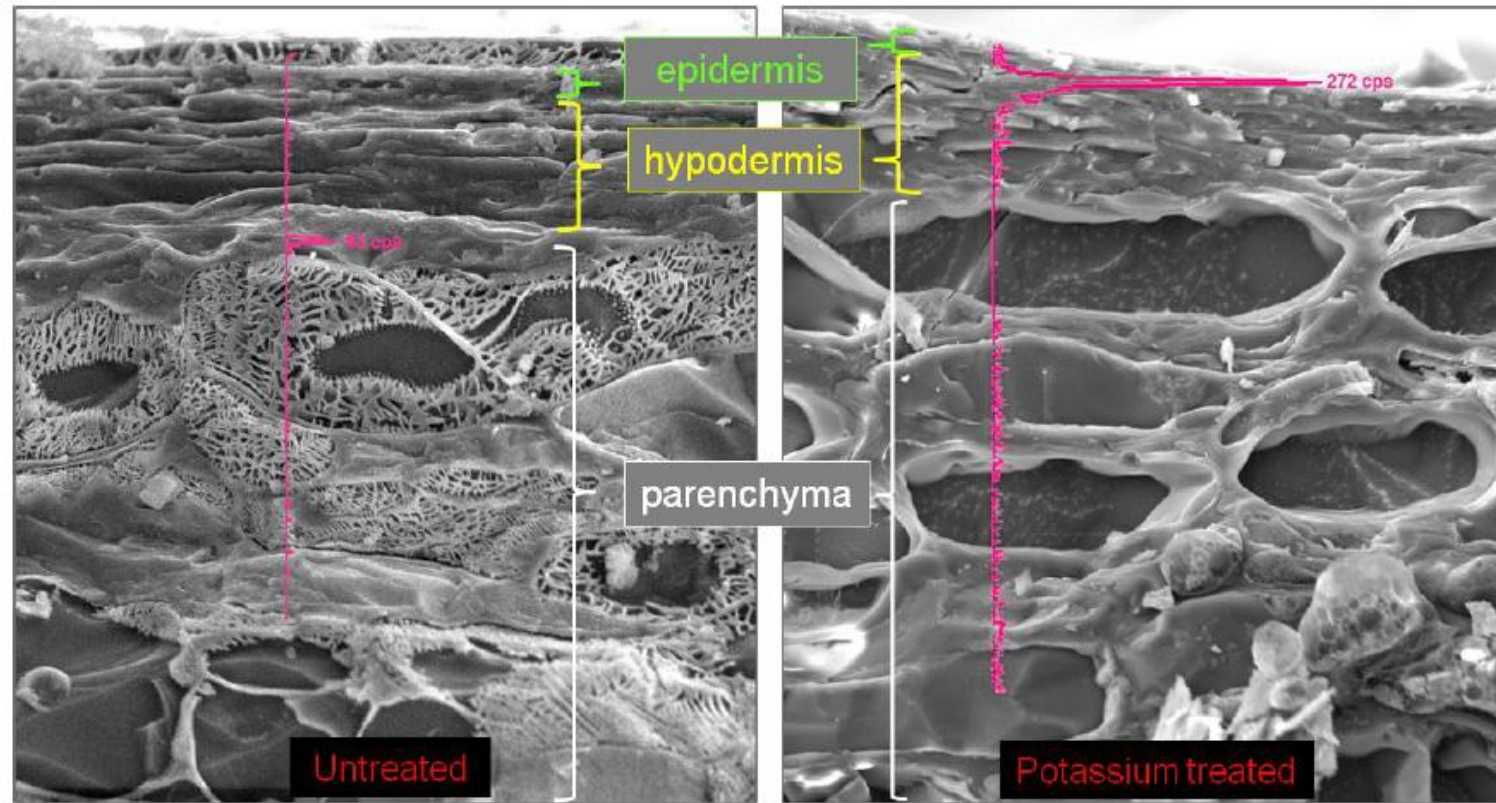
**Figure 2.** Appearance of ‘Autumn Royal’ table grapes on Aug 18, 2009, after three applications of potassium metalosate. Soluble solids of the untreated grapes were 15.2% and those of the potassium-treated grapes were 20.2%.



**Figure 1.** Appearance of ‘Sweet Scarlet’ table grapes at harvest on Aug 5, 2009, after four applications of potassium metalosate. Soluble solids untreated were 16.0% and those potassium-treated were 19.5%.



# Why is Potassium Critical?



**Figure 6.** Potassium distribution within 'Redglobe' table grapes after the onset of veraison. Potassium sorbate ('K-sorbate; 0.5% wt/vol) was sprayed into clusters on June 2, June 23, July 28, and August 19, 2009. Red line indicates potassium content. In untreated grapes, potassium was located near the bottom of the hypodermis, in potassium treated grapes, most potassium was located in layers 3 to 5 of the hypodermis.

# Enough Basics on Potassium Nutrition

## Let's Talk About Potassium Acetate



- 🌱 “The Foliar Absorption of Potassium from Organic and Inorganic Potassium Carriers”
- 🌱 Shafer and Reed, Texas A&M Horticultural Science
- 🌱 Journal of Plant Nutrition, 1986

# Foliar Potassium Source Trials

- 🧪 31 different \*organic and inorganic K sources
- 🧪 Applied to most recently matured leaves on soybean
- 🧪 Measured % K absorbed after 48 hours
- 🧪 Highly replicated

\* acetate, formate, lactate, malate, sorbate, citrate and others

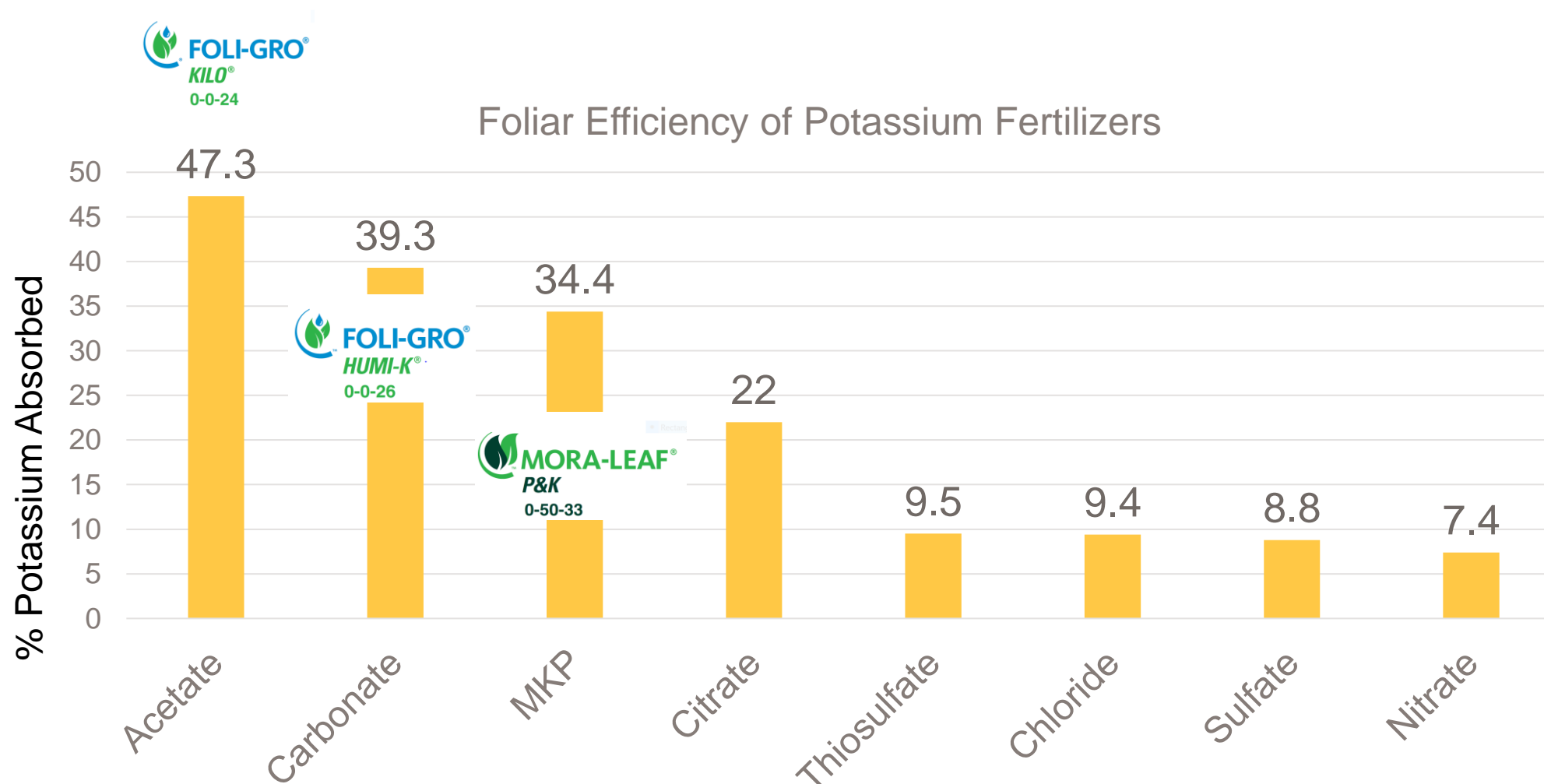
Texas A&M, Plant Nutrition, 9(2), 143-157

# Foliar Potassium Source Trials Findings

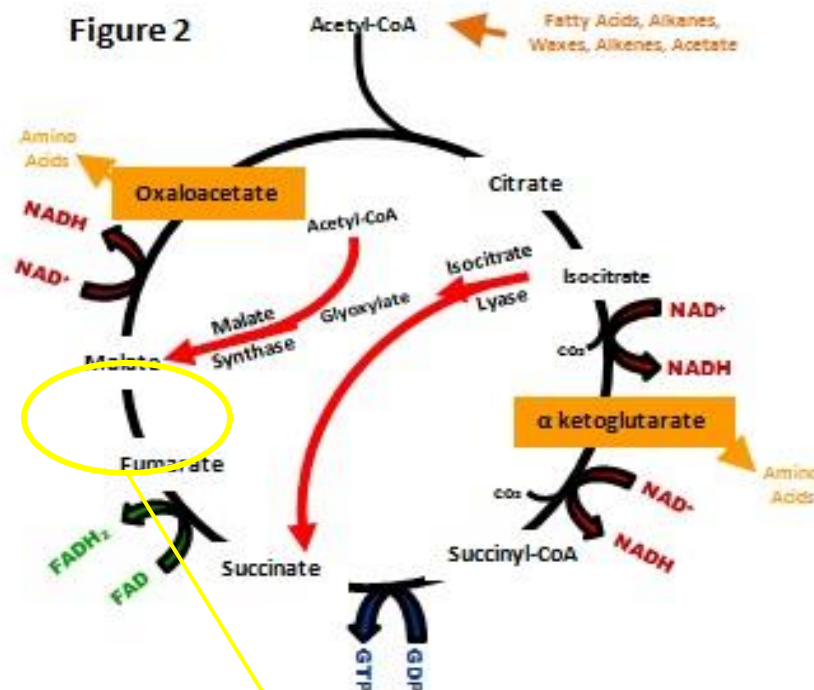
- 🍃 ***“Potassium acetate had the highest percent K absorption”*** and did not cause burn
- 🍃 **Organic K compounds performed better than inorganic**
- 🍃 **Two exceptions: potassium bicarbonate and mono potassium phosphate (MKP)**
- 🍃 **Organic sources remained wet on the leaves**



# Foliar Potassium Source Trials



# Acetate as a Food Source for Plants



Acetate can boost plant energy & metabolism once inside the plant

Key regulating pathway in cell metabolism

FOLI-GRO KILO & TILL-IT KOMPOUND provide Potassium Acetate – the carbon based, soluble, active K-source.

Important role in cell ionic balance and cotton fiber elongation.

# Acetate-mediated novel survival strategy against drought in plants

Kim et al., 2017

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- Studied drought tolerant plant types
- ABP was upregulated during drought
- ABP = Acetate Biosynthesis Pathway
- Promoted production of acetate in plants

Water  
HCl  
Formic acid  
Acetic acid  
Butyric acid  
Lactic acid  
Citric acid



**Applied Treatment & Induced Drought for 14 Days**





Water  
HCl  
Formic acid  
Acetic acid  
Butyric acid  
Lactic acid  
Citric acid

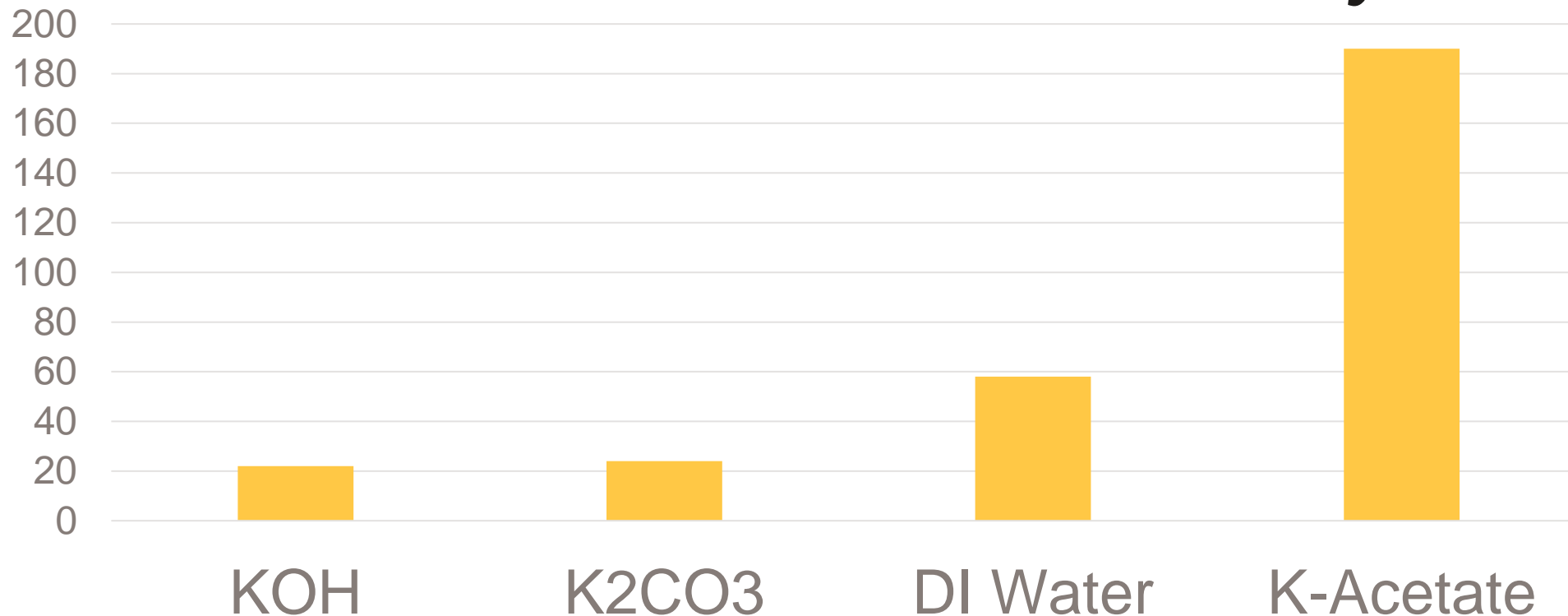


**Applied Treatment & Induced Drought for 14 Days**



# Texas A&M AgriLife Extension – Lubbock, TX

## *Soil Microbial Biomass Carbon Study*



4 gpa each added to PGPR





**WE**

# Effect of high rate Foli-Gro Kilo on Peppers with Desert Mist

## R&D Trial Results

## Product Support Summary

**Trial Code**  
**WCR23N110CC610**

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**WILBUR-ELLIS**  
AGRIBUSINESS

# Foli-Gro Kilo/ Peppers / Yield, Quality



## Objective

- To evaluate the effect of Foli-Gro Kilo on pepper fruit size and weight
- To evaluate the effect of Foli-Gro Kilo on pepper at high rates
- To evaluate the effect of Foli-Gro Kilo on pepper with drip injection

## Methods

- Application dates:
- **Grower: Desert Mist- Domingo Ranch**
- Application Method: drip injected
- Evaluations: Yield (n=32), plant height, canopy NDVI, fruit count/sizing/area, fruit BRIX
- Evaluation dates: May 17 (with Paul)

Trial Details			
Crop(s), Variety	Sweet Bell Peppers	Year Established	2023
Location	Thermal, CA Desert Mist - Domingo	Discipline	Nutrition
Target	Yield and Quality	Manager	Dan Jones, Patrick Troy
Team	WCR	Investigator	Paul Darroch
Other		Trial Number	WCR23N110CC610

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WCR23N110CC610



# Foli-Gro Kilo/ Peppers / Yield, Quality

TREATMENT LIST		
Trmt	Product	Rate
1	Grower standard	2-0-8 (xx gal)
2	Foli-Gro Kilo	2 x 12gal= 24 gallons across season

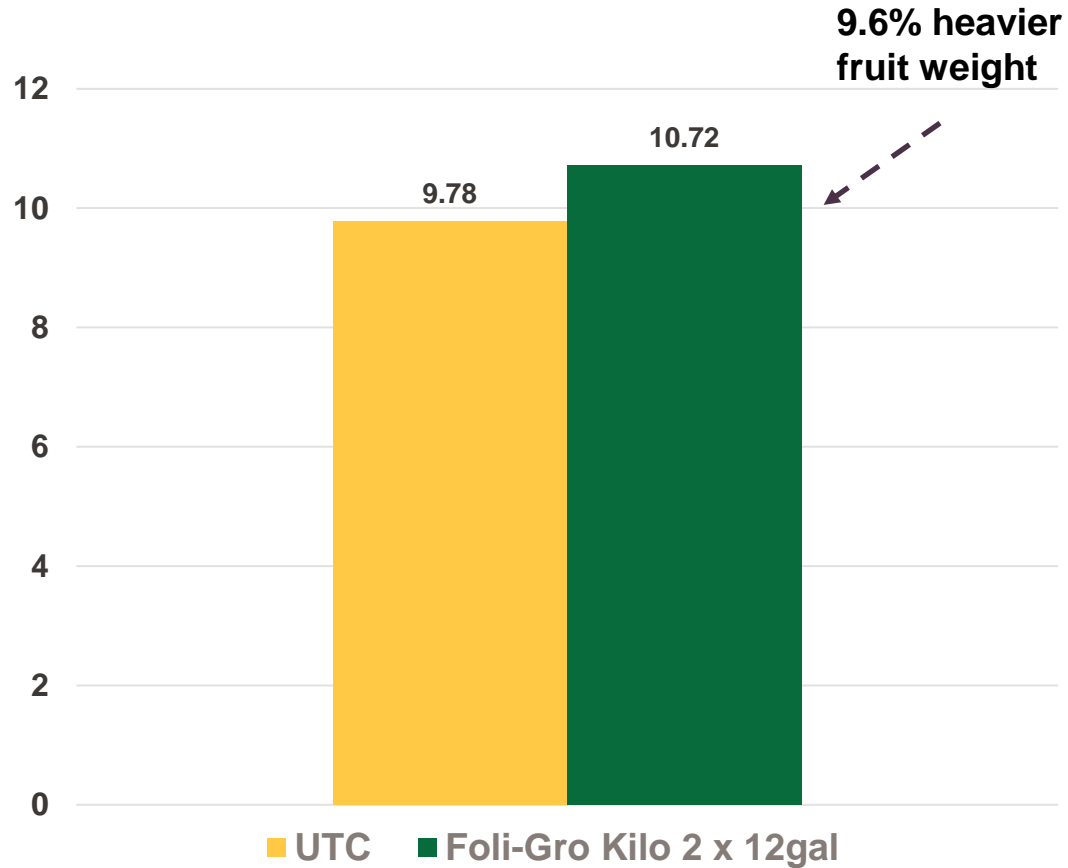


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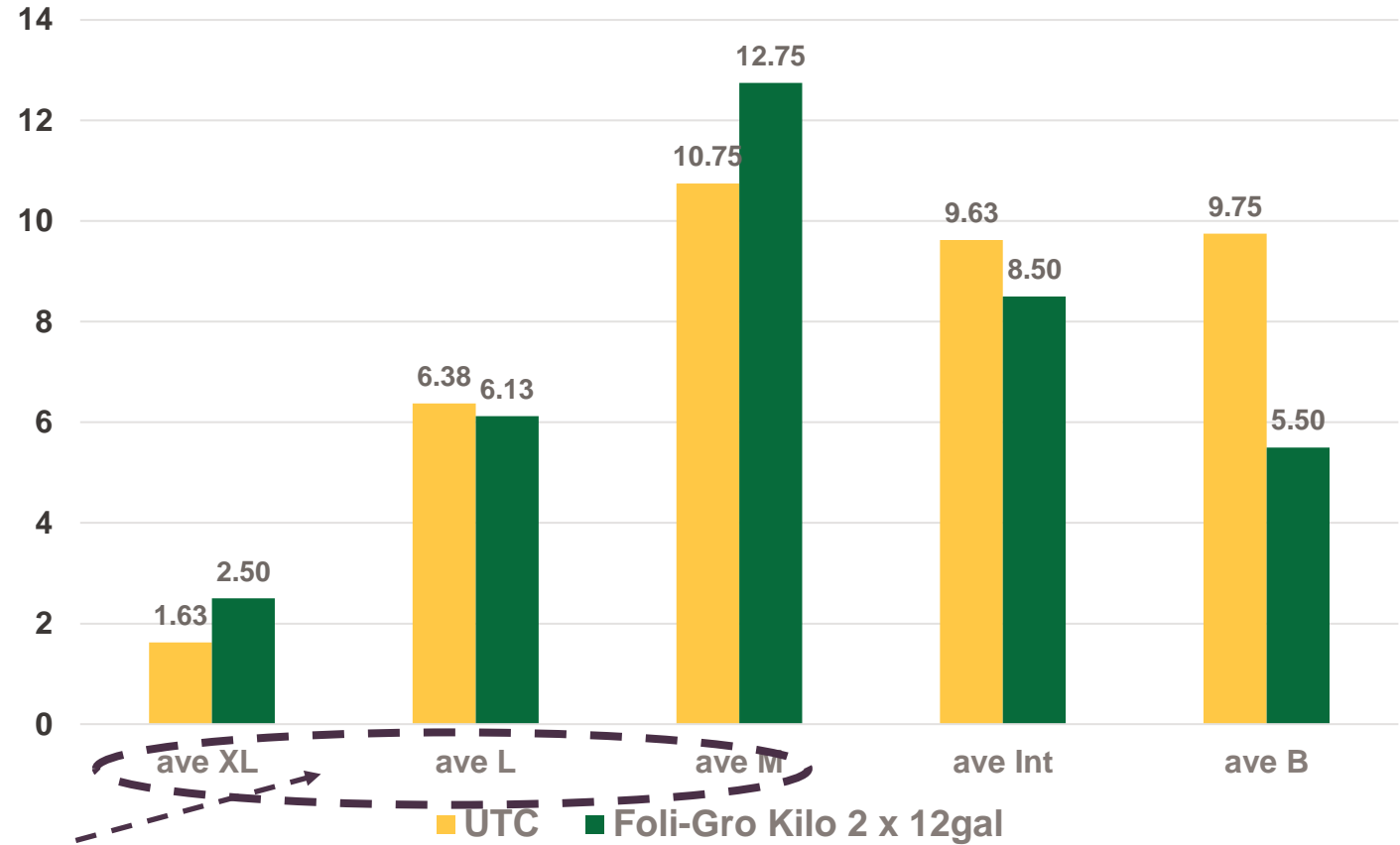
# Foli-Gro Kilo/ Peppers / Yield, Quality

fruit weight (4 plant subsample) 104 DAA in  
Mecca, CA 5.17.23

Subsample of 4  
plants measured 8  
x across the field



## Fruit size (4 plant subsample)



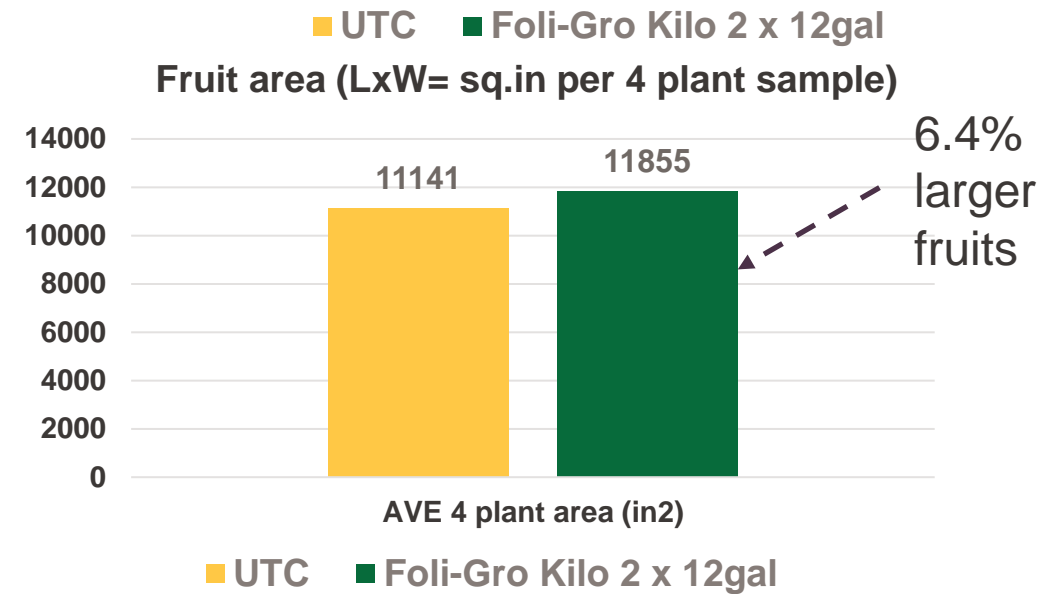
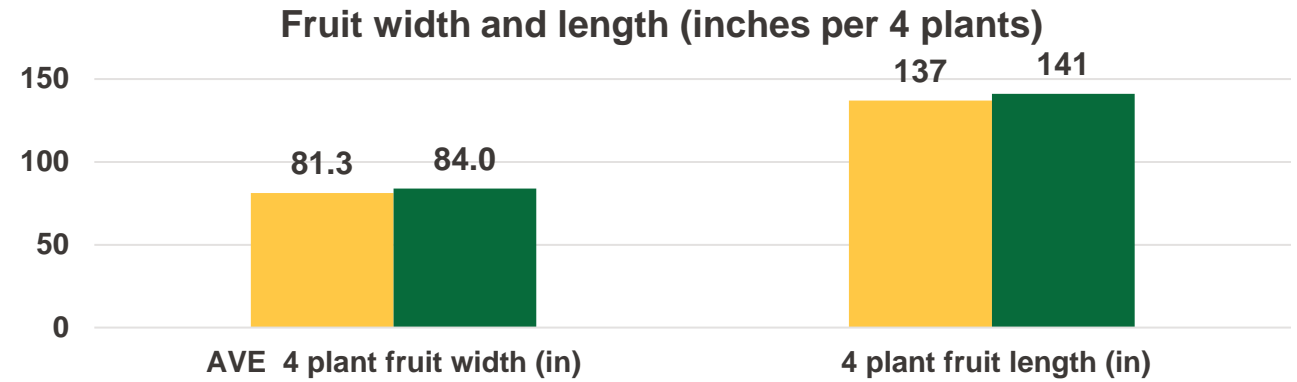
14% more marketable sizes

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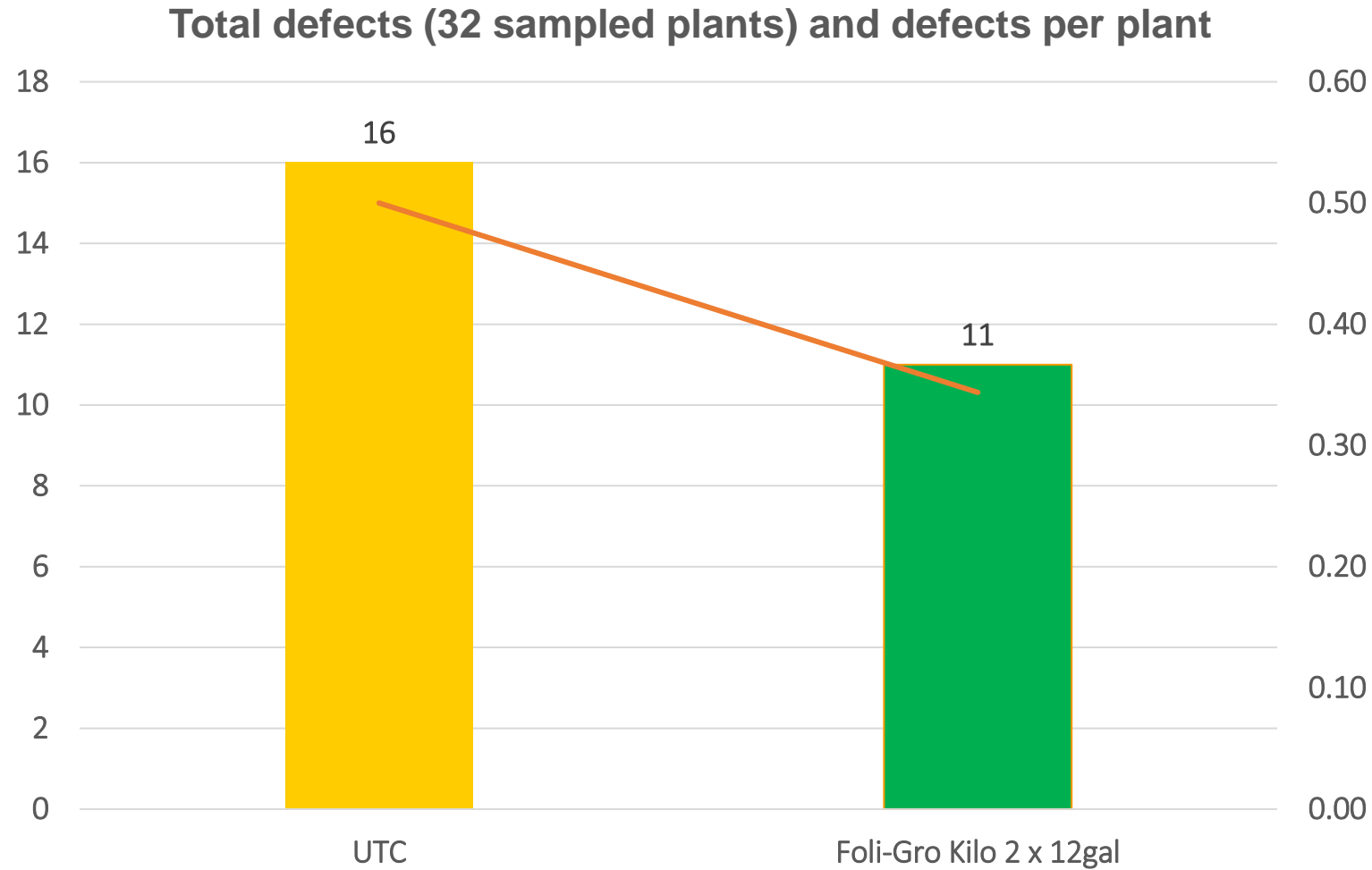


# Foli-Gro Kilo/ Peppers / Yield, Quality



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# Foli-Gro Kilo/ Peppers / Yield, Quality



FG Kilo treatment recorded 31.3% less damaged fruit



Red line is number of fruits damaged per plant



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# Foli-Gro Kilo/ Peppers / Yield, Quality

## Key Learnings

- FG Kilo had 9.6% higher fruit weight
- FG Kilo had 14% more marketable fruit
- FG Kilo had 6.4% larger fruits
- FG Kilo had 2.2% taller plants
- FG Kilo had = fruit BRIX
- FG Kilo had 1% higher NDVI (green)
- FG Kilo had 26% fewer Defects

4 plant subsample  
(2 adjacent plants  
S+N facing)→

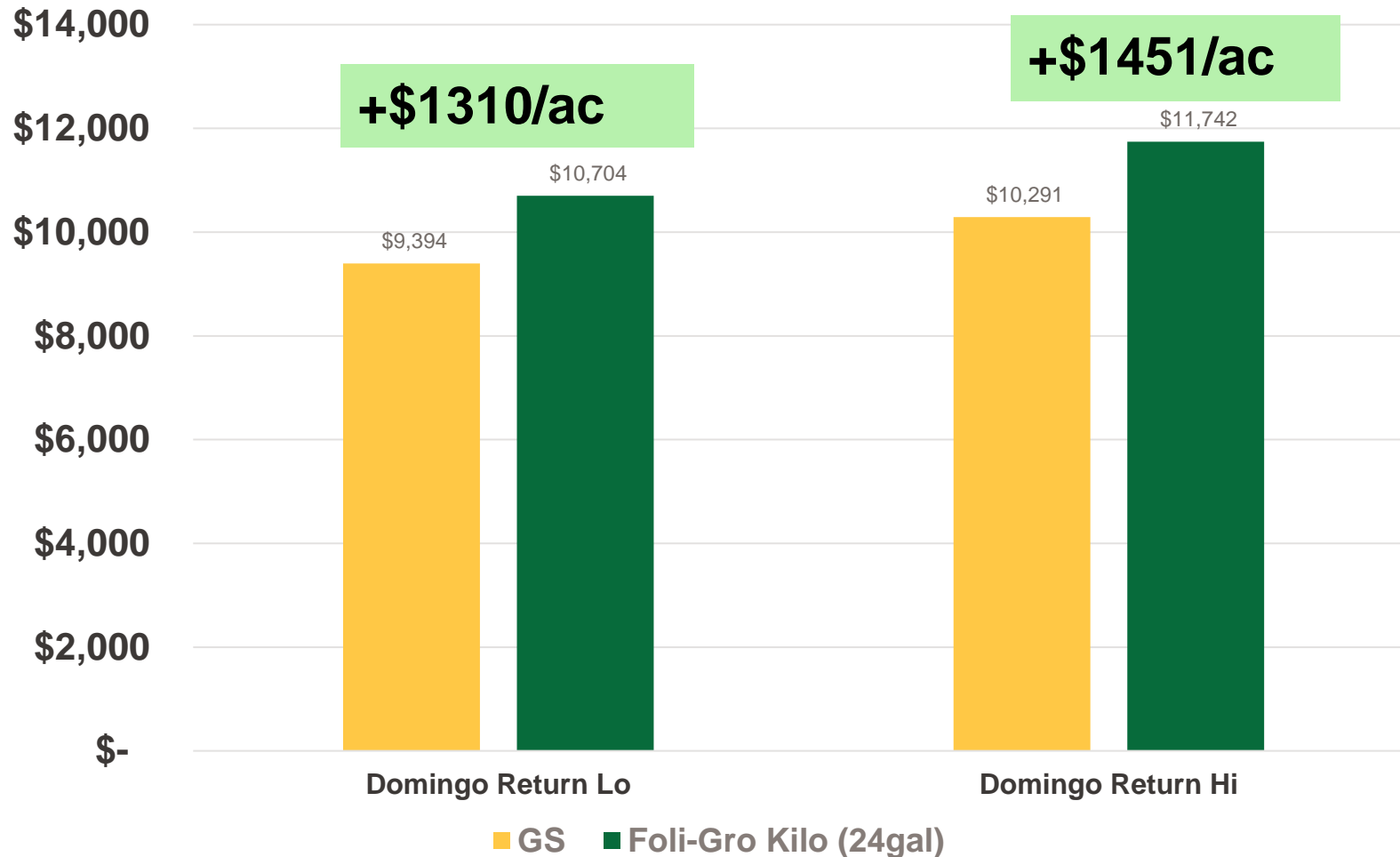


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# Foli-Gro Kilo/ Peppers / Yield, Quality

Comparable returns for low and high priced bell peppers in Mecca, CA



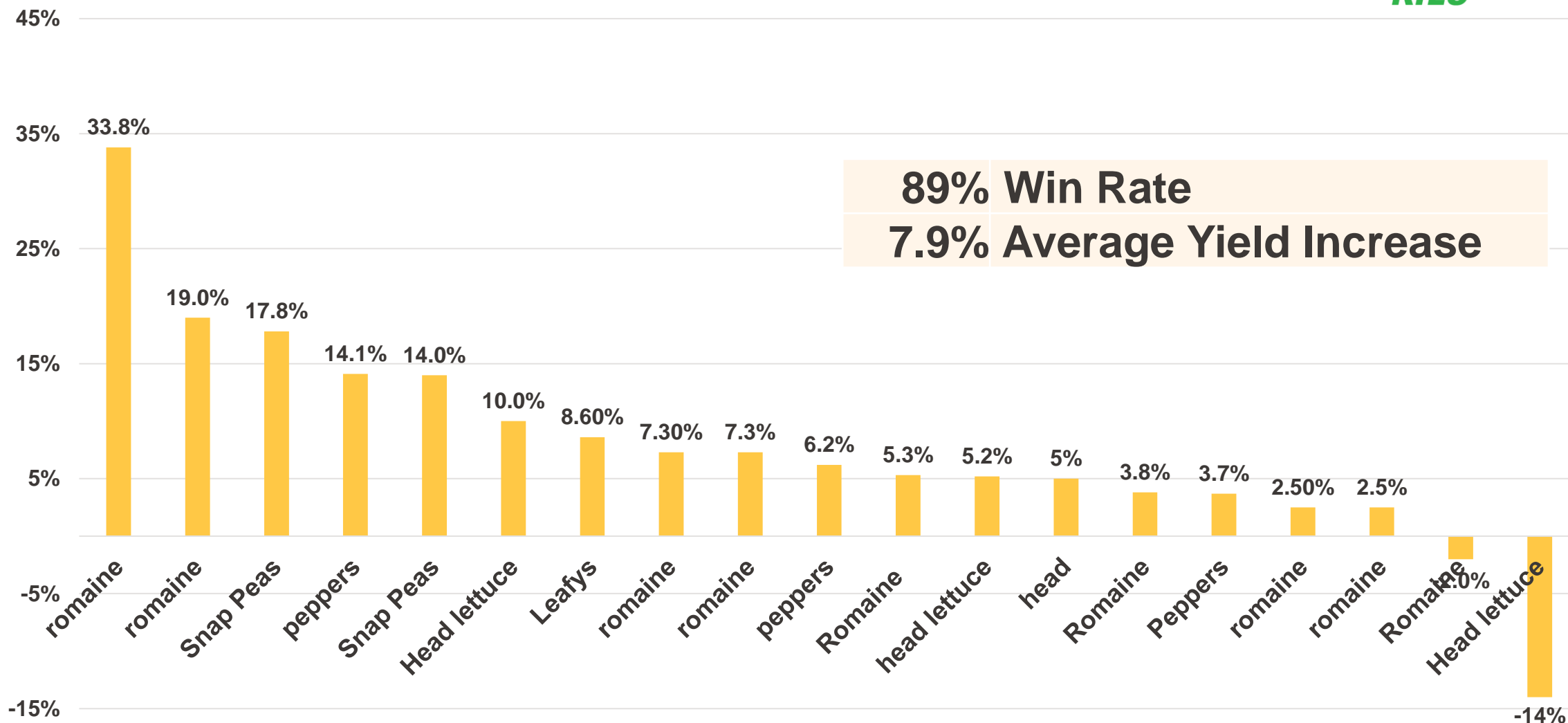
Using 20,000 plants per Acre  
~95% final Stand  
XL fruit count 50-55/box  
Lg fruit count 60-65/box  
Med fruit count 70-78/box

**Est. Gross Value per box**  
\$20- 8 for PP& cooling=\$12  
\$18- 8 for PP& cooling=\$10  
\$12- 8 for PP& cooling=\$4

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# 2022-23 Foli-Gro Kilo Yield Increase





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# 2024 Wheat Yield Vision™

## [INTERNAL USE ONLY]

**Trial Number**  
**PCR 24- 05**



WILBUR-ELLIS.

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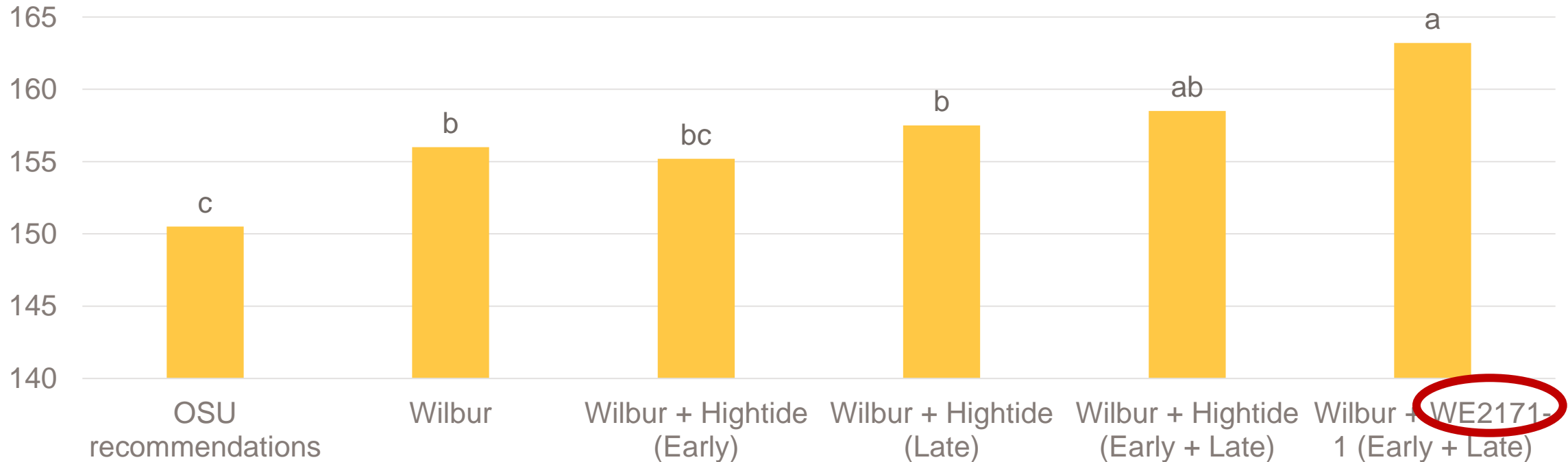


**ADVANCED AGRONOMY** ACADEMY®

# Background

We are continuing to refine the wheat Yield Vision™ program in 2024. In 2023, there was a strong response to Hightide + Kilo. We wanted to see if it would hold up in 2024.

2023 Yield (bu/ac) 13.5% moisture adjusted



Mix of Hightide + K-  
acetate (aka Kilo)





# Objectives

- Evaluate products/programs to build on our Yield Vision™ program

- August soil test before fertilizer application
- Fert application: 9/5/23: 300lbs/ac (8-8-33-4S-.0001Mo-1.6Mg)
- P adequate
- K was low

ELEMENT	YOUR RESULTS	INTERP	SHOULD BE
pH-Your Soil	5.3	Strongly Acidic	
pH-Buffer*	5.7	Moderately Acidic	
Soluble Salts Ec-mmhos/cm	0.13	Optimum	< 1.5
% Lime Ca CO <sub>3</sub>	0.0	No crusting expected	
% Organic Matter-LOI	1.46	Very Low	
Nitrates-ppm NO <sub>3</sub> -N	19	Optimum	10 - 35
Ammonium-ppm NH <sub>4</sub> -N	3	Low	5 +
Phosphorus-ppm Olsen-P	30	Optimum	25 - 40
Phos-ppm Bray-P*	66	Optimum	50 - 100
Potassium-ppm K	74	Very Low	300 +
Sulfates-ppm SO <sub>4</sub> -S	10	Very Low	20 +
Calcium-ppm Ca	1504	Low	1,800 +
Magnesium-ppm Mg	94	Very Low	250 +
Sodium-ppm Na	41	Optimum	< 225
Zinc-ppm Zn	0.9	Low	1.0 - 3.0
Copper-ppm Cu	0.6	Low	0.8 - 2.5
Manganese-ppm Mn	9	Optimum	6 - 30
Iron-ppm Fe	96	Very High	25 +
Boron-ppm B	0.3	Very Low	0.7 - 1.5

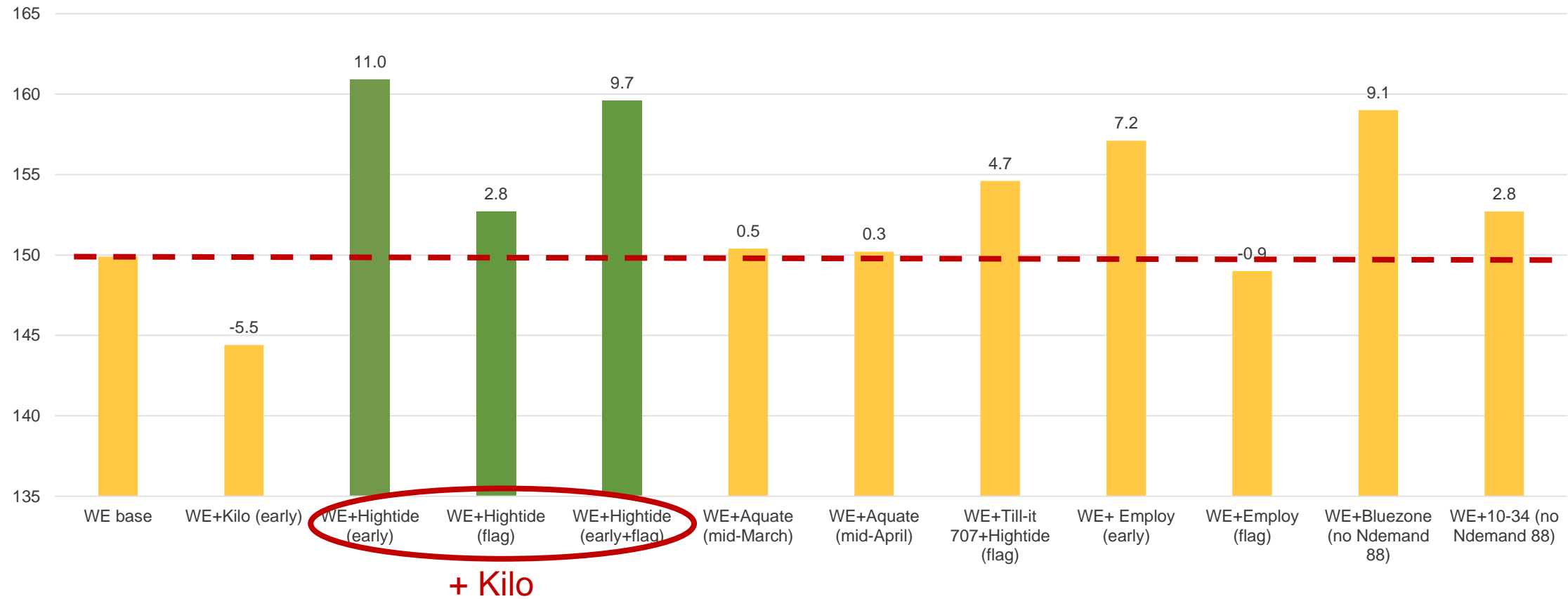
The treatments with Hightide + Kilo applied early (Trts 3 and 4) and Kilo alone (Trt 2) showed the most spring growth (Hightide + Kilo most visually different, on left in picture taken on 4/9/24).



# Results

Yield (bu/ac)

Number above bar is change in bu/ac relative to control



Not statistically significant at P=0.10, but differences at P=0.15

# ROI

Based on wheat price of \$5.4/bu  
(Nov 2024)

Treatment	ROI above WE base program (\$/ac)
Wilbur YV + Foligro Kilo (Early)	-32
Wilbur YV Employ late	-16
Wilbur YV + Aquate Max (later timing)	-15
Wilbur YV + Aquate Max (fungicide timing)	-14
Wilbur YV + Hightide/Kilo (Late)	1
Wilbur YV + Till-it 707	10
Wilbur YV + 10-34	20
Wilbur YV + Hightide/Kilo (Early + Late)	25
Wilbur YV Employ early	28
Wilbur YV + Bluezone	36
Wilbur YV + Hightide/Kilo (Early)	46





# FOLI-GRO KILO Handling

## Remember Solubility Matters:

- There are limits to bulk blends
- 3:1 on APP and Ortho P
- 5:1 on UAN blends
  - Potassium Nitrate has high salt out temp (60-70F)
  - Not an issue with Urea-N and Ammoniacal-N
- Keep the K to N ratio lower than 1:4 with KTS/ATS and UAN blends or add 25% water to 1:1 ratio.
- **DO mix with** - Herbicides, Fungicides, Insecticides, Adjuvants, Micronutrients, Water





# FOLI-GRO® KILO®

Superior potassium nutrition to meet yield goals  
Nutrients delivered fast and efficiently

## GUARANTEED ANALYSIS

Soluble Potash ( $K_2O$ ) ..... 24.00%  
DERIVED FROM: Potassium Acetate.

### What is it?

- Superior source of potassium derived from 100% potassium acetate
- Extremely soluble with a low salt index
- Carbon source that can be applied as a soil or foliar application.

### Benefits

- 1 Proven to increase yield, brix, quality, and stalk strength
- 2 Rapid and long-lasting uptake of available K and is known to increase frost tolerance and heat/drought resistance by regulating the acetate biosynthesis pathway.
- 3 Proven to boost soil microbial activity and support energy production within the plant.



