



EMPLOY -- Harpin Proteins

Human Response to a Pathogen

- Strong defense mechanism varies by person
- The human body recognizes an “intruder”
- Combat Mode= Produce compounds that fight
- Compounds (antibodies) neutralize pathogen
- Vaccines teach the body to produce antibodies against a particular pathogen



Plant Response to a Pathogen

- Strong defense mechanism (varies by plant)
- The plant cells recognize an “intruder”
- Combat Mode= Produce compounds that fight
- Compounds “combat” pathogen (e.g., PR proteins)
- “Inducers” are like a vaccine in humans by building a stronger defense fighting mechanism within the plant.



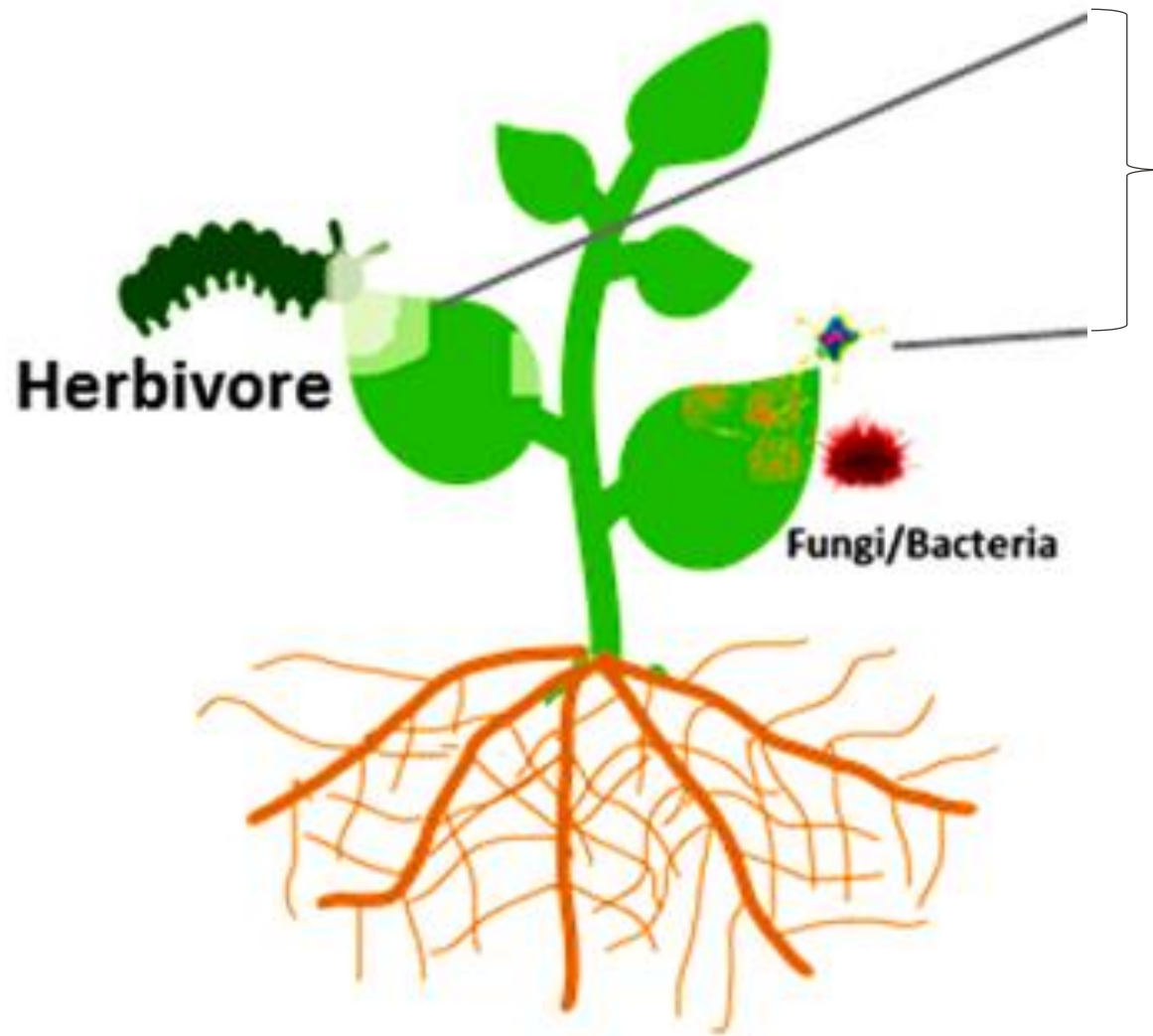
Plant Hormones

- Naturally produced organic compounds that control all aspects of plant growth
- Growth & Development hormones include auxin, cytokinin, gibberellin, ethylene...
- Plant Defense hormones include ethylene, abscisic acid, jasmonic acid, & salicylic acid

What is a SAR Response?

- **Activated mostly by Salicylic Acid**
- **Induced by Pathogens**
- **Duration depends on plant/pathogen/environment**
- **Weeks – Months – Entire Season**
- **Repeated attacks increase SAR response**
- **Are all SAR responses the same?**

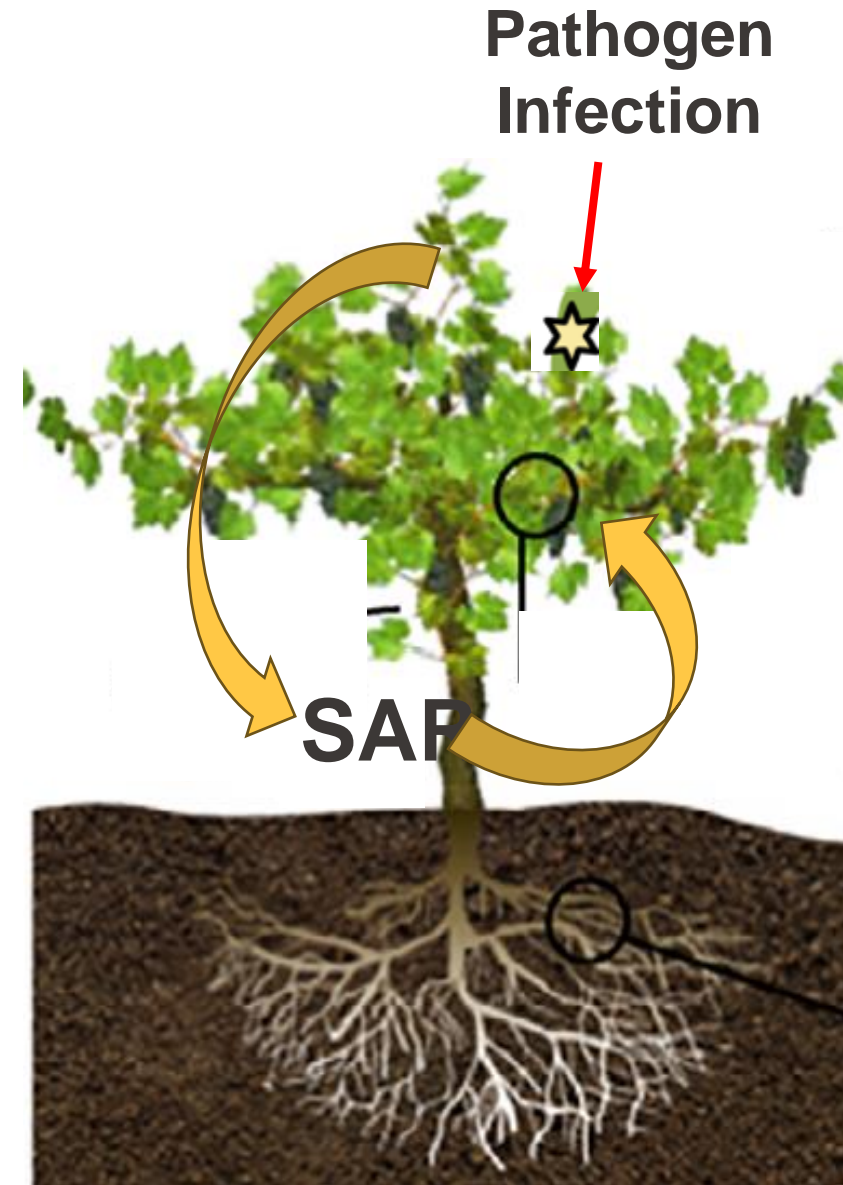
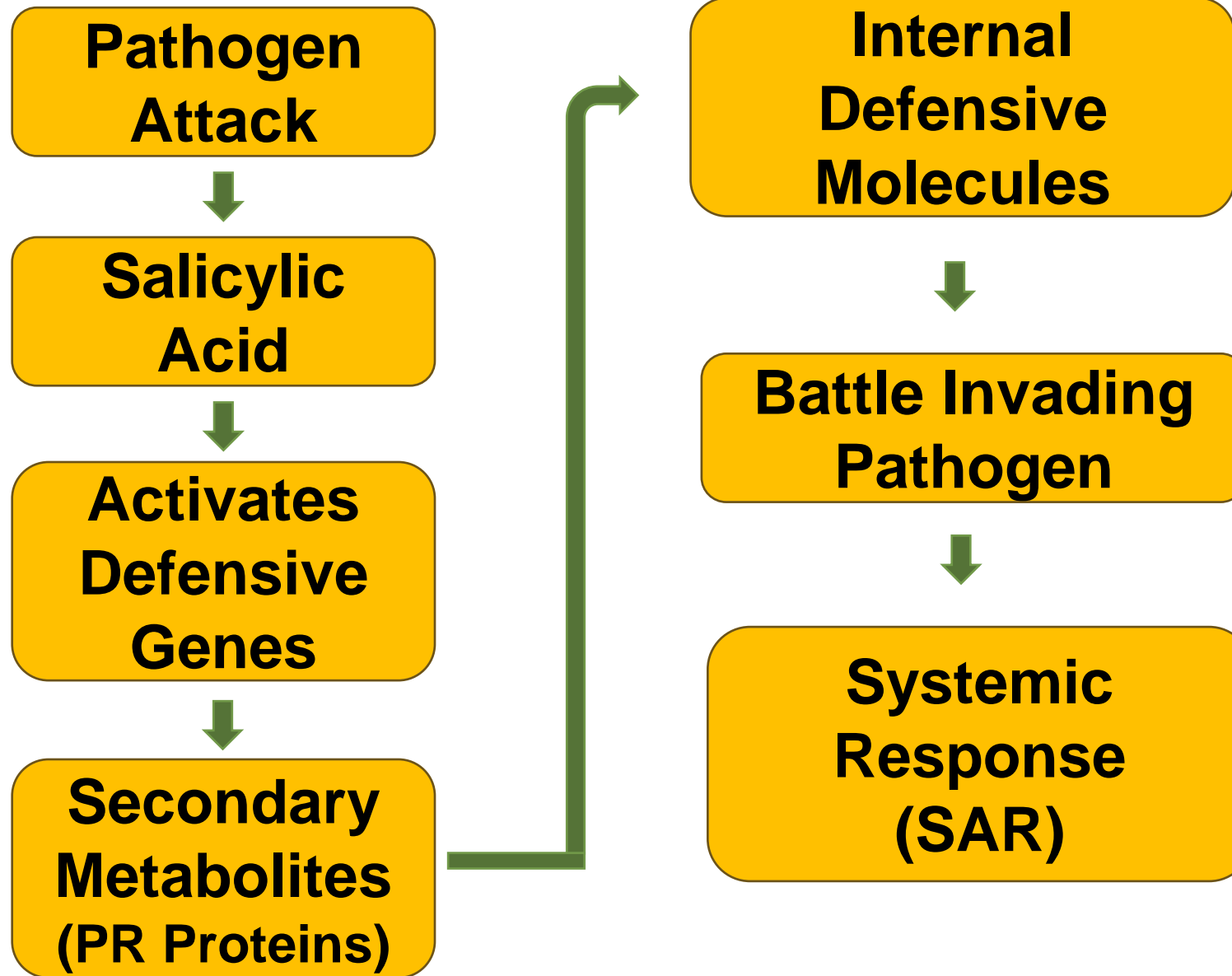


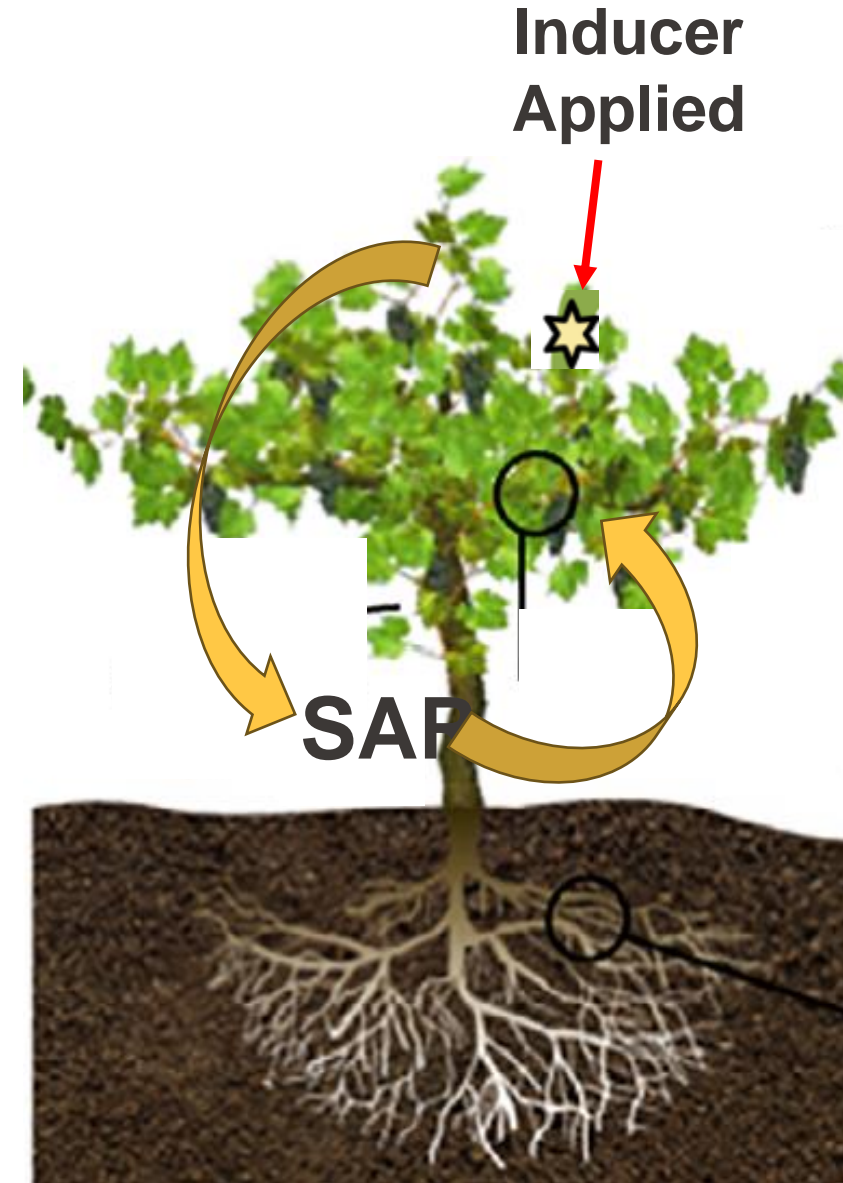
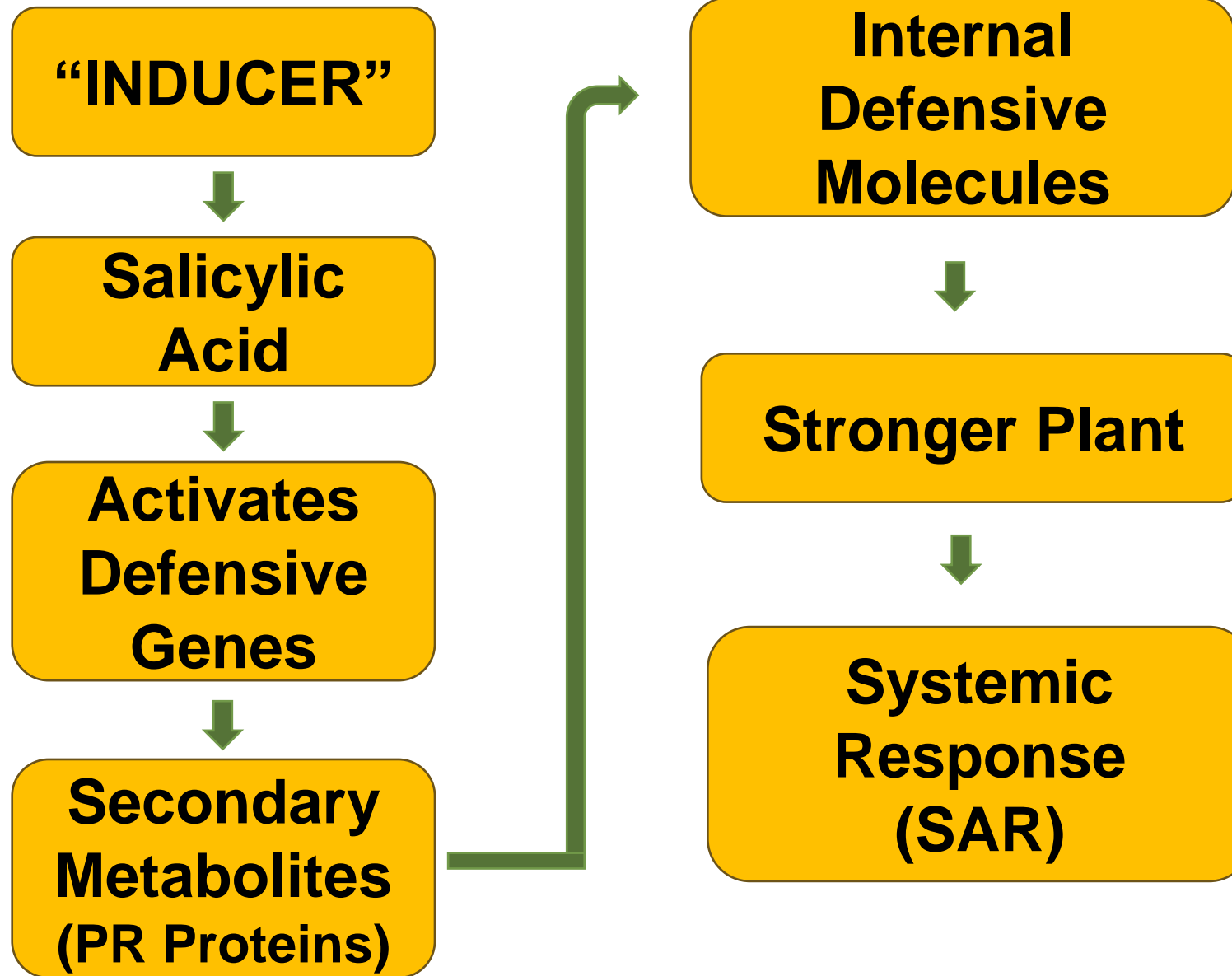


“Defense Mode”

**Stimulates
Plant-derived
Defensive
Hormones**







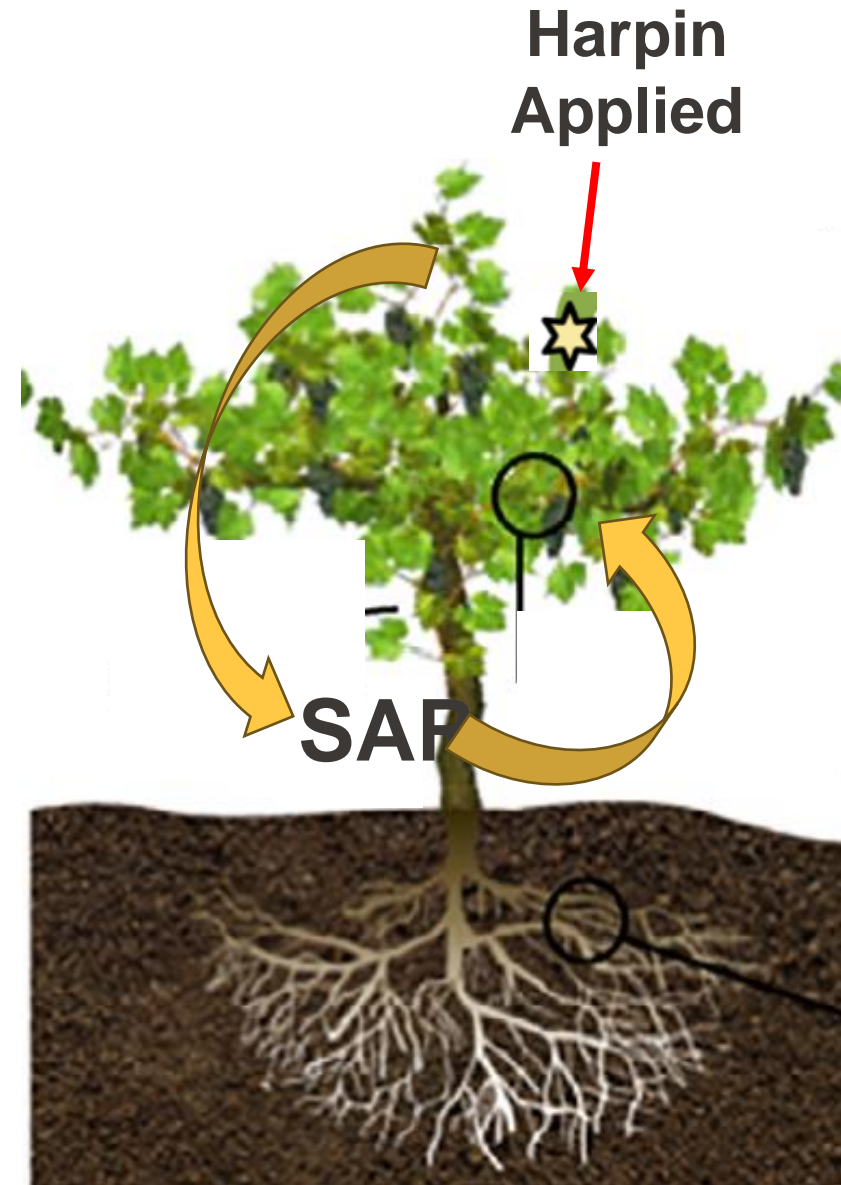
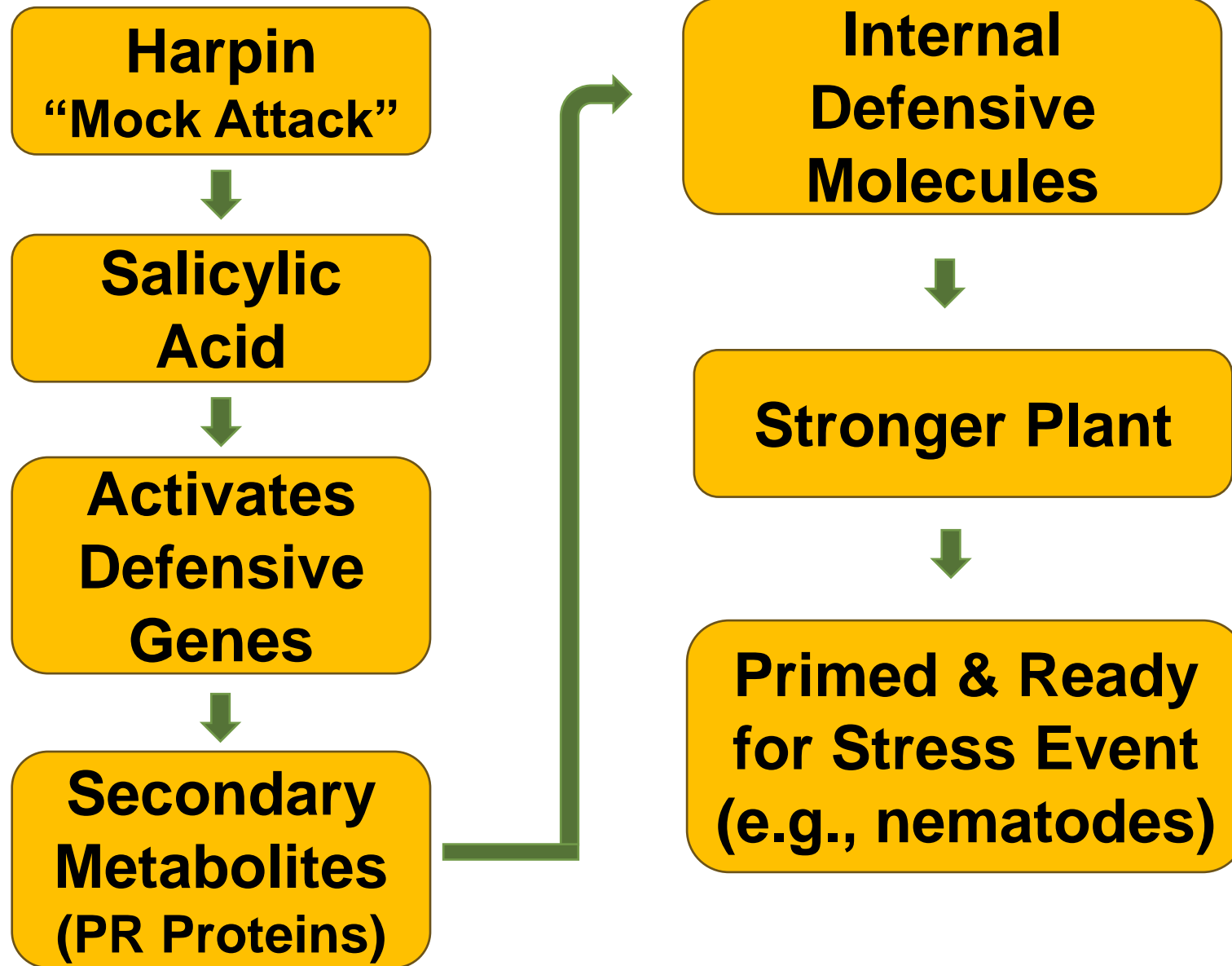
What are “Inducers”?

- Compounds that stimulate plant defense
- Trick plant into believing it is being attacked
- Various compounds can initiate this response
- Harpins proteins fall into this category
- What is a “Harpin Protein”?

Harpin Proteins

- Discovered in 1990 (Dr. Wei @ Cornell Univ)
- Extracted from “*Erwinia amylovora*”
- Initiates natural plant defense mechanisms
- Builds stronger immunity of plants to stress
- Induces PR genes (PR = pathogenesis-related)
- Published research in “SCIENCE”





- Employ is four different “Harpin Proteins”
- 10x more active
- Improved stability & better formulation
- EPA-registered “biochemical” pesticide
- Integrated Pest Management (IPM) Program
- Suppresses nematode* egg production

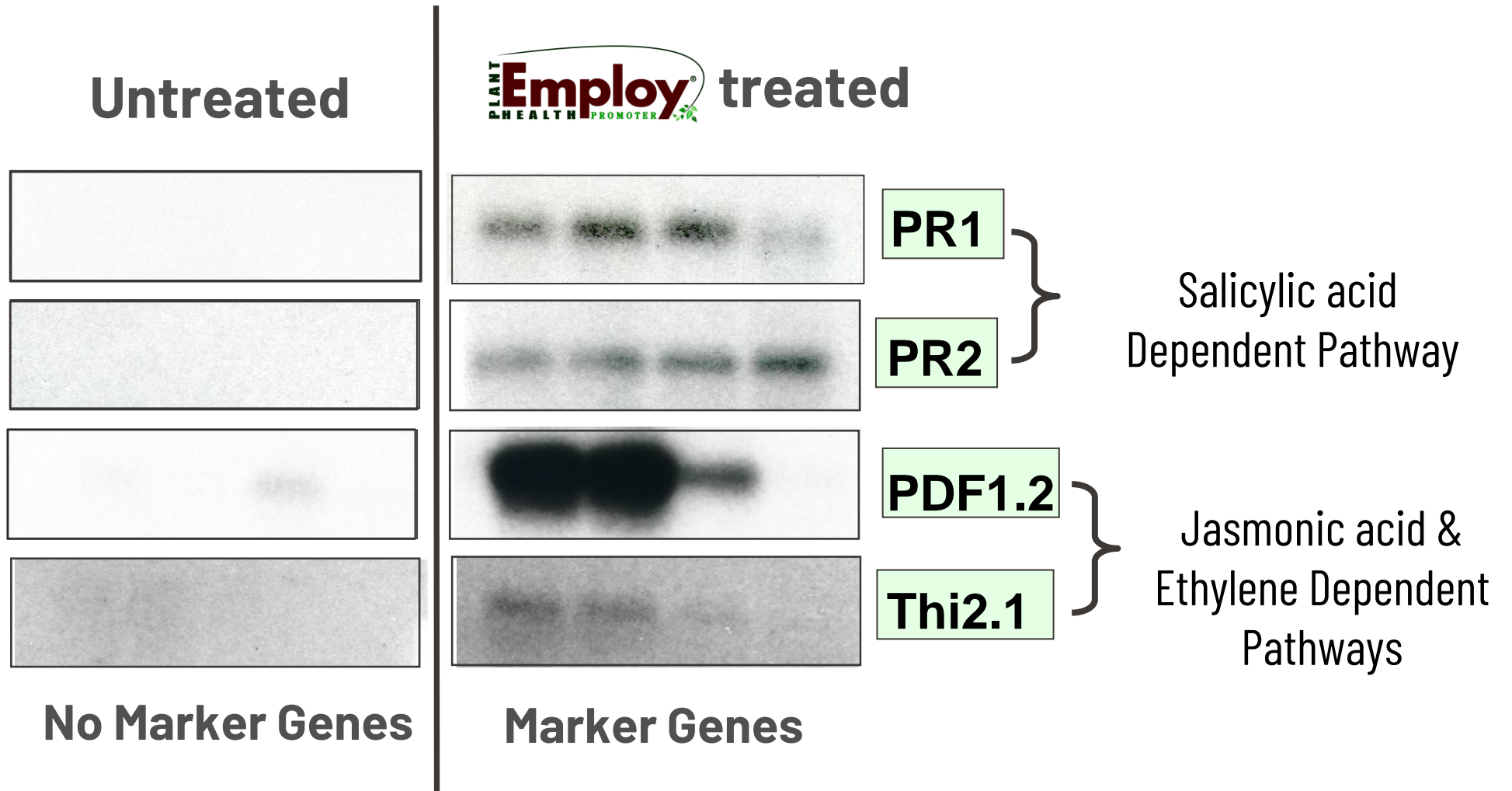
*root-knot, soybean cyst, root lesion & northern root knot



**Can we measure
activity within plants?**



Activation of Defense Genes



EMPLOY Soybean Simulated Drought Video



Employ/ Tomato / Yield

Objective

- Effect of Employ on tomato leaf temperature, photosynthesis, quality and yield

Methods

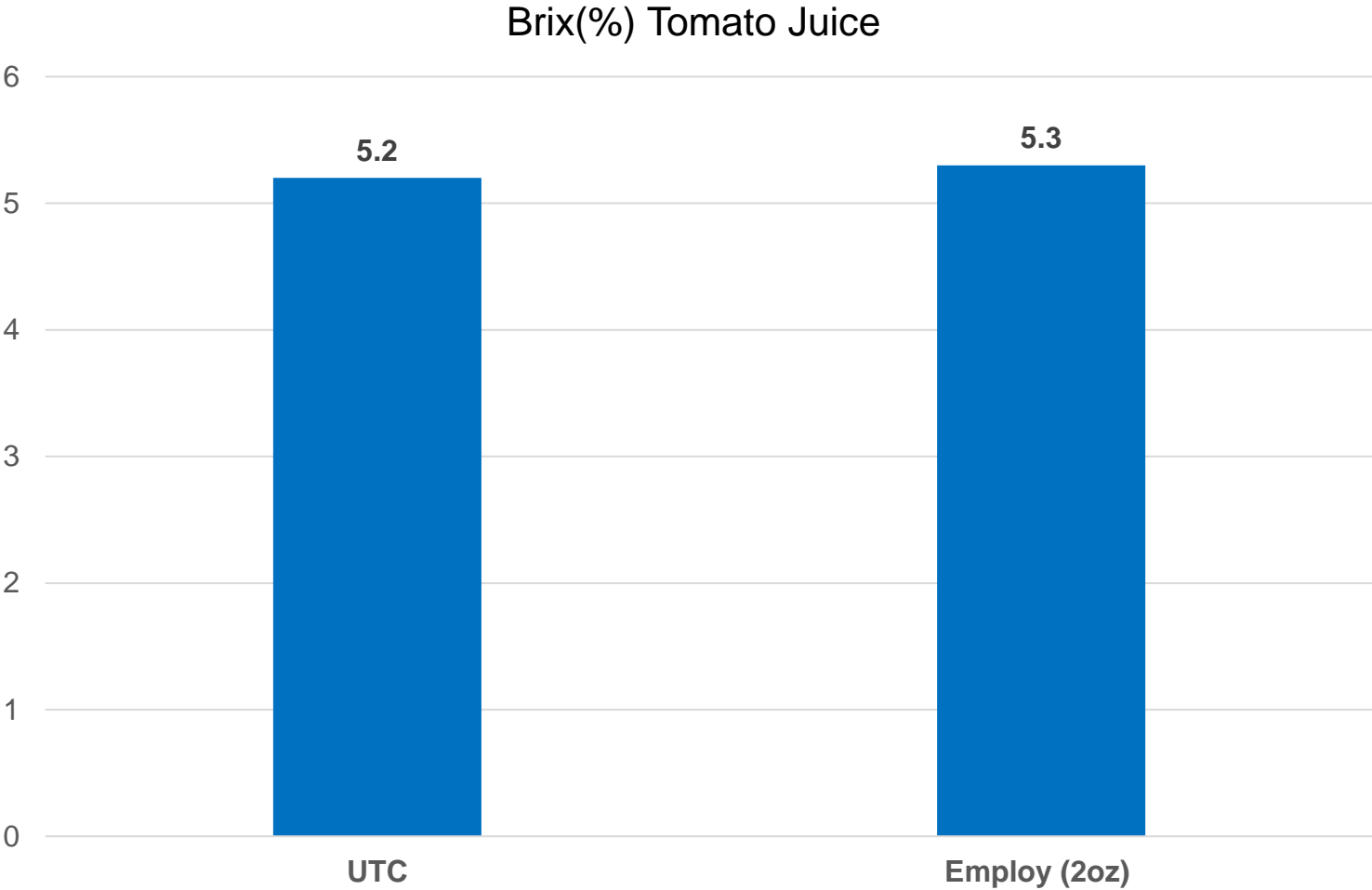
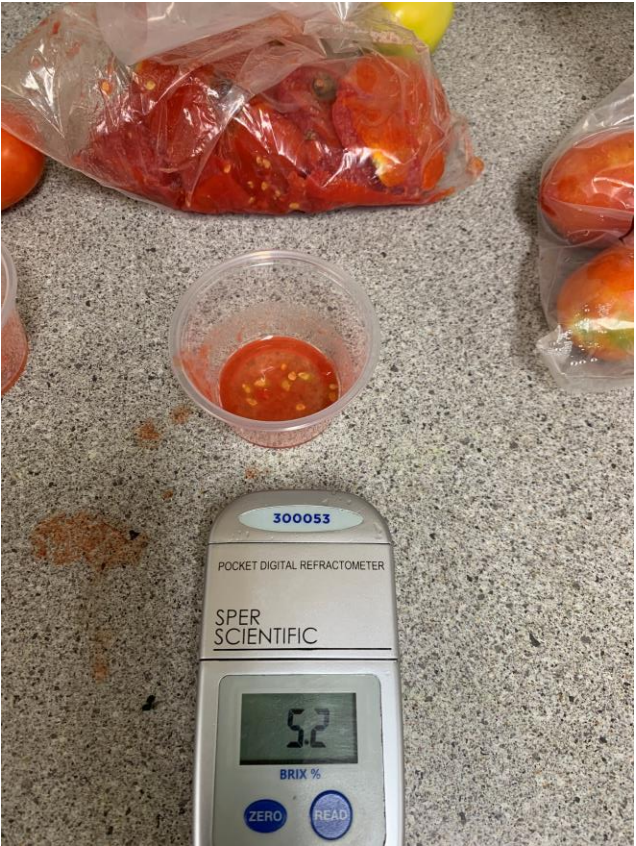
- Application date: 6/18
- Application method: CO2 backpack sprayer 4x AI110 nozzles 35 psi, 45gpa
- Evaluations: SAP, K meter, Leaf tissue and Biomass
- Evaluation dates: Bi-weekly, Biomass 8.23

Trial Details			
Crop(s), Variety	Processing Tomato	Year Established	2024
Location	El Nido, CA	Discipline	Growth
Target	Yield	Manager	Patrick Troy
Team	WECO	Investigator	Jeremiah Lucas, PCA Angelita Cisneros-Aguilar
Other	Double Diamond	Trial Number	307FS24TOMCA1

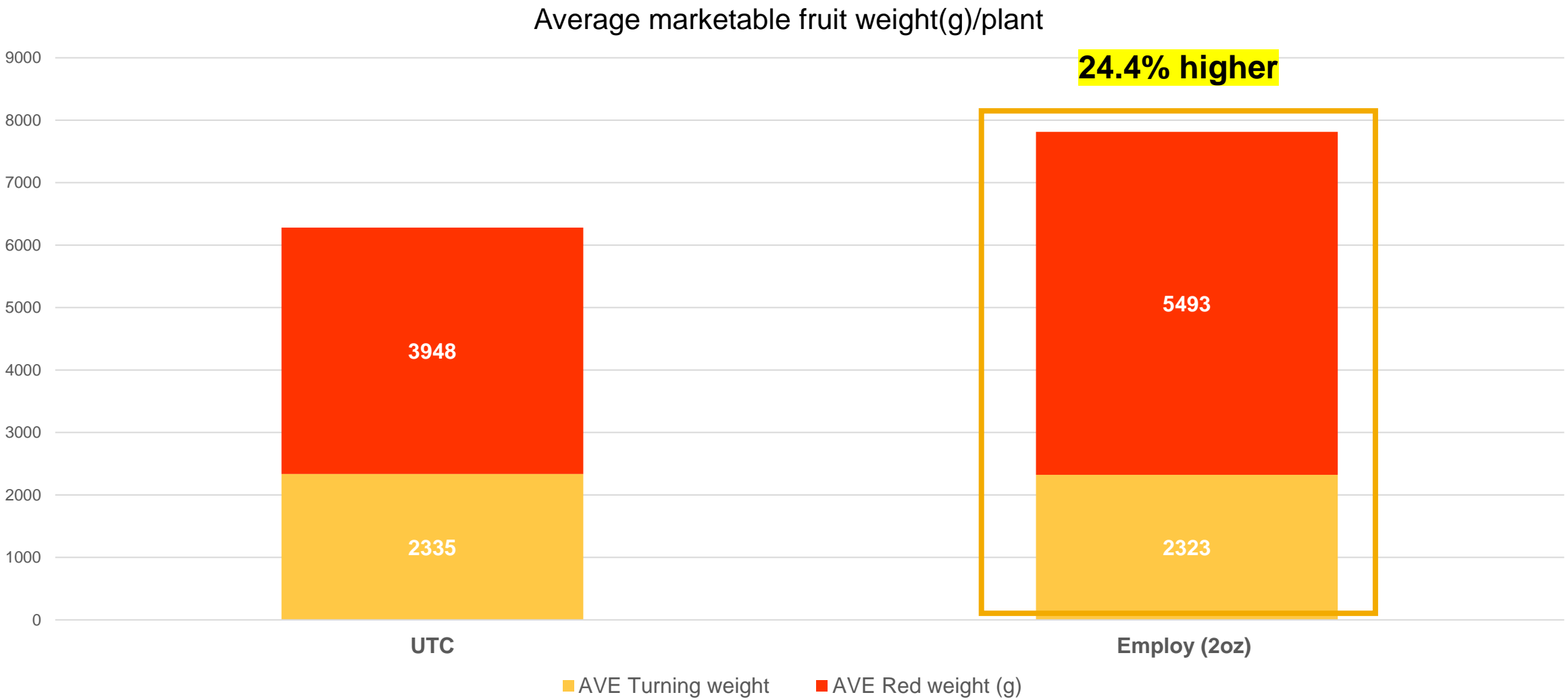
Employ/ Tomato / Yield

TREATMENT LIST TABLE			
Trmt	Product	Rate, fl oz/ac	Timing & Application Method
2	UTC	N/A	50% Bloom
7	Employ	2 oz	50% Bloom

Employ/ Tomato / Yield



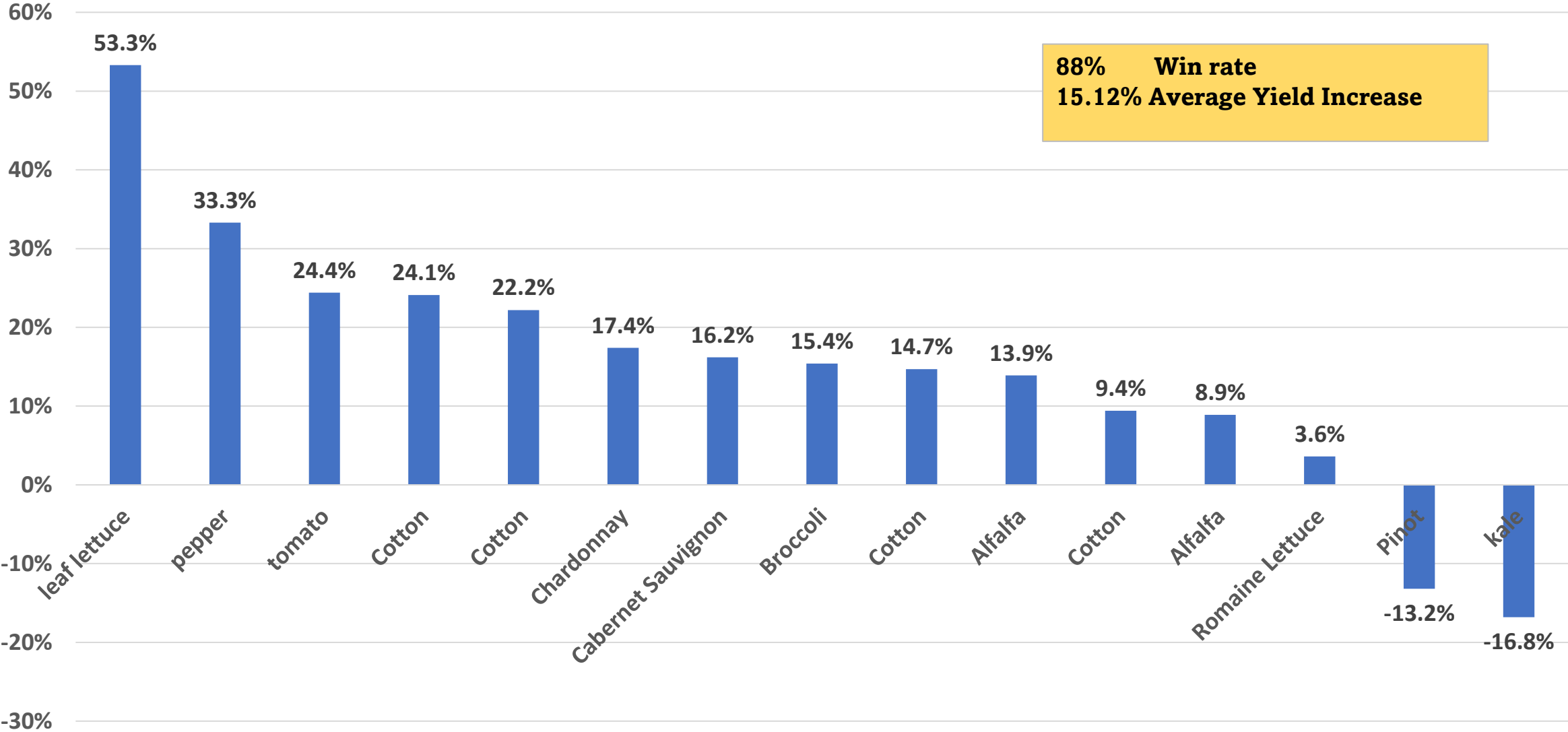
Employ/ Tomato / Yield



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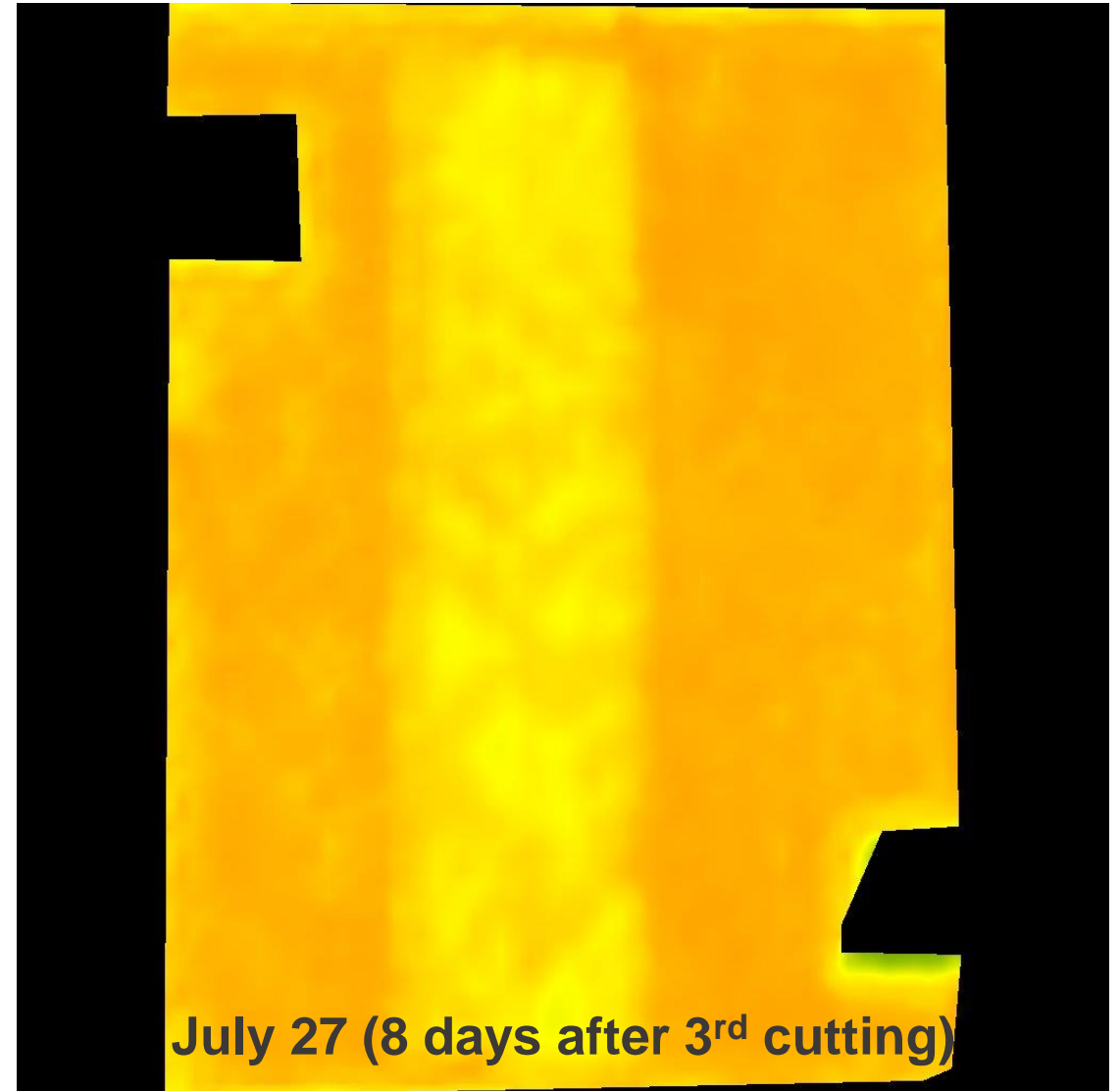
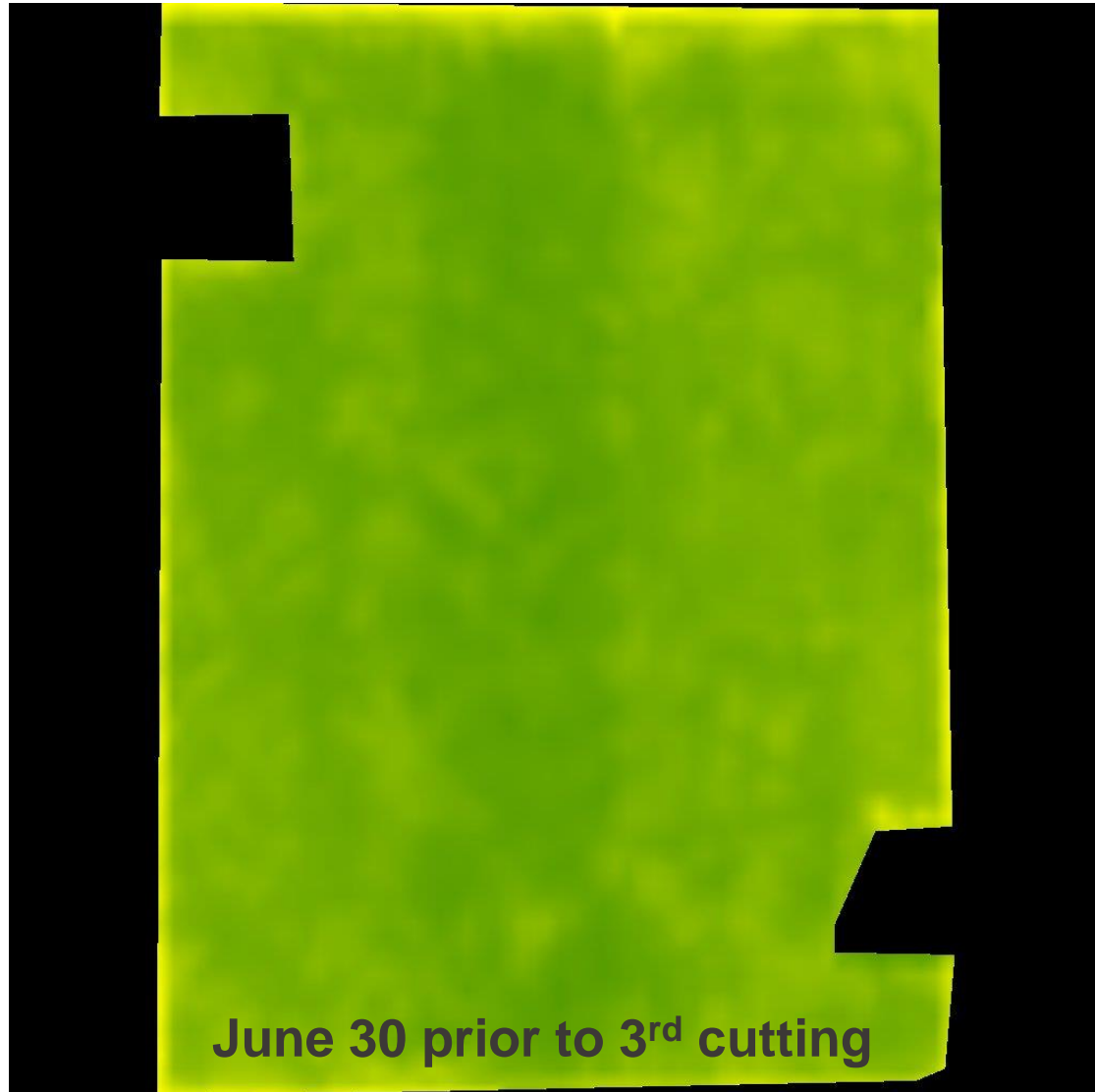
307FS24TOMCA1

2024 Piano Graph for Central Coast Employ % Yield Increase



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Alfalfa – Applied 2x (2 oz/ac/application)



WILBUR-ELLIS.

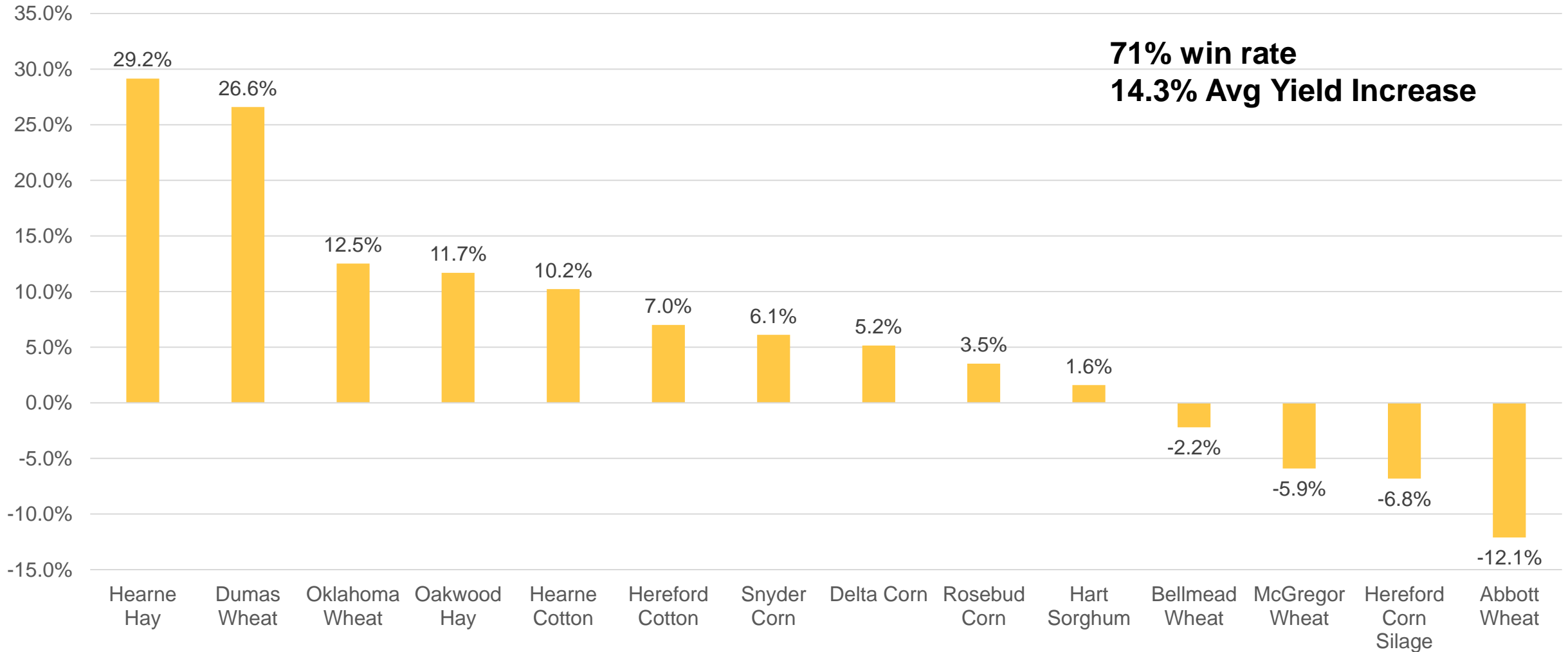
Sprayed @ Green up (April 16) & prior to 3rd cutting (June 24) with insecticide



ADVANCED AGRONOMY ACADEMY®

Employ Summaries

Employ 0.5 oz % Difference from Untreated



Multiple

Features & Benefits

Features

- Harpin $\alpha\beta$, the 2nd Generation Harpin Protein
- SAR properties (Systemic Acquired Resistance)
- 4-hour REI, 0-day PHI and no MRL restrictions with excellent tank mix compatibility

Benefits

- Second generation Harpin protein – 10x more potent than 1st with better consistency & efficacy
- Triggers defense mechanism to suppress nematodes & heal damaged roots. Stimulates JA, SA, Eth pathways increasing yield, quality, brix, etc,
- Safe, flexible compatibility for tank mixing with pesticides & nutritionals with no MRL concerns

Questions & Opportunities

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