



**WILBUR-ELLIS**  
AGRIBUSINESS

# **Seaweed or Seaplant Extracts & FOLI-GRO HIGHTIDE**

# Seaplant Technology

# Benefits of Seaplants for Plants

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- **Used in specialty crops and turf for decades**
- **Rich in bioactive compounds**
- **Sterols, flavonoids, proteins, amino acids, etc...**
- **Result of extreme growth conditions**
- **Long history of fertilizer use (at least 1400s)**
- **Contains Antioxidant Properties**

# Aerobic Respiration

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- **Natural process of all living organisms**
- **Take in  $O_2$  and release  $CO_2$**
- **Main function of respiration is what?**
- **Production of Energy (ATP molecules)**
- **Energy (ATP) is needed to drive all major processes within living organisms**

# Aerobic Respiration

- $\text{C}_6\text{H}_{12}\text{O}_6$  (Glucose) + 6  $\text{O}_2 \Rightarrow$  6  $\text{CO}_2$  + 6  $\text{H}_2\text{O}$  + ATP
- Free radicals: result of incomplete  $\text{O}_2$  reduction
- Free radicals = extra electrons ( $\text{O}_2^-$ ,  $\text{H}_2\text{O}_2$ ,  $\text{OH}^-$ )
- Negatively charged and highly reactive (ROS)
- Normal part of cell metabolism, but...
- Too many = Tear Stuff Up (proteins, lipids, DNA)

# **Excess ROS (i.e., free radicals)**

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- **Cell membrane damage**
- **Protein & DNA damage**
- **Chloroplast damage = reduced photosynthesis**
- **Decreased ATP (i.e., energy) production**
- **Weakened defense = increased disease potential**
- **Ultimately can lead to CELL DEATH!**

# Main Cause of Excessive ROS Levels in Cells?

# STRESS!

# Stress = Plant Health Declines

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- **Temperature (too hot or too cold)**
- **Moisture (too dry or too wet)**
- **Sunlight (too cloudy or too sunny)**
- **Nutrient deficiency or excess**
- **Crop inputs (i.e., pesticides)**
- **Normal plant metabolism (vegetative to reproductive)**



**Solution to excessive levels of ROS in cells is...**

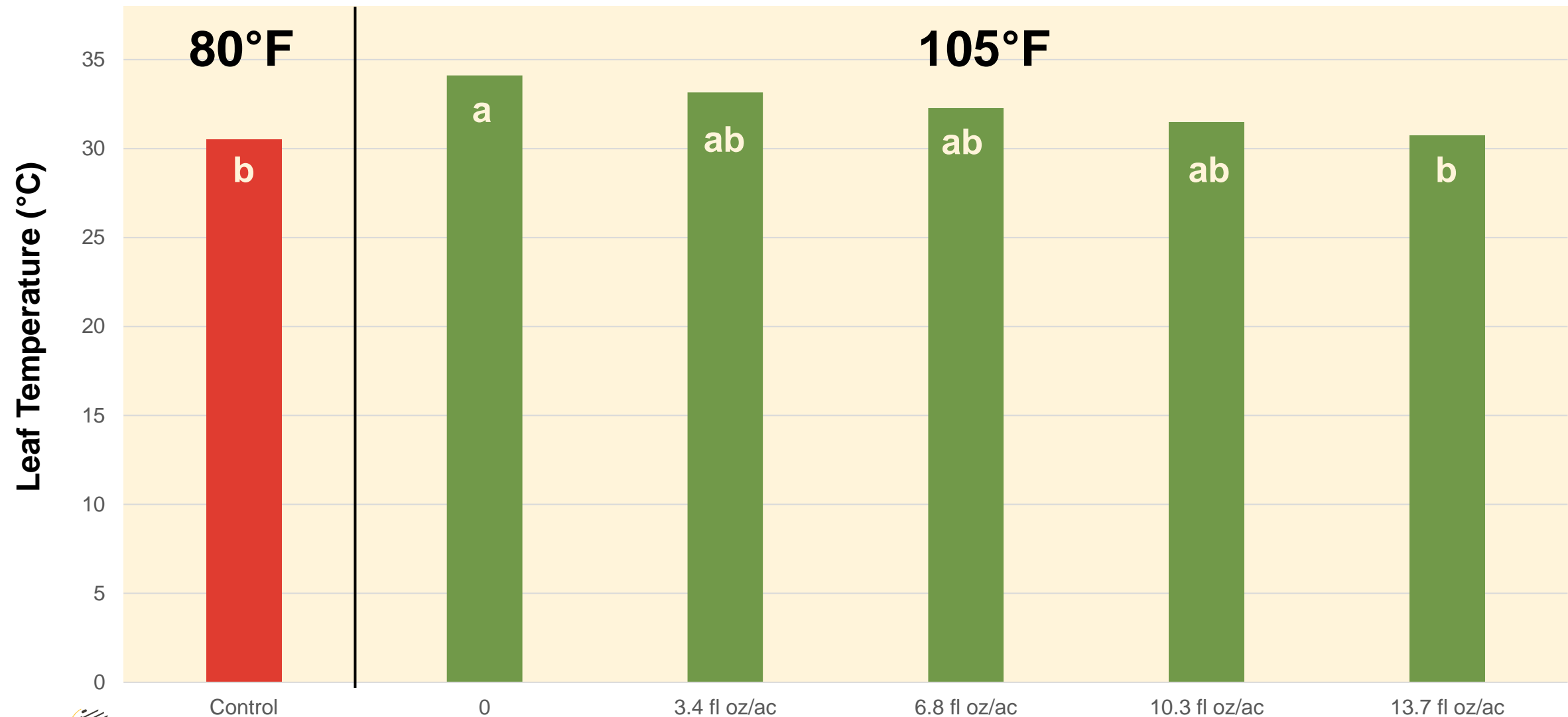
**Antioxidants!**

# Antioxidants

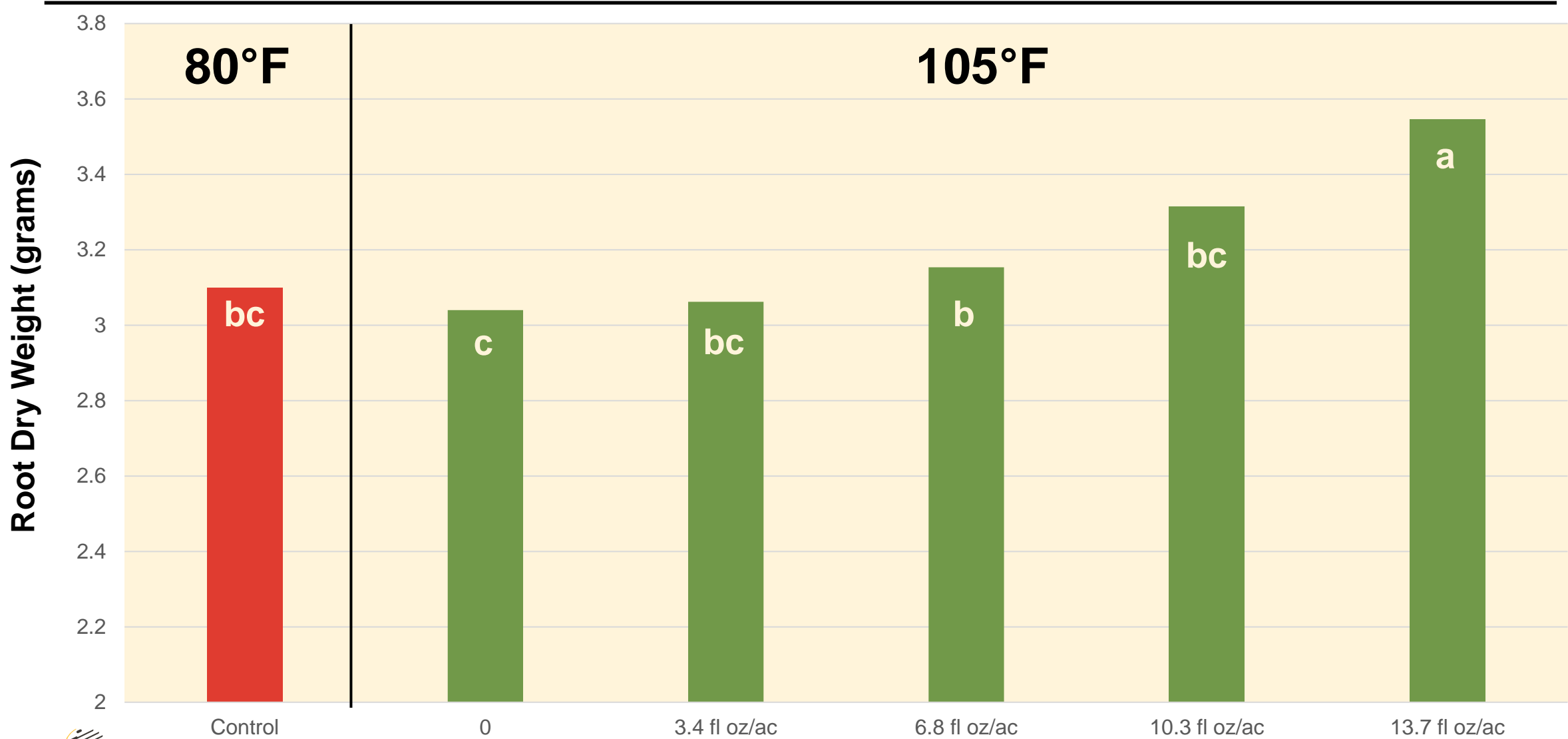
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- **Antioxidants = Neutralizing Agents**
- **Neutralize/Capture/Consume free radicals (ROS)**
- **Stress increases antioxidant production**
- **Other compounds can increase antioxidants**
- **Seaplant extracts are known to promote greater production of antioxidants in cells**

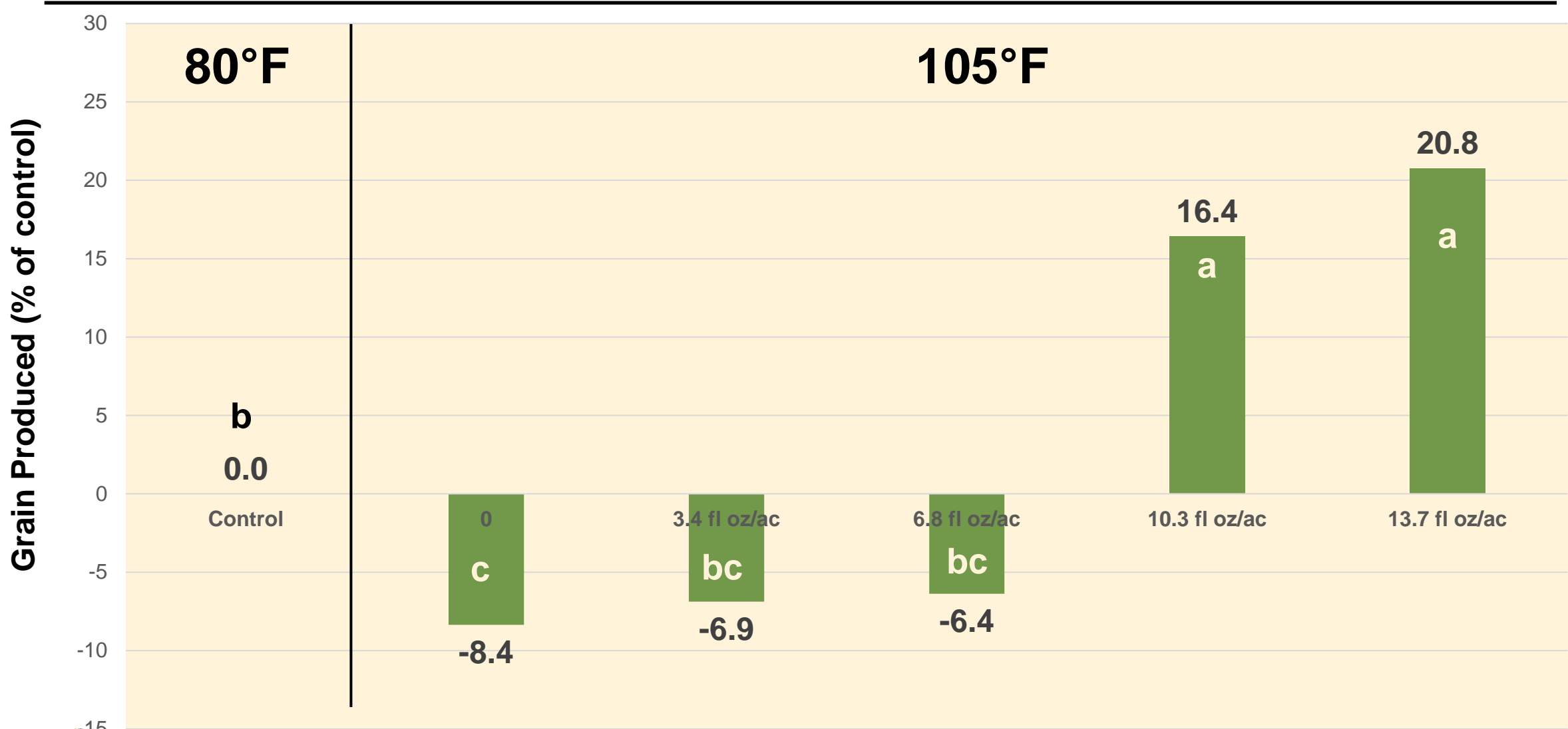
# *Ascophyllum nodosum* @R1 on Soybean



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# Ascophyllum nodosum @R1 on Soybean



# Biostimulants on Tomato

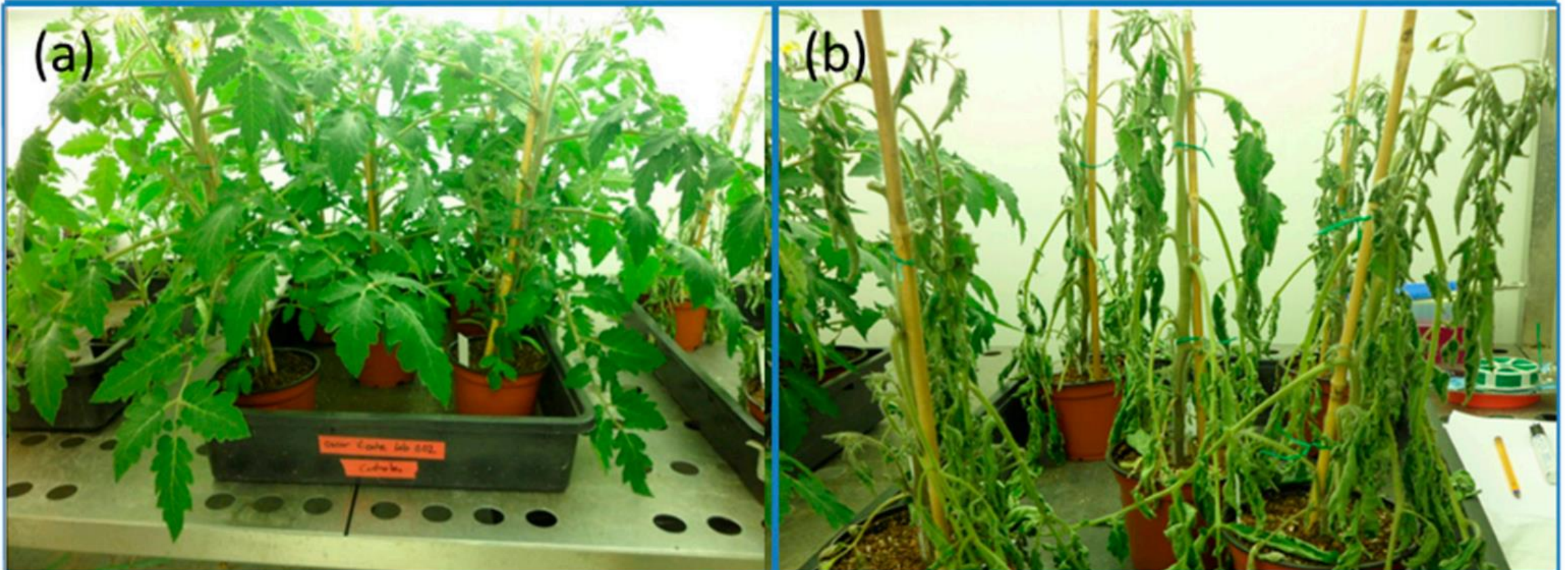
- 55-day experiment on Cherry tomato plants
- Biostimulants last applied on Day 31
- On Day 43 – irrigation was stopped
- Biostimulants applied:
  - ✓ Fulvic Acid
  - ✓ Seaplant Extract
  - ✓ Humic Acid



# Biostimulants on Tomato

Untreated – Not Stressed

Untreated – H<sub>2</sub>O Stressed





# Biostimulants on Tomato

**FA Treated – H<sub>2</sub>O Stressed**

**Untreated – H<sub>2</sub>O Stressed**





# Biostimulants on Tomato

HA Treated – H<sub>2</sub>O Stressed

Untreated – H<sub>2</sub>O Stressed





# Biostimulants on Tomato

**SPE Treated – H<sub>2</sub>O Stressed**

**Untreated – H<sub>2</sub>O Stressed**



# Our W-E Product



**FOLI-GRO<sup>®</sup>**  
**HIGHTIDE<sup>™</sup>**

**4-0-1**

## GUARANTEED ANALYSIS

Total Nitrogen (N) .....	4.00%
3.20% Urea Nitrogen	
0.80% Other Water Soluble Nitrogen	
Soluble Potash (K <sub>2</sub> O) .....	1.00%
Zinc (Zn) .....	0.35%
0.35% Chelated Zinc	

DERIVED FROM: Urea, Potassium Hydroxide, Kelp (*Ascophyllum nodosum*), and Zinc EDTA.

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- Seaplant extract
  - *Ascophyllum nodosum*
  - Stress Reduction
  - Contains Organic Acids (unique feature)
  - Long history as fertilizer material



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## GUARANTEED ANALYSIS

Total Nitrogen (N).....	5.00%
1.30% Urea Nitrogen	
3.70% Other Water Soluble Nitrogen*	
Zinc (Zn) .....	0.35%
0.35% Chelated Zinc	

Derived from Urea, Triazone, Methylene Urea, and Zinc EDTA.

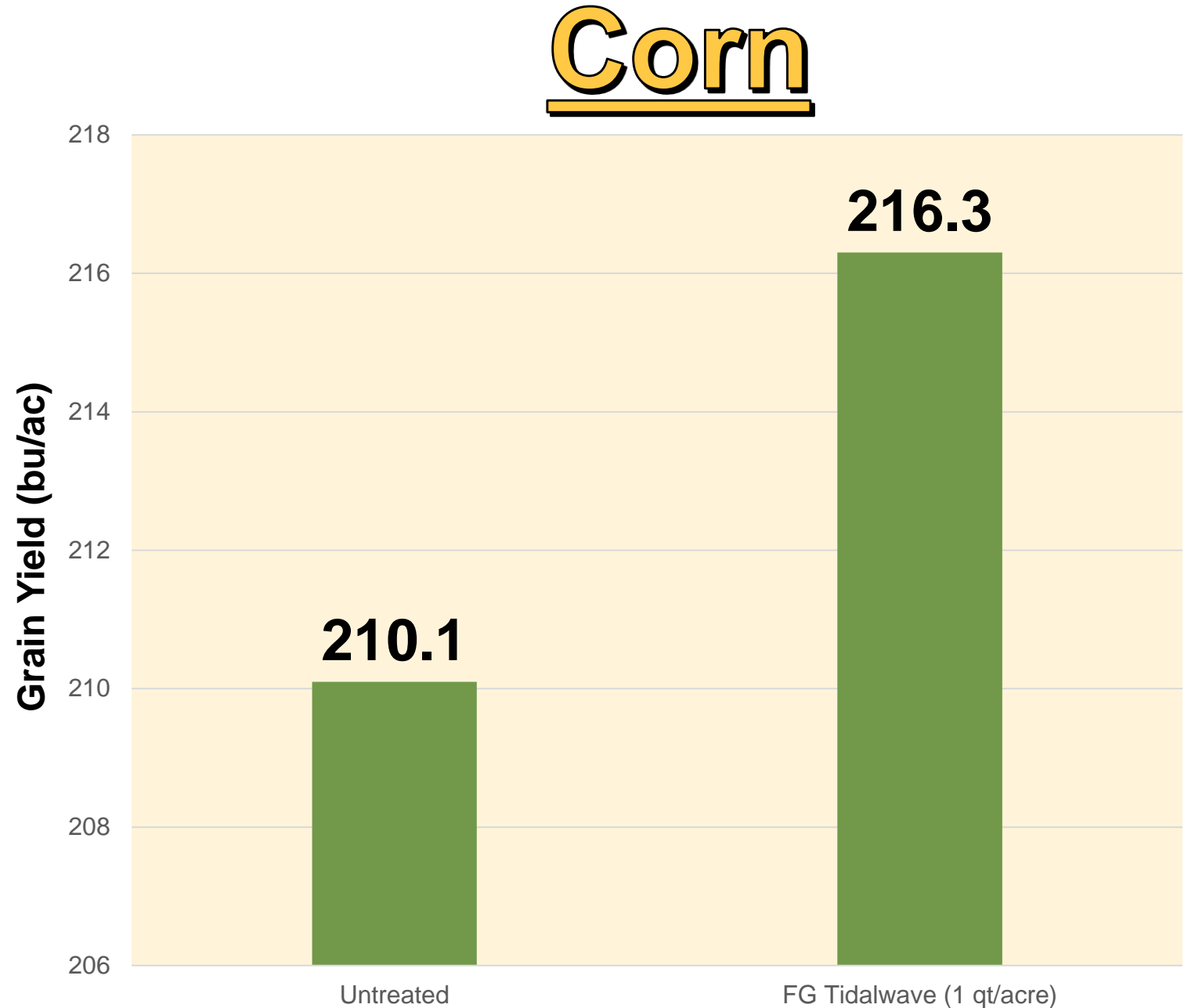
\*3.70% Slowly available nitrogen from triazone and methylene urea.

### ALSO CONTAINS NON-PLANT FOOD INGREDIENT:

25.00% Kelp (microbe food)

- **Apply prior to or just after stressful event!**
- **Changing to reproductive growth**
- **Physical stress such as hail or insects**
- **Transplanting**
- **Apply with pesticide applications**

- 49 trials
- Applied @ V5
- 80% win rate
- + 6.2 bu/ac





# Other Experiences

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- **Wheat in Washington State**
  - ✓ Osprey Xtra, Widematch, Base Camp, NDEMAND, R-11, 32-0-0, Quilt
- **Hailed Malt Barley in Montana (12 bpa)**
- **Hailed Soybeans in South Dakota (10 bpa)**
- **Many other hailed crops across the country**
- **Several reports on herbicide damage**



## FOLI-GRO TIDALWAVE with ADVANTIGRO



## Untreated – Dicamba Damage



- **Applied FG TIDALWAVE (1 pt/ac)  
w/ Advantigo after symptoms**
- **4 days after application**

# Questions

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