Viral Suppression Through the Use of Conservation Tillage Systems in Peanut

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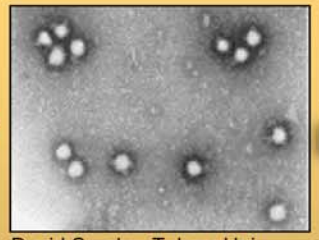
Why is research in TSWV important?

Annual loss of $100 million to all commodities $40 + million dollars *in Georgia alone*

What is needed?


Randy Hudson, Jack Reed

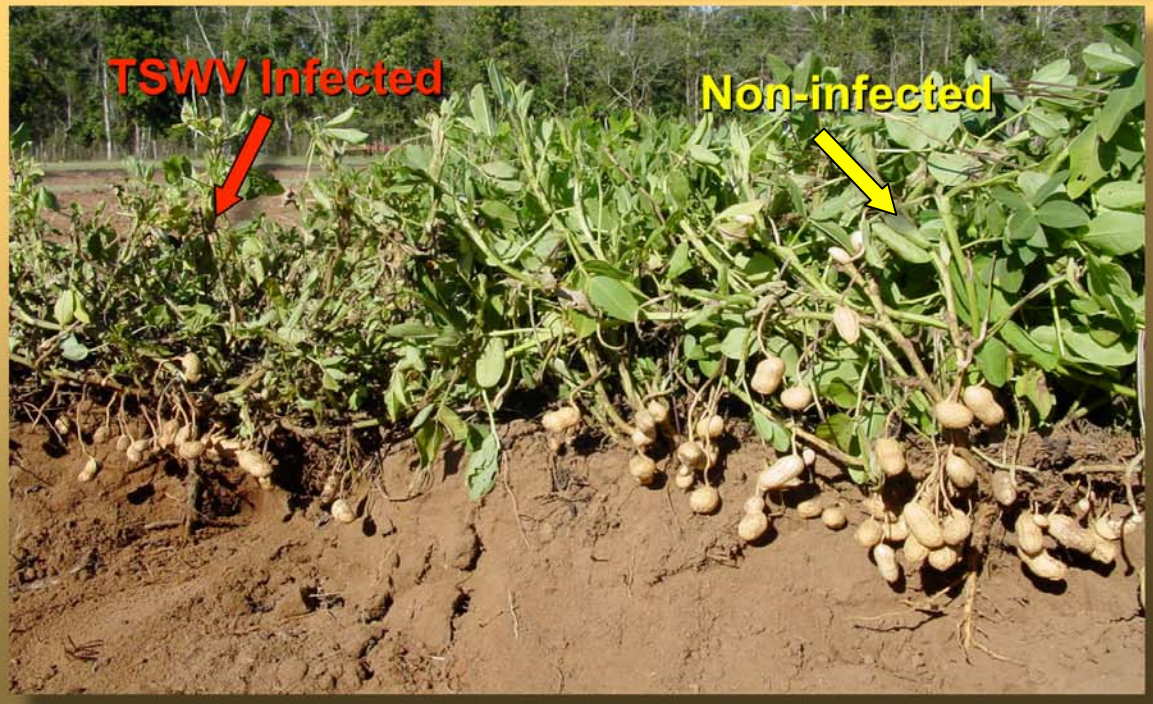

David Sander, Tulane Univ.


NCSU

ENHANCING tolerance to TSWV – physiology, genetics, management.

Effects on Root System, Plant Size and Yield

Plant stunting



Root necrosis and decreased pod production

Currently used methods of *Tomato spotted wilt virus* (TSWV) MANAGEMENT:

- **Phorate (Thimet) at Plant**

Mechanism: largely UNKNOWN, not entirely related to thrips control

- **Conservation Tillage systems**

Possible mechanism: effects on thrips behavior

Tillage ⟺ Chemicals

Ongoing Study: 2006 and 2007

Questions

Methods chosen

Verify Tillage Effect on TSWV

→ **ELISA detection in conventional and strip tillage**

Identify Chemical interaction with cultivar and tillage

→ 4 Chemical Treatments: **Control**, **Thimet/Proline**, **Temik**, **Thimet**

3 Genotypes: **GA02C**, **AP3**, **Georgia Green**

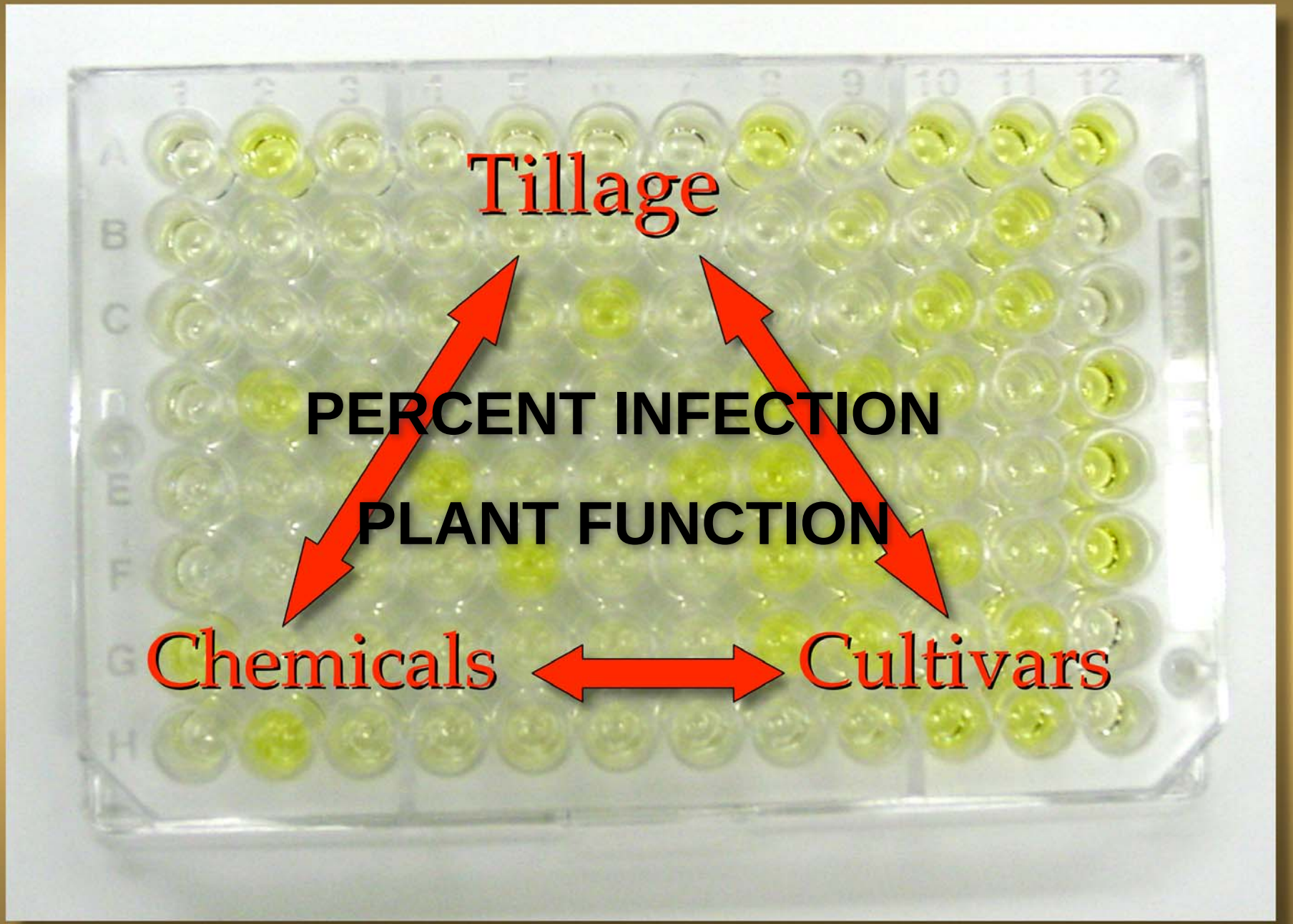
Identify Physiological Indicators of Plant Performance

→ Chlorophyll Fluorescence

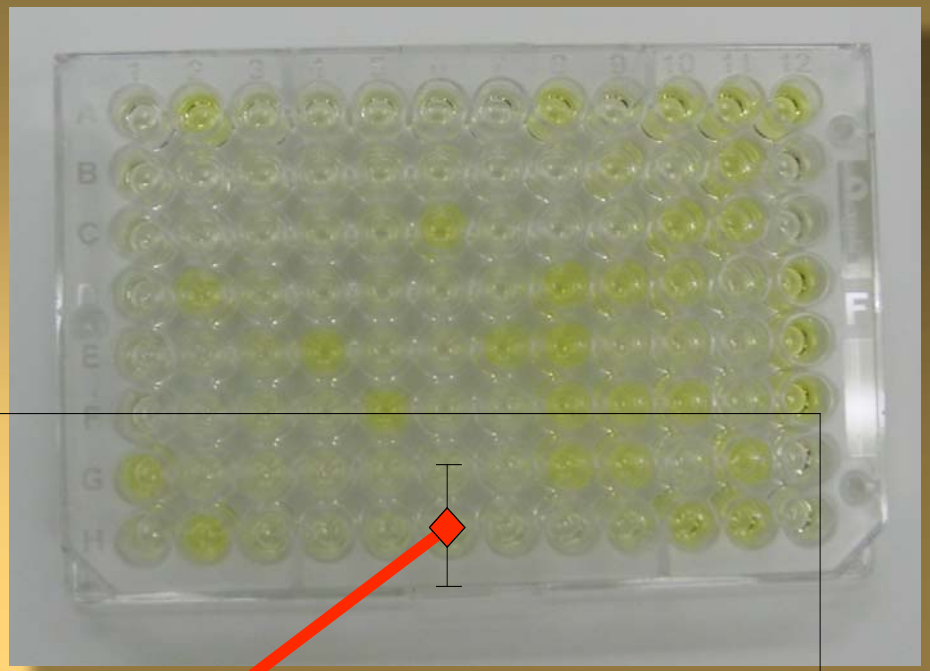
NDVI

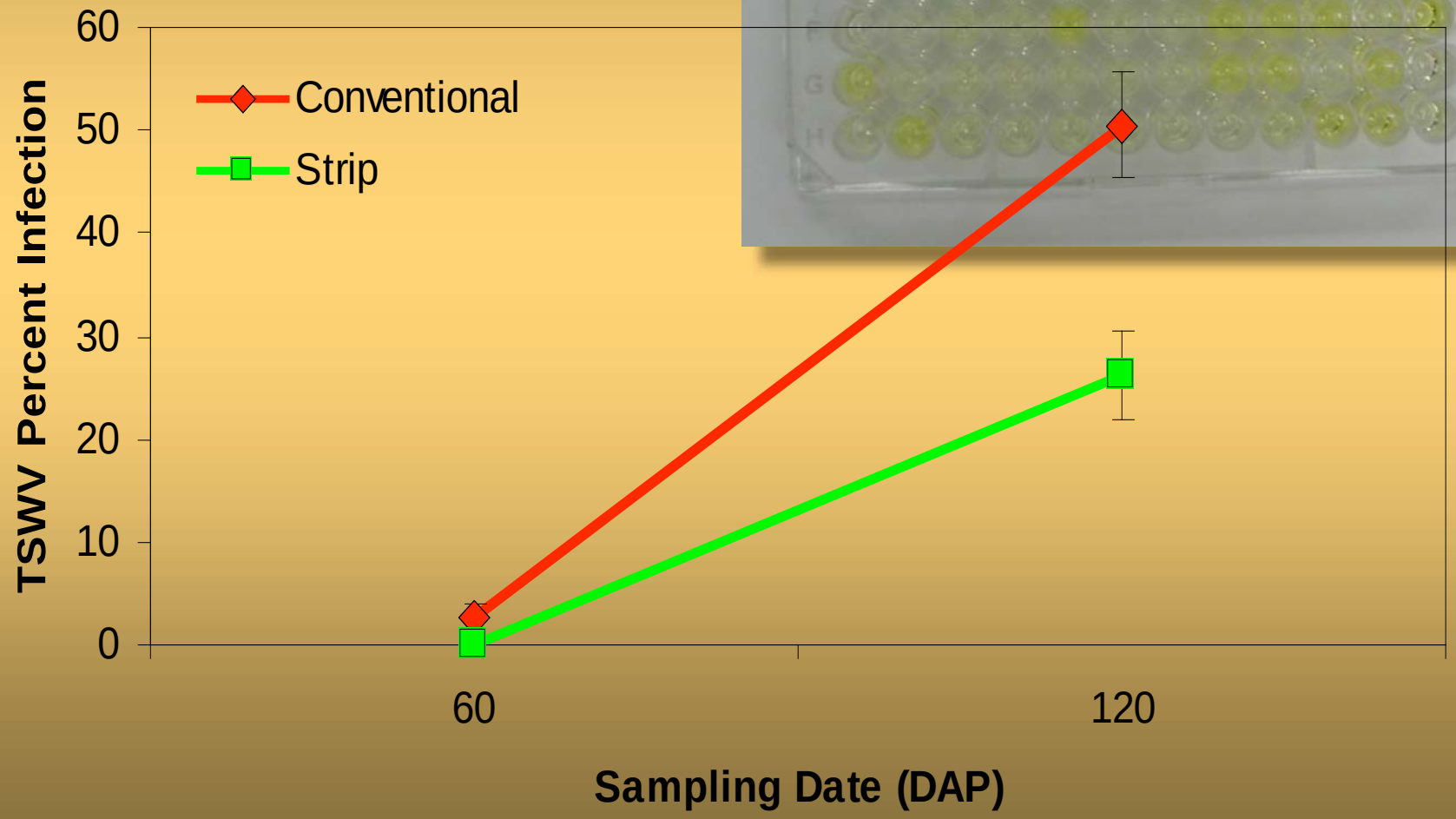
What factors are really important to YIELD??

→

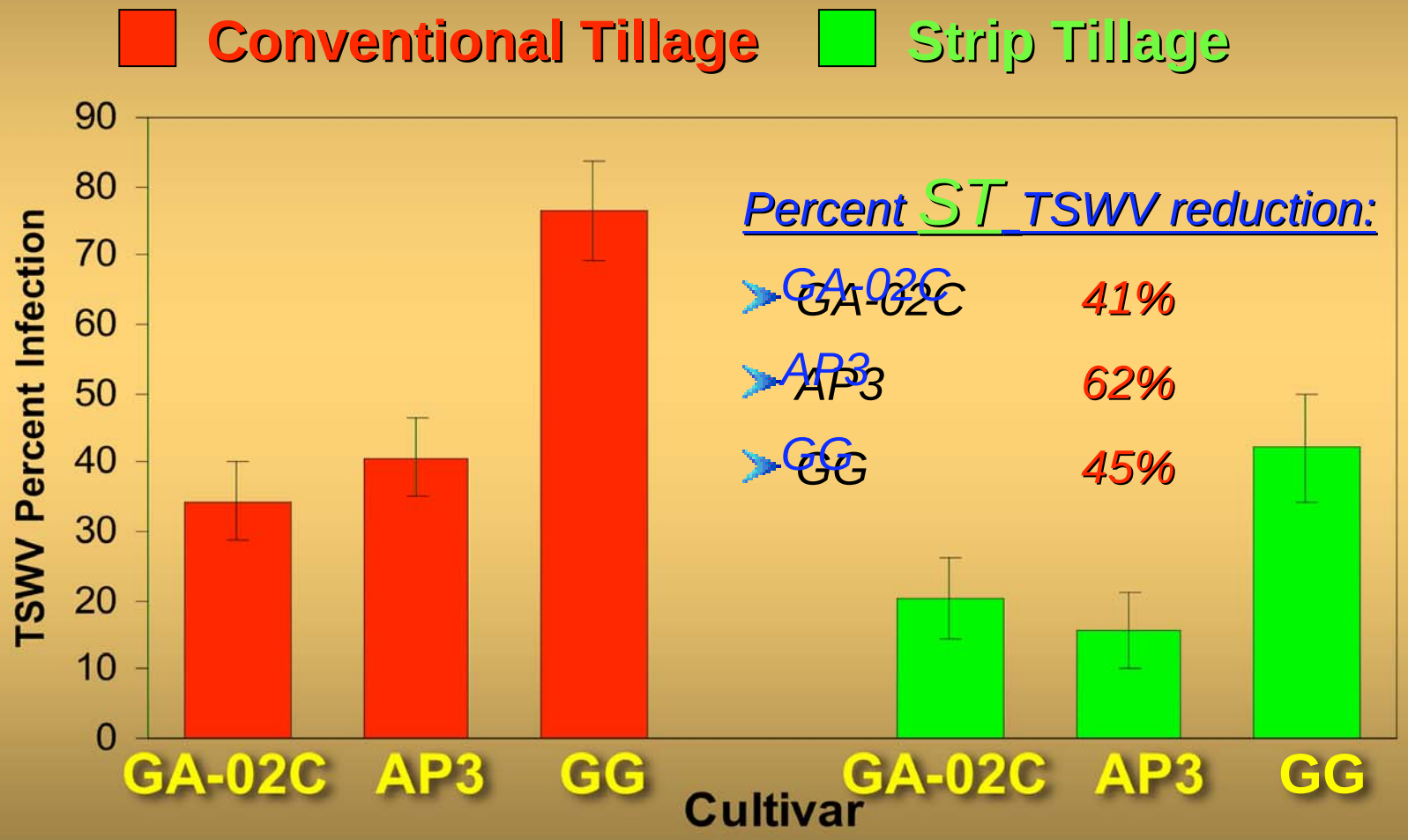

Tillage
PERCENT INFECTION
PLANT FUNCTION
Chemicals
Cultivars

Tillage Effect: Viral Infection

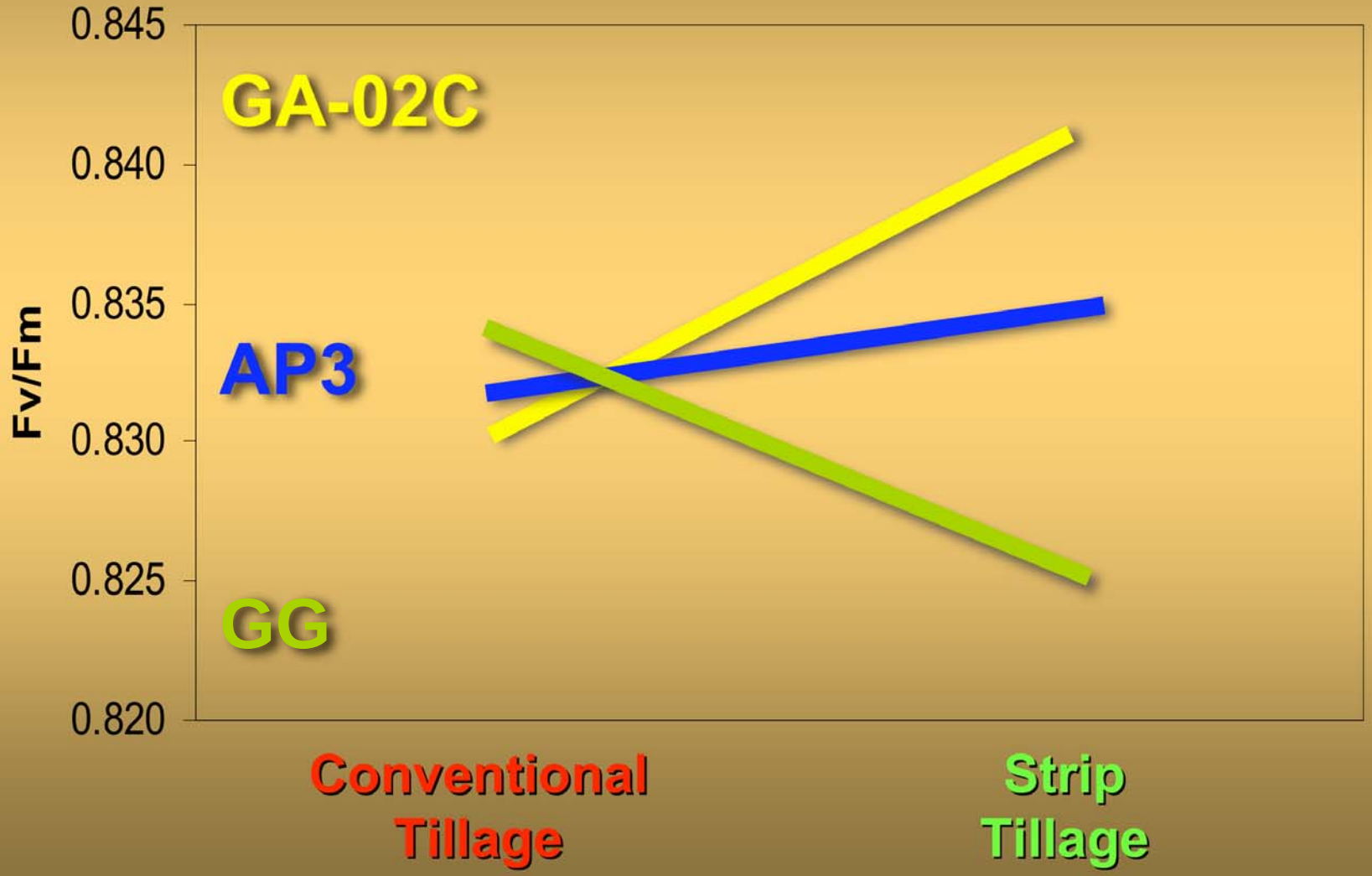




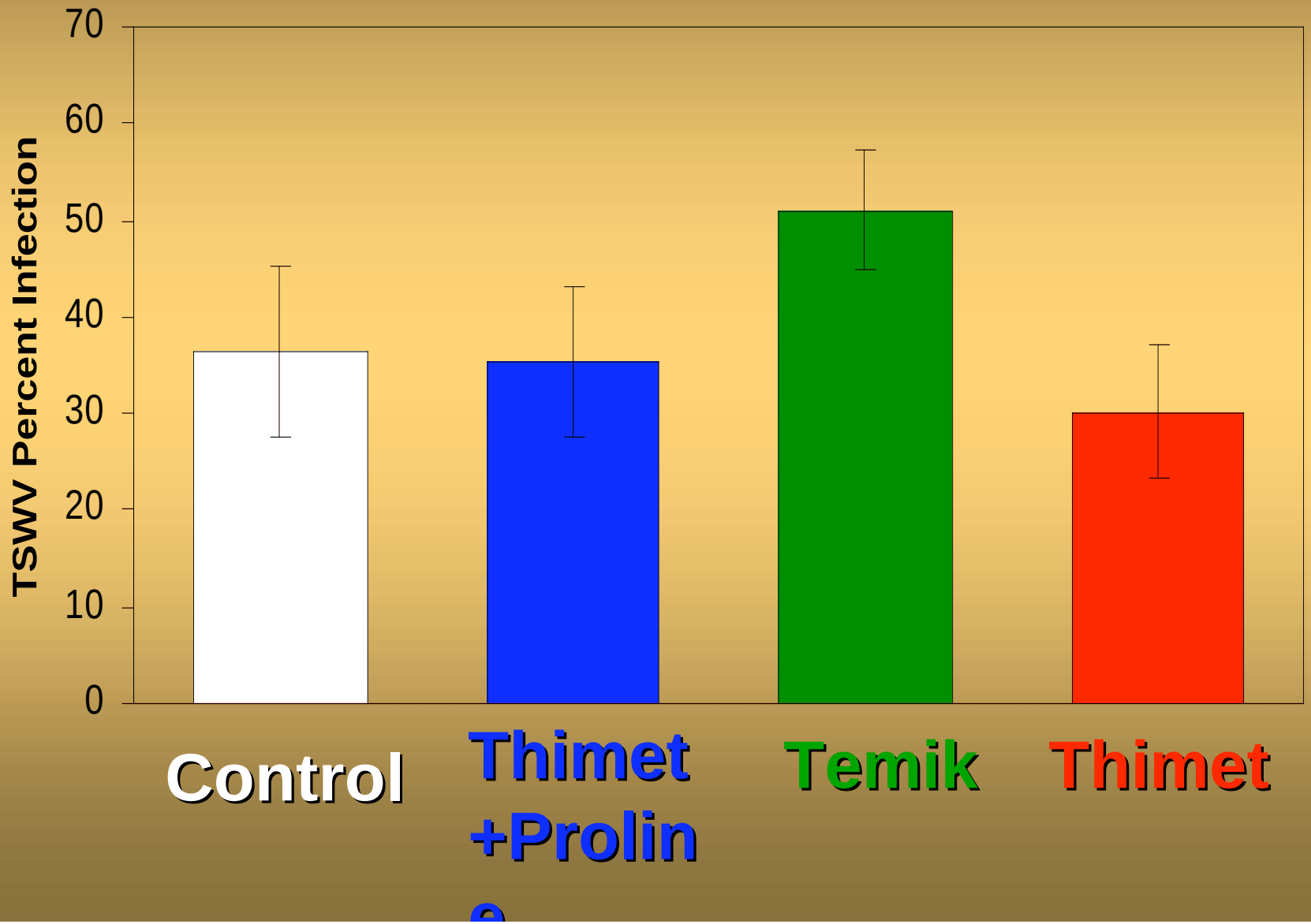
Tillage Effect X Cultivar



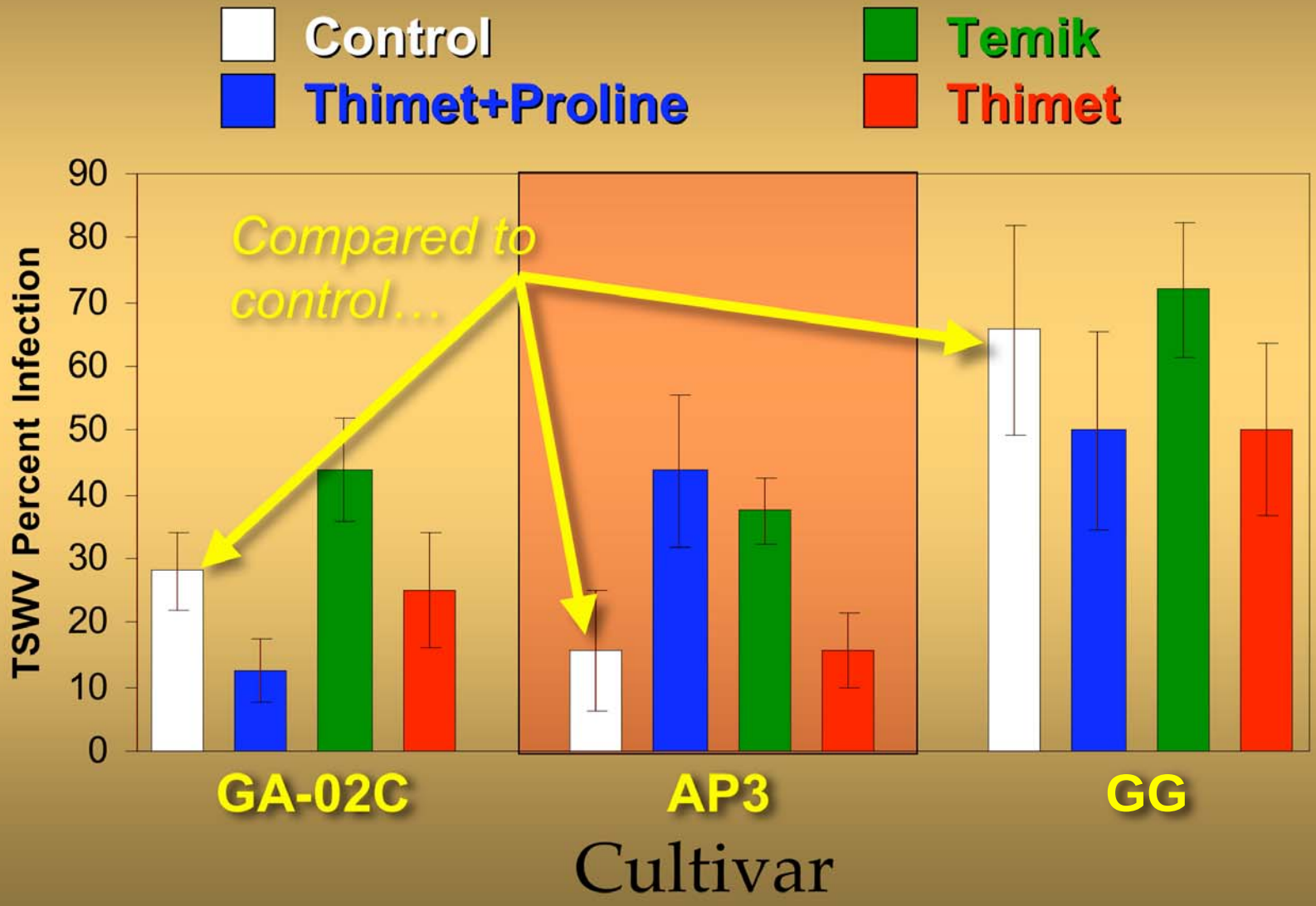
Chlorophyll Fluorescence: An Indicator of the Photosynthetic Machinery



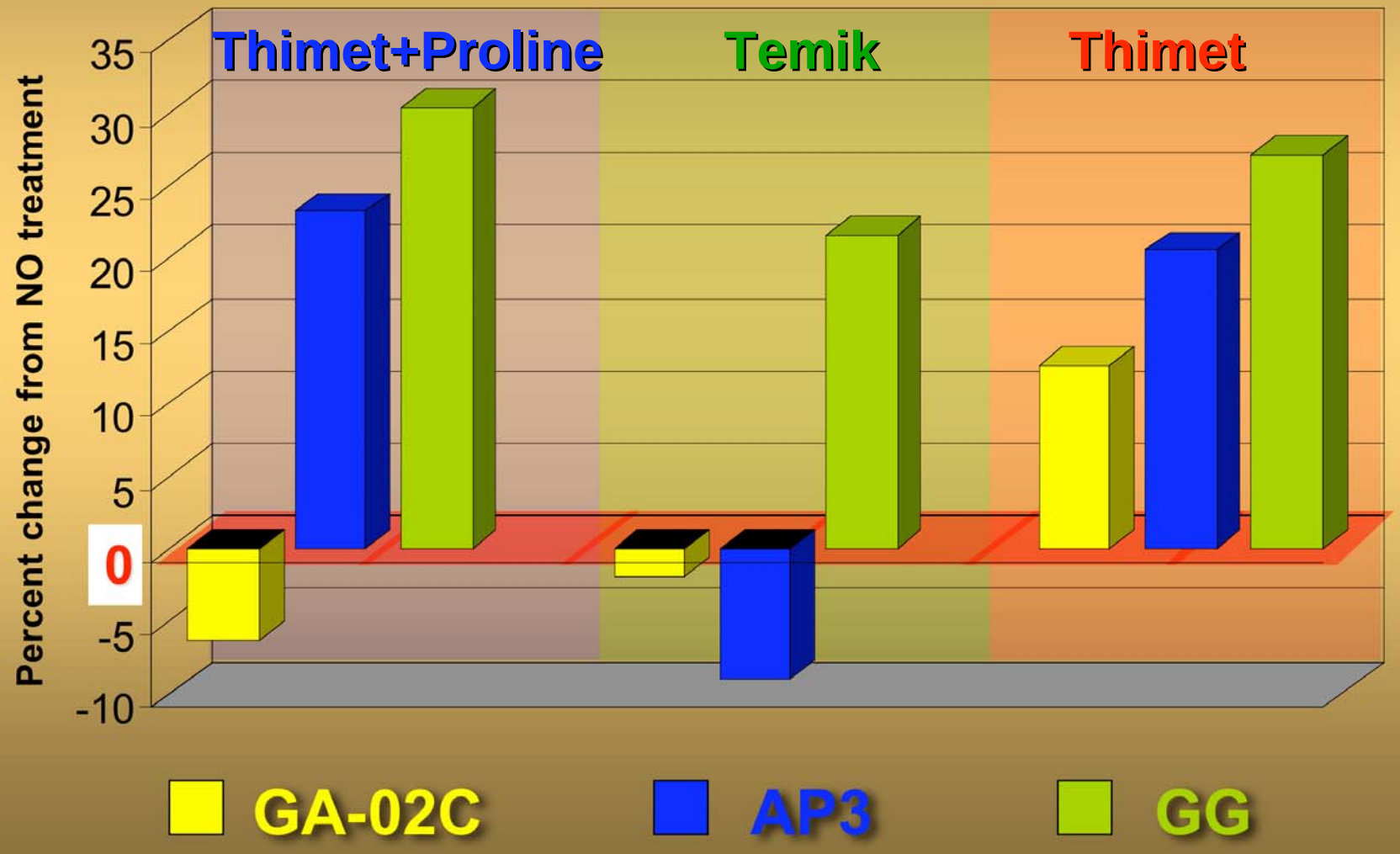
Chemical Effect: Viral Infection



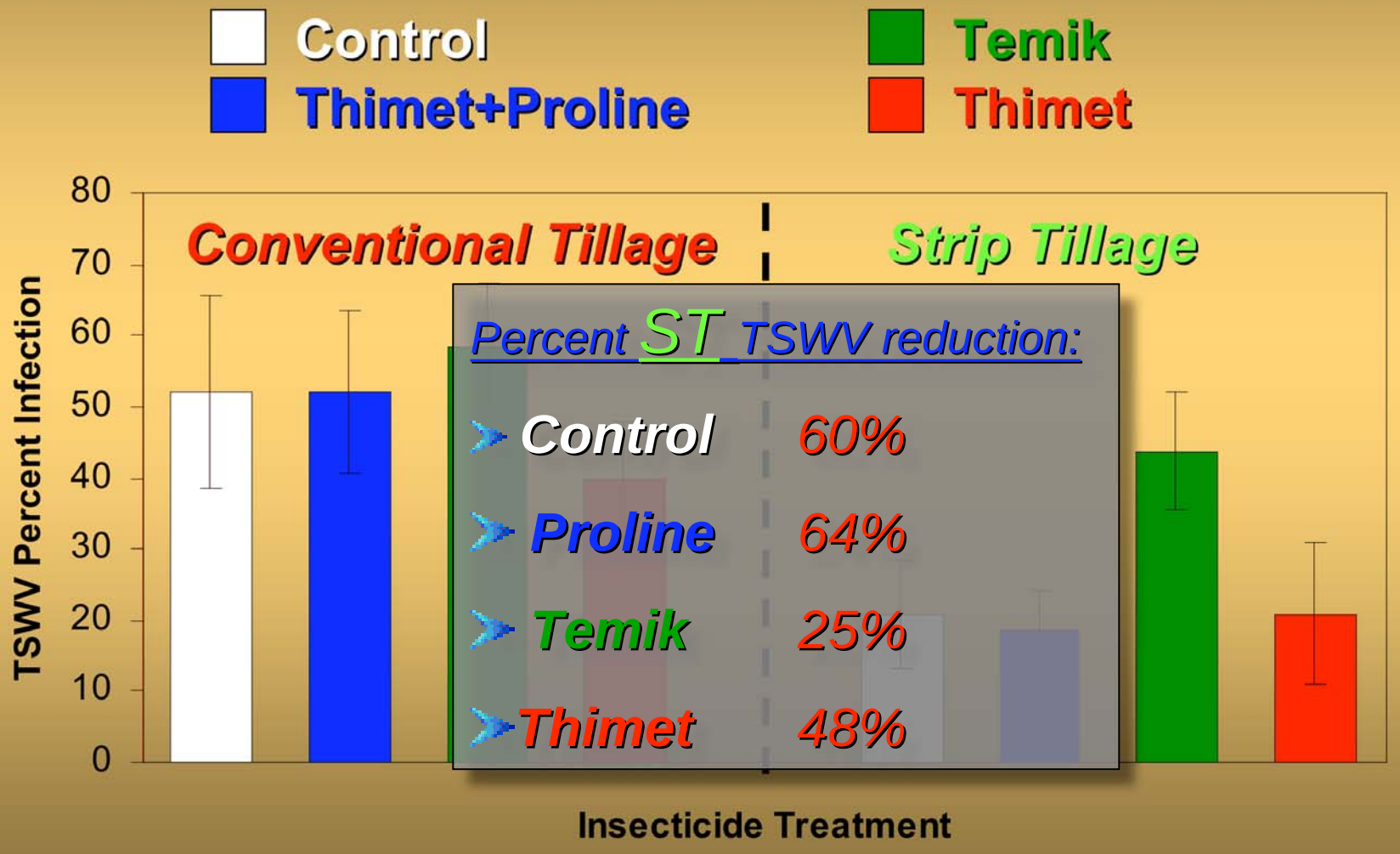
Cultivar X Insecticide



Percent Change in NDVI due to Chemical Treatment

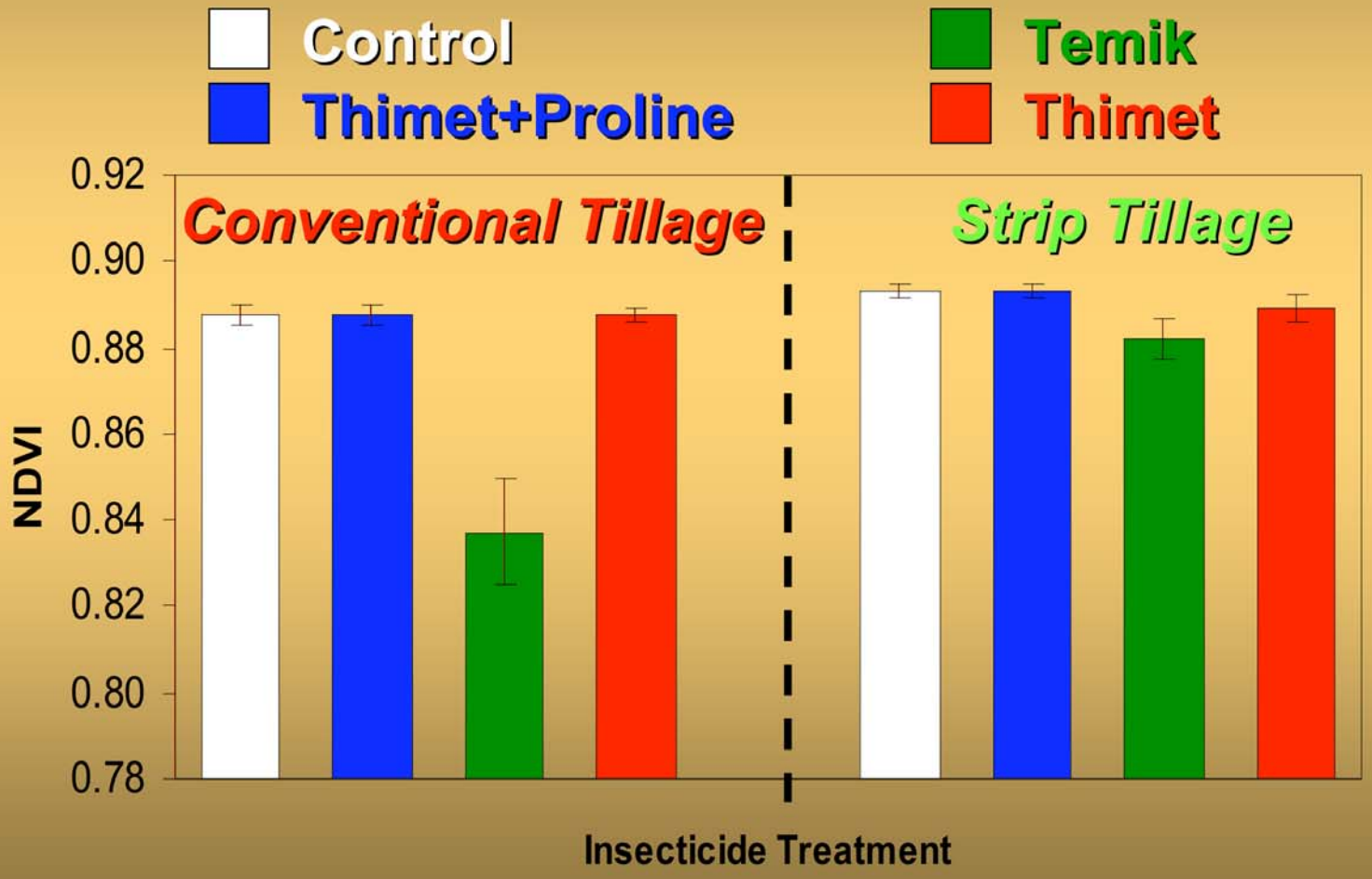


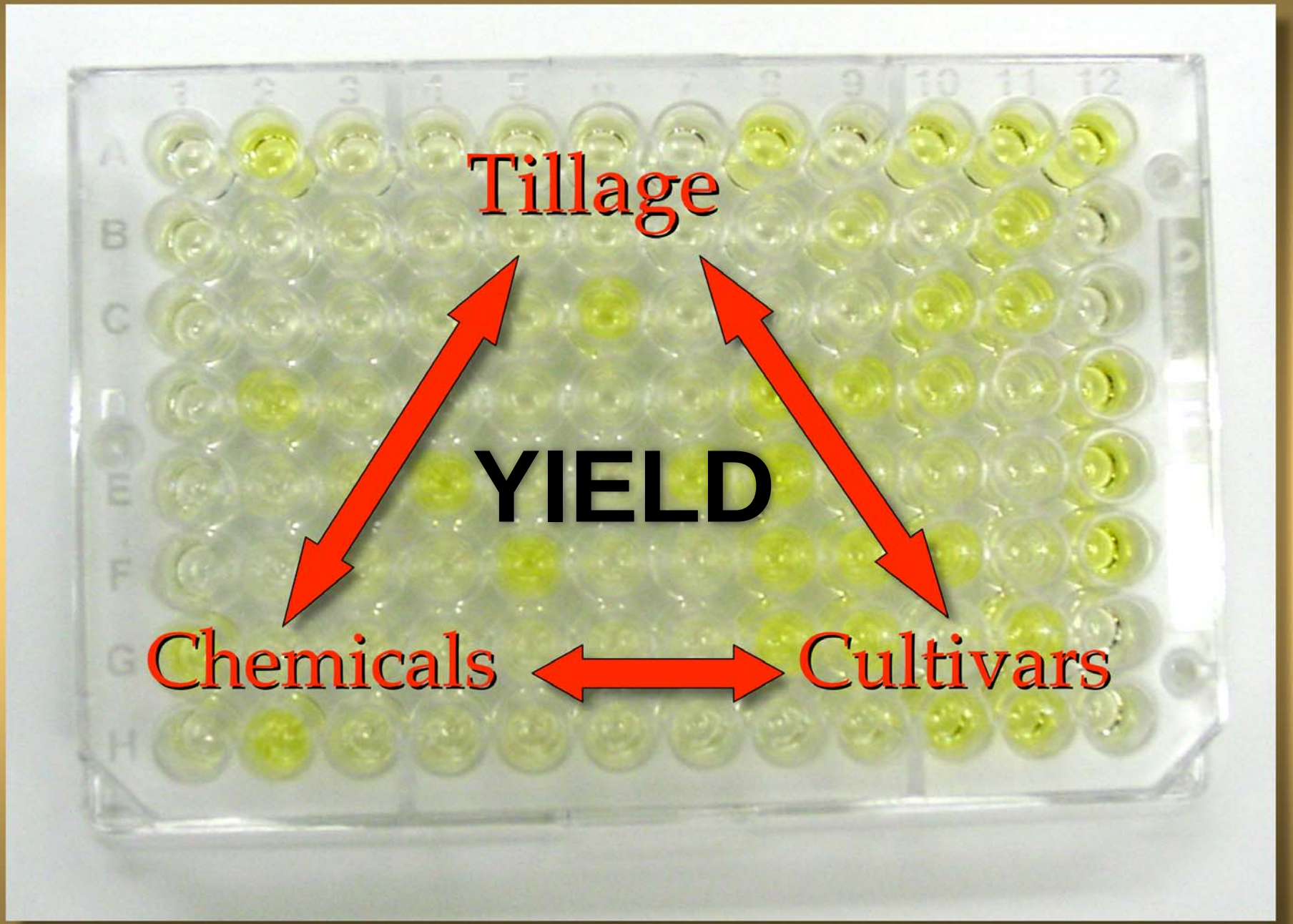
Tillage X Insecticide



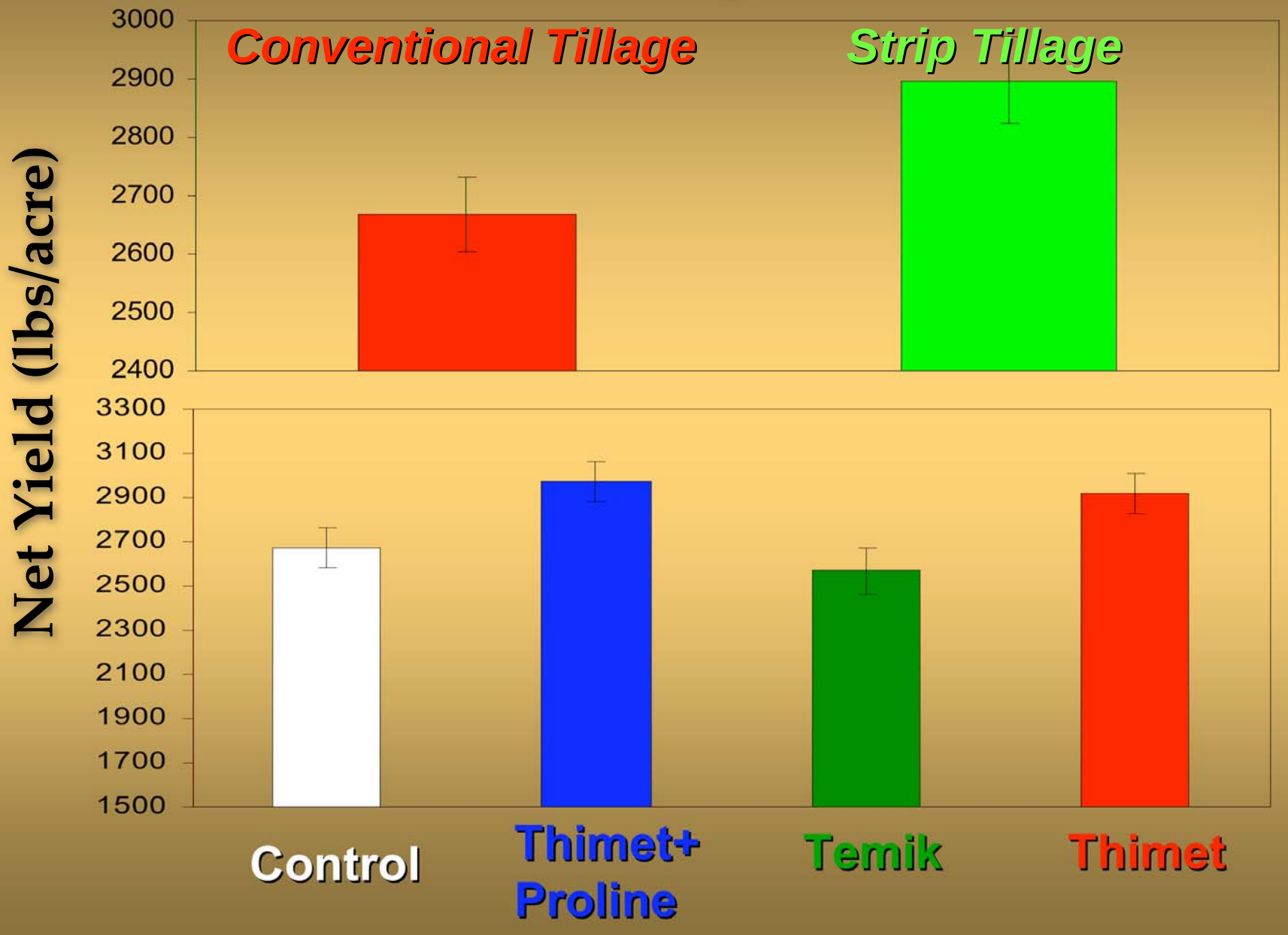
Tillage X Insecticide

Physiological Function: Disadvantage of Temik most prevalent in conventional tillage

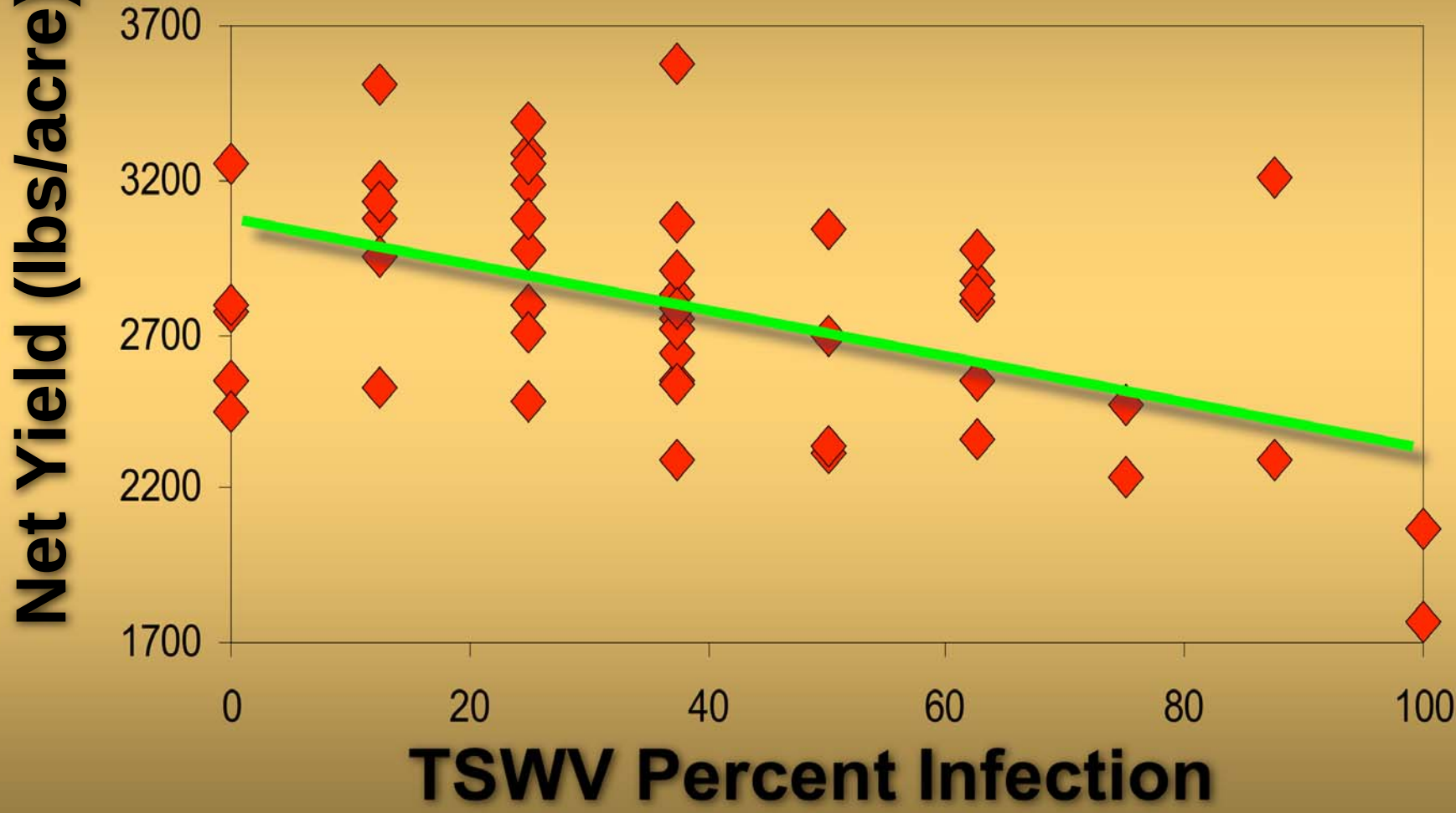



Tillage
YIELD
Chemicals
Cultivars

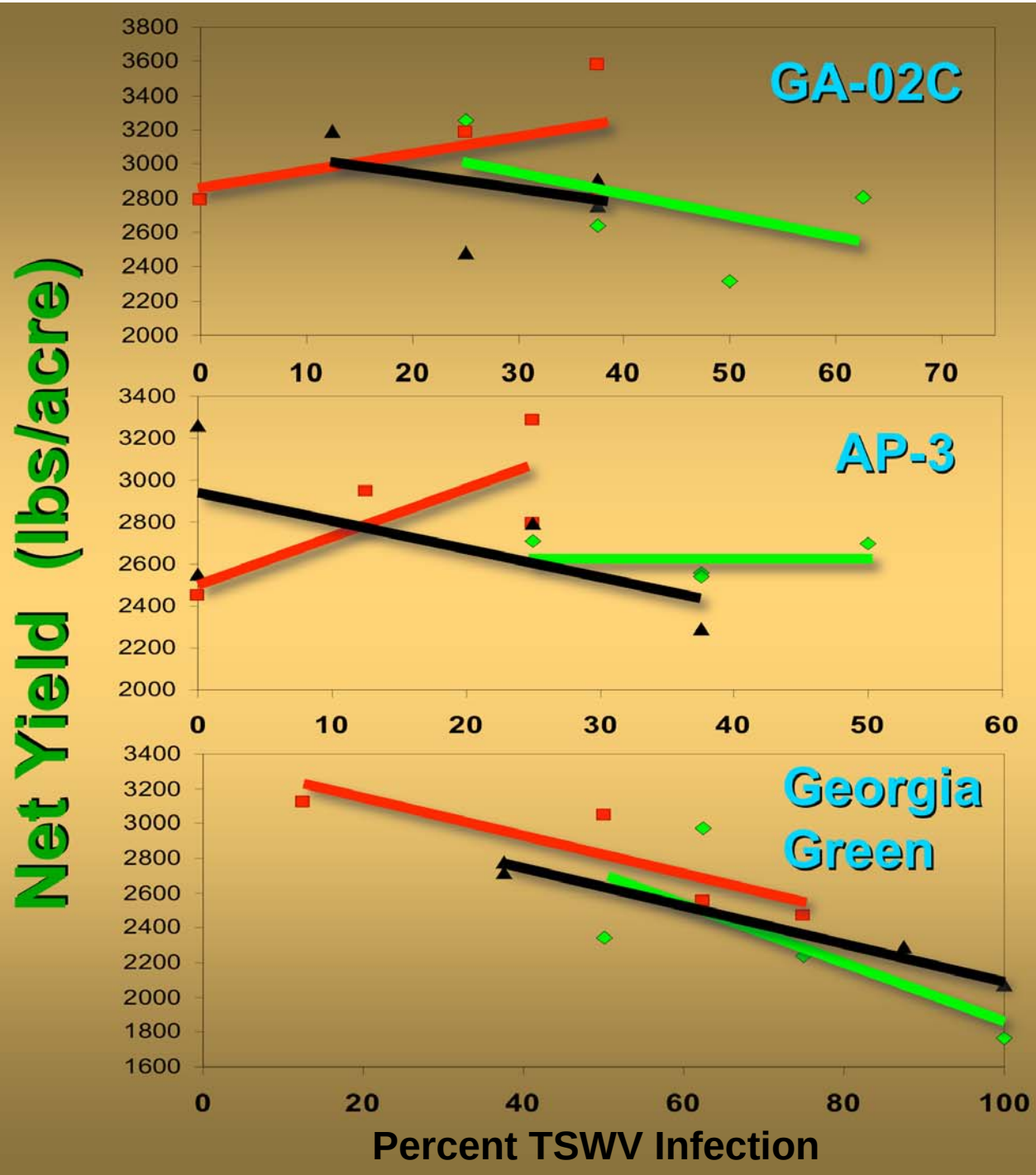
Yield Effects: Tillage and Chemicals



Relationship of Yield and TSWV Infection



Yield vs. Infection



Control

Thimet

Temik

Tillage works to manage TSWV

- but interactions of variety and chemicals can be important

Chemicals work to some extent

- depends on interaction of variety and tillage
- use of Temik should be carefully chosen with best combination of variety and tillage
- appear to have some action with the function of the plant (*or the virus*) and not JUST insect control
- sensors can indicate TSWV infection and response; may be useful for early selection in breeding programs