

Agronomic Management of Irrigated Cotton



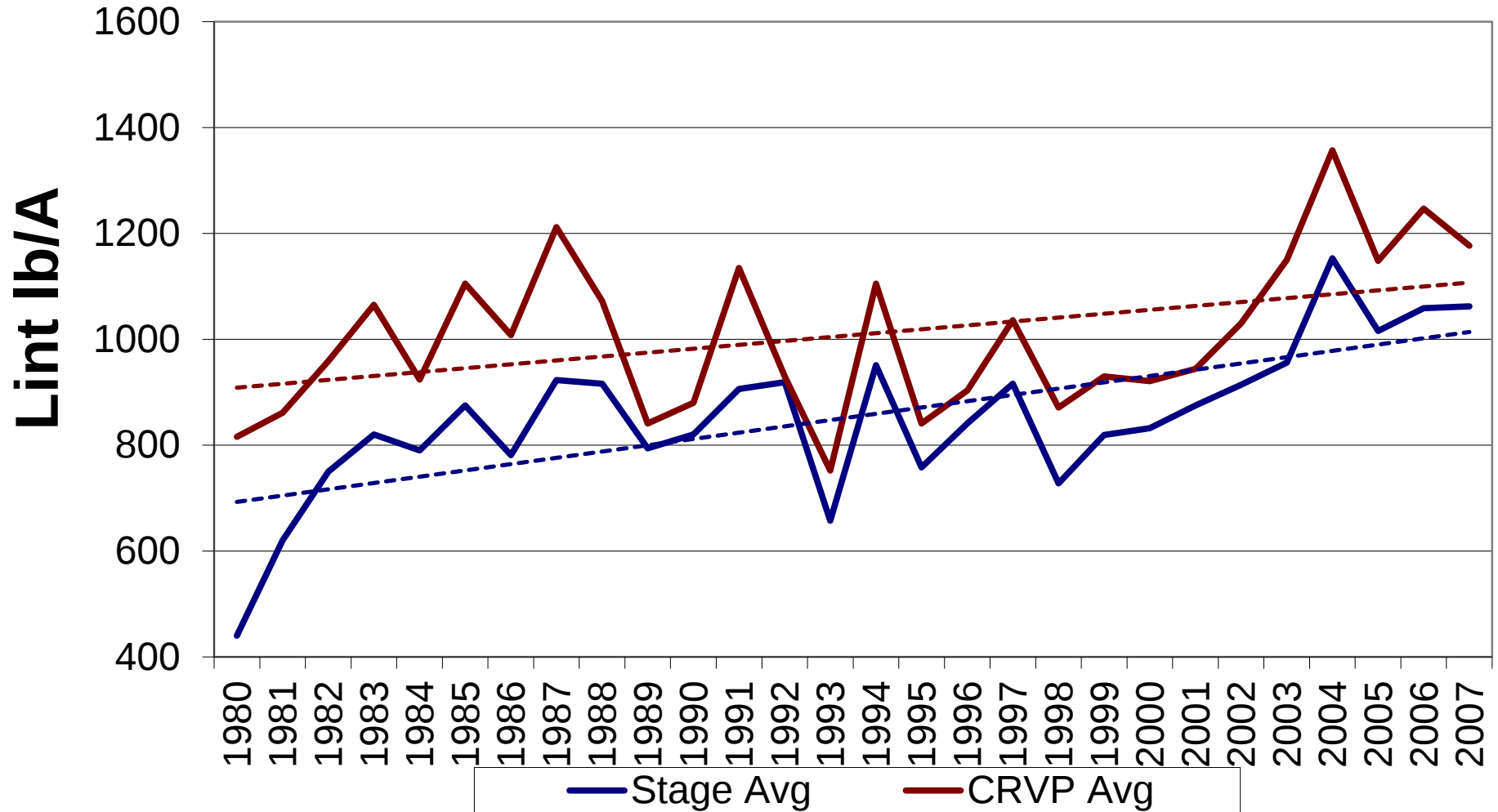
Tom Barber

University of Arkansas

Division of Agriculture



Arkansas Irrigated Cotton



Irrigation Benefits



- **Yield**
- **Stand Establishment**
- **Herbicide Activation**
- **Nitrogen Activation and nutrient movement**
- **Canopy Development**
- **Maintain Earliness**

Factors and Variability



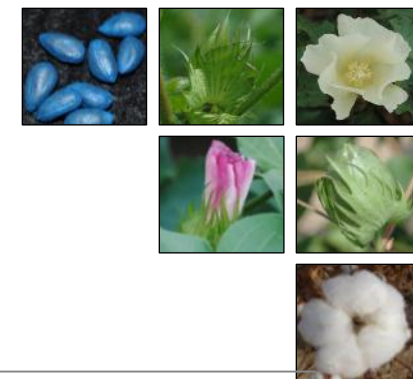
- ❑ **Pumping Capacity**
- ❑ **Soil Type**
- ❑ **Soil Productivity**
- ❑ **Rooting Zone**
- ❑ **Infiltration**
- ❑ **Drainage**
- ❑ **Leveling/ditching**

Questions

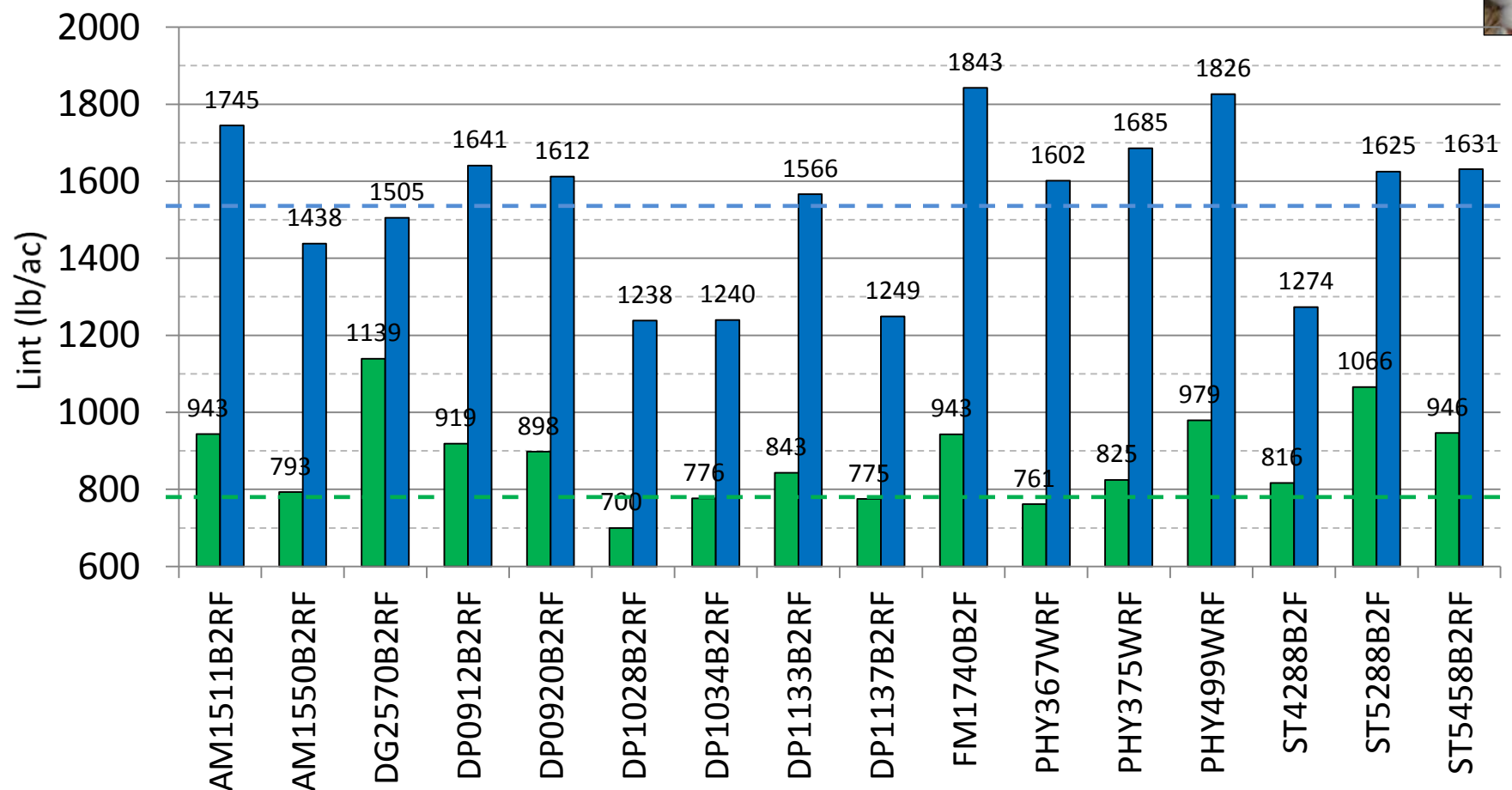


- **Do varieties respond differently?**
- **Will increased PGR applications be needed?**
- **Can I activate residual herbicides?**
- **What about fertility especially nitrogen?**

Arkansas Cotton Yield Response to Irrigation



LSD (0.05) = 249



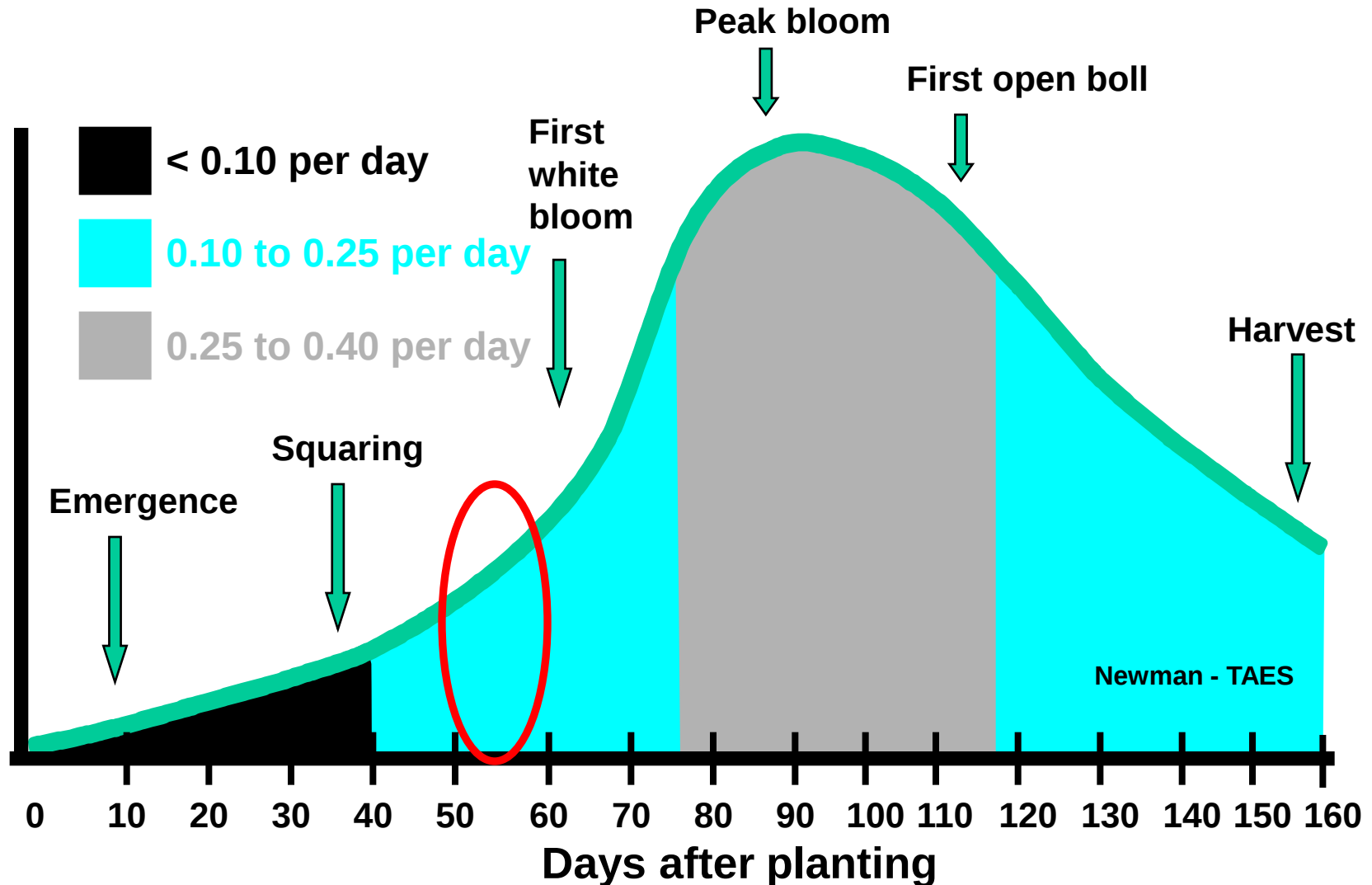
Questions



- Will increased PGR applications be needed?

It depends.... When was irrigation initiated ?

Rate of Water Use in Relation to Cotton Development



Early – 10 DBB

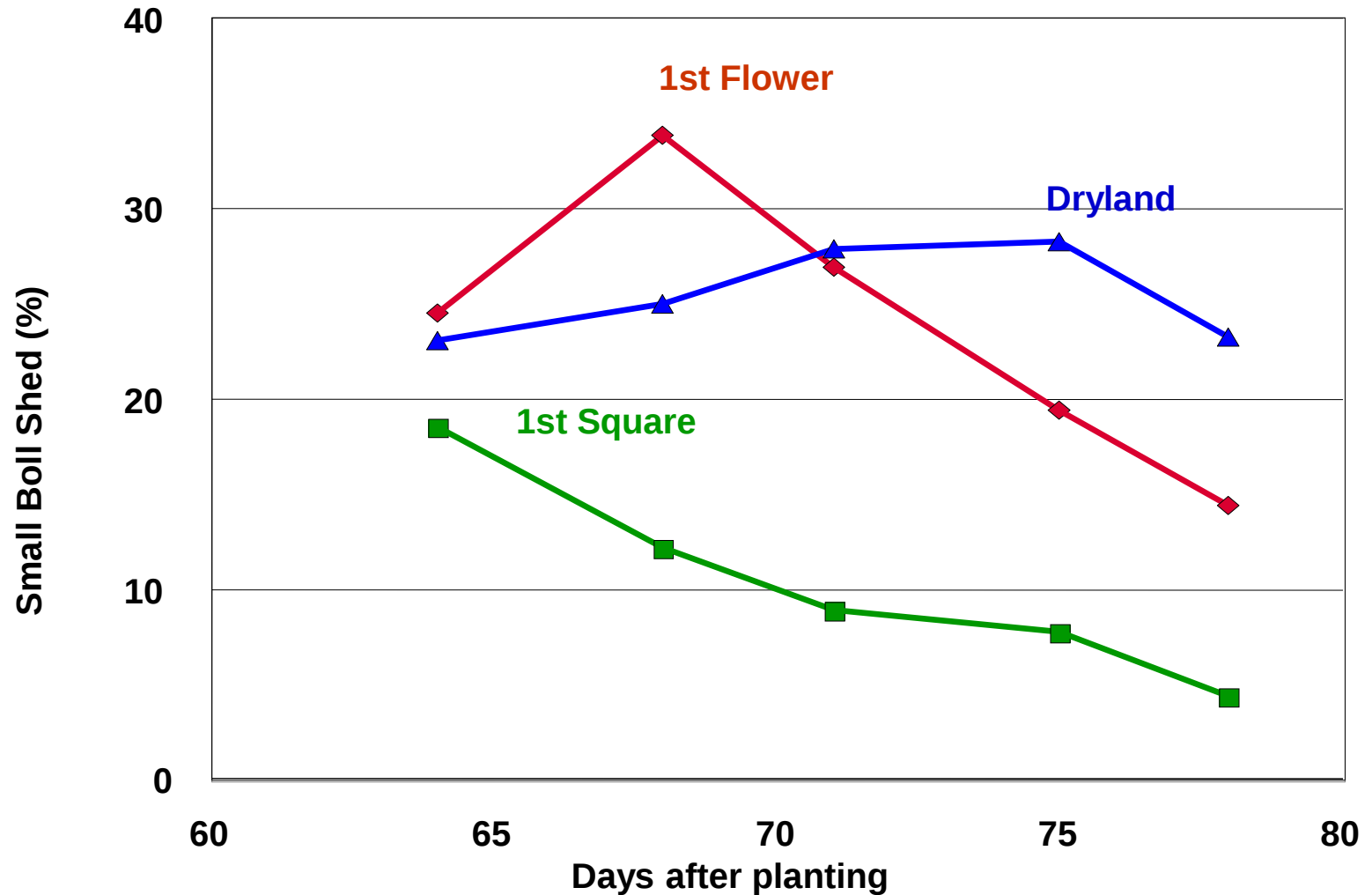


Late - Bloom

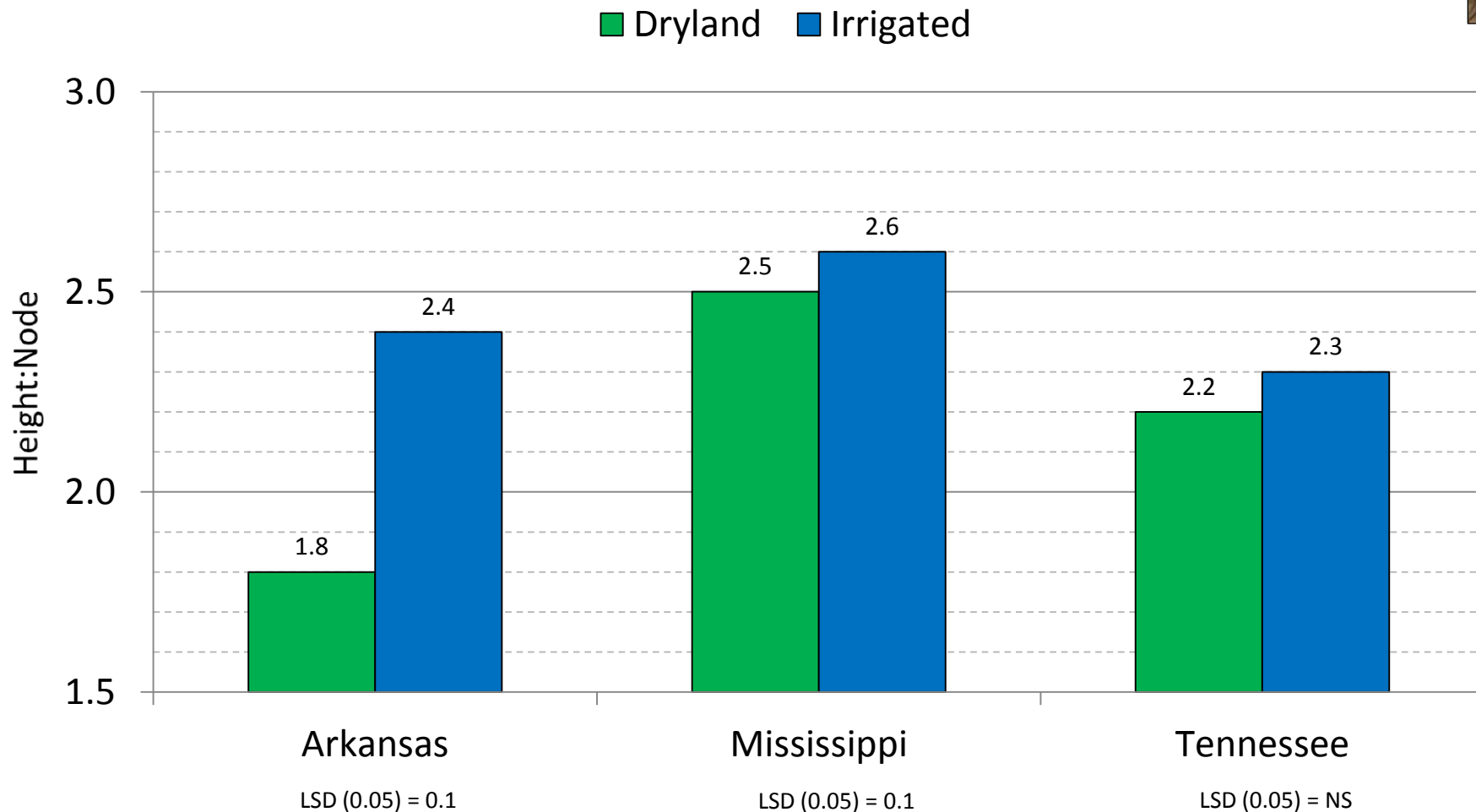
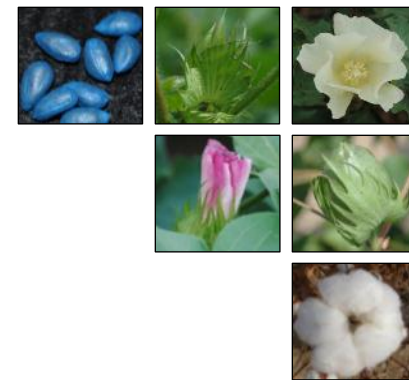


Irrigation Initiation (Tacker)

Small Boll Shed

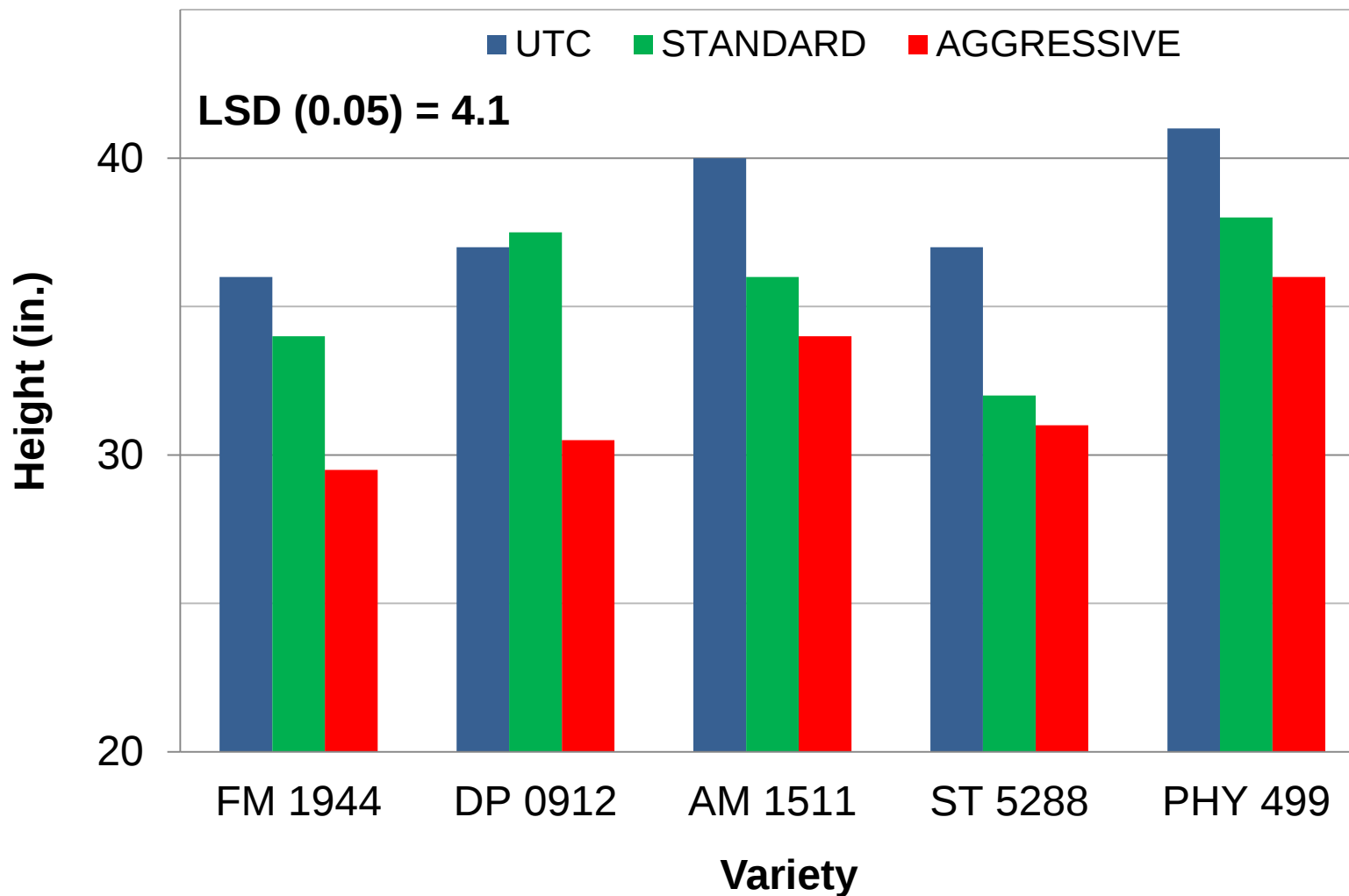
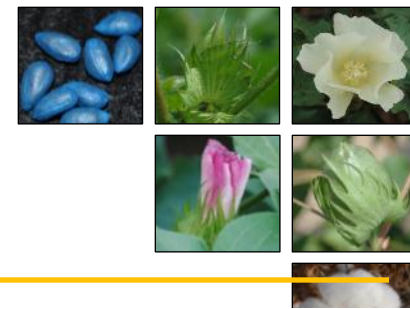


Plant Height:Node



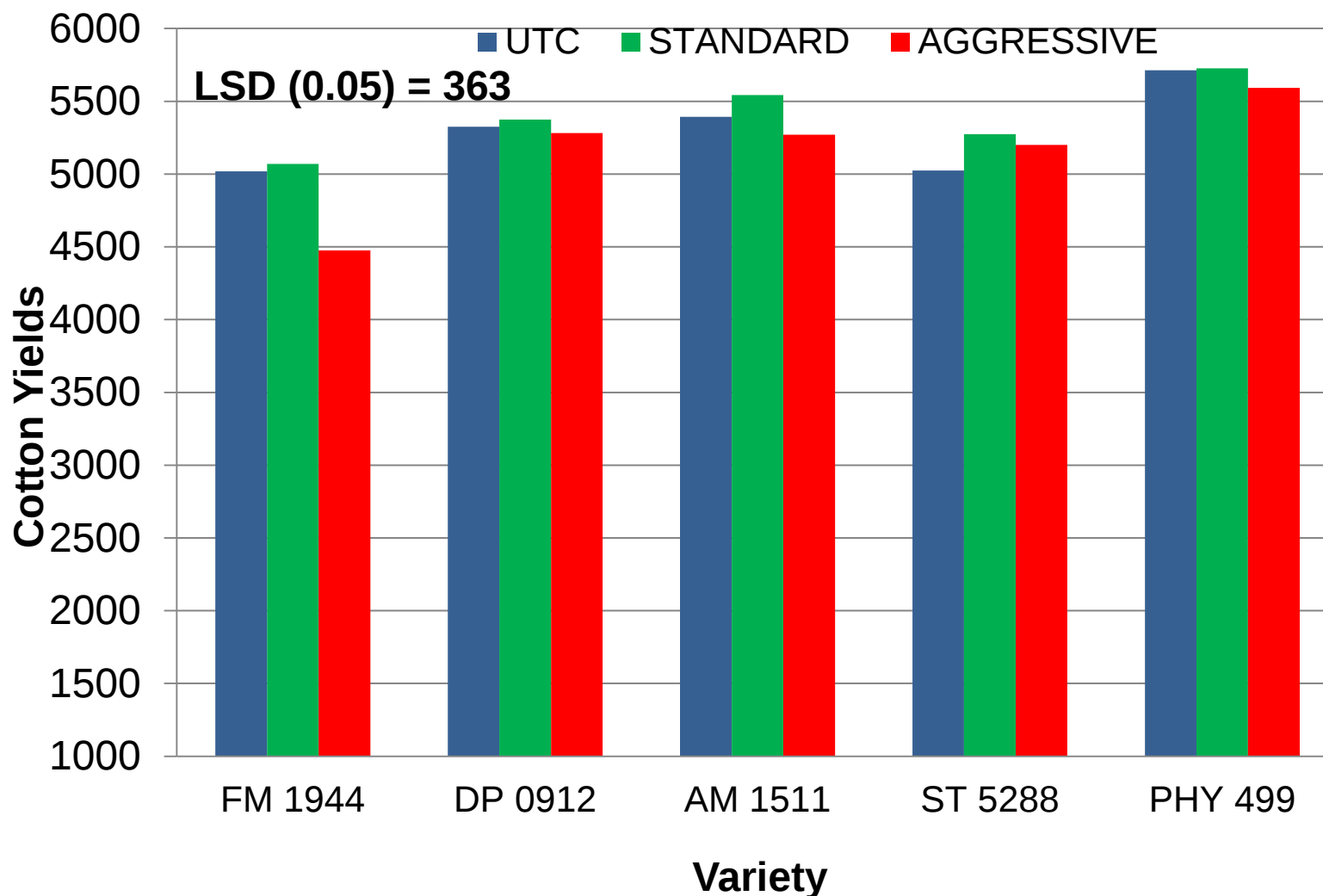
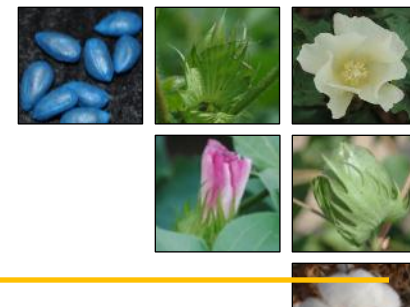
CI: Variety Management 2012

Plant Heights: Cutout (7-30-12)



CI: Variety Management 2012

Seed Cotton Yields



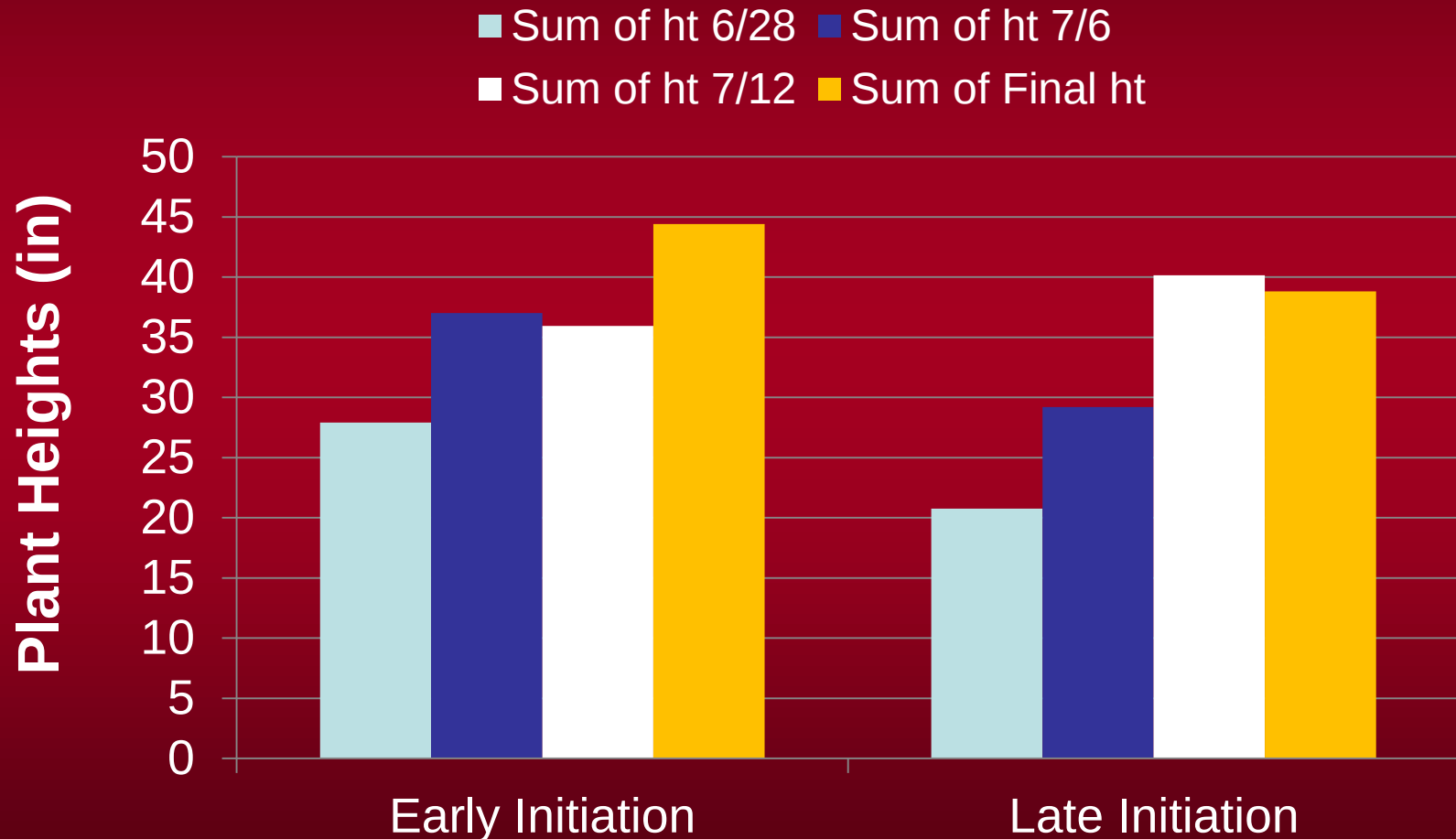
Irrigation and PGR Application

- Conducted at Rohwer Research Center
- Irrigation Treatments
 - Early – 12 node cotton ~ week prior to bloom
 - Late – 15 node cotton ~ first week of bloom
- PGR (Mepex) Applications
 - Just Prior to first irrigation
 - 6 oz, 12oz and 12 oz at bloom
 - 5 days after initial irrigation
 - 6 oz, 12oz and 12 oz at bloom



Irrigation Initiation

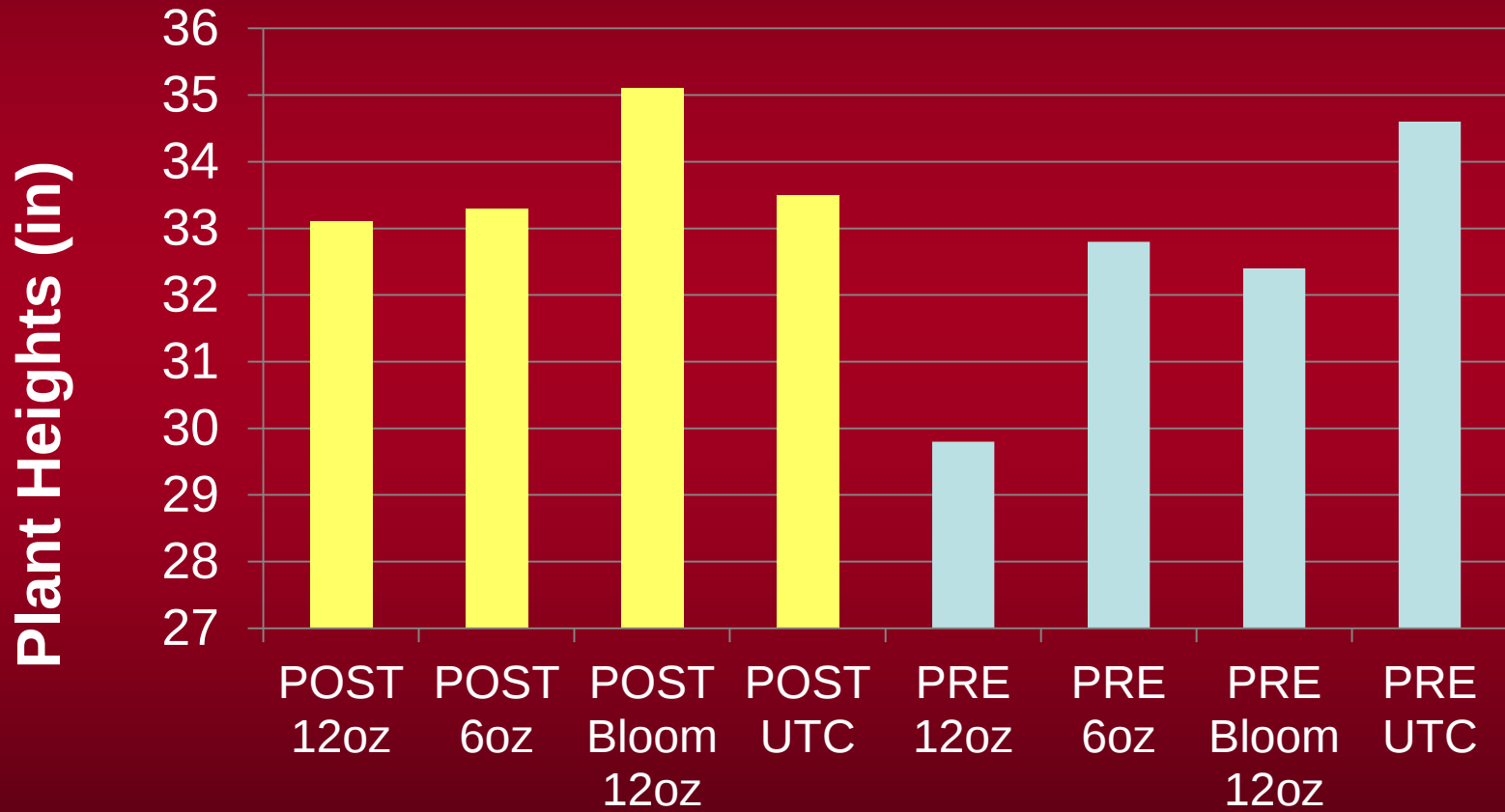
Main Effect on Plant Heights



Irrigation X PGR

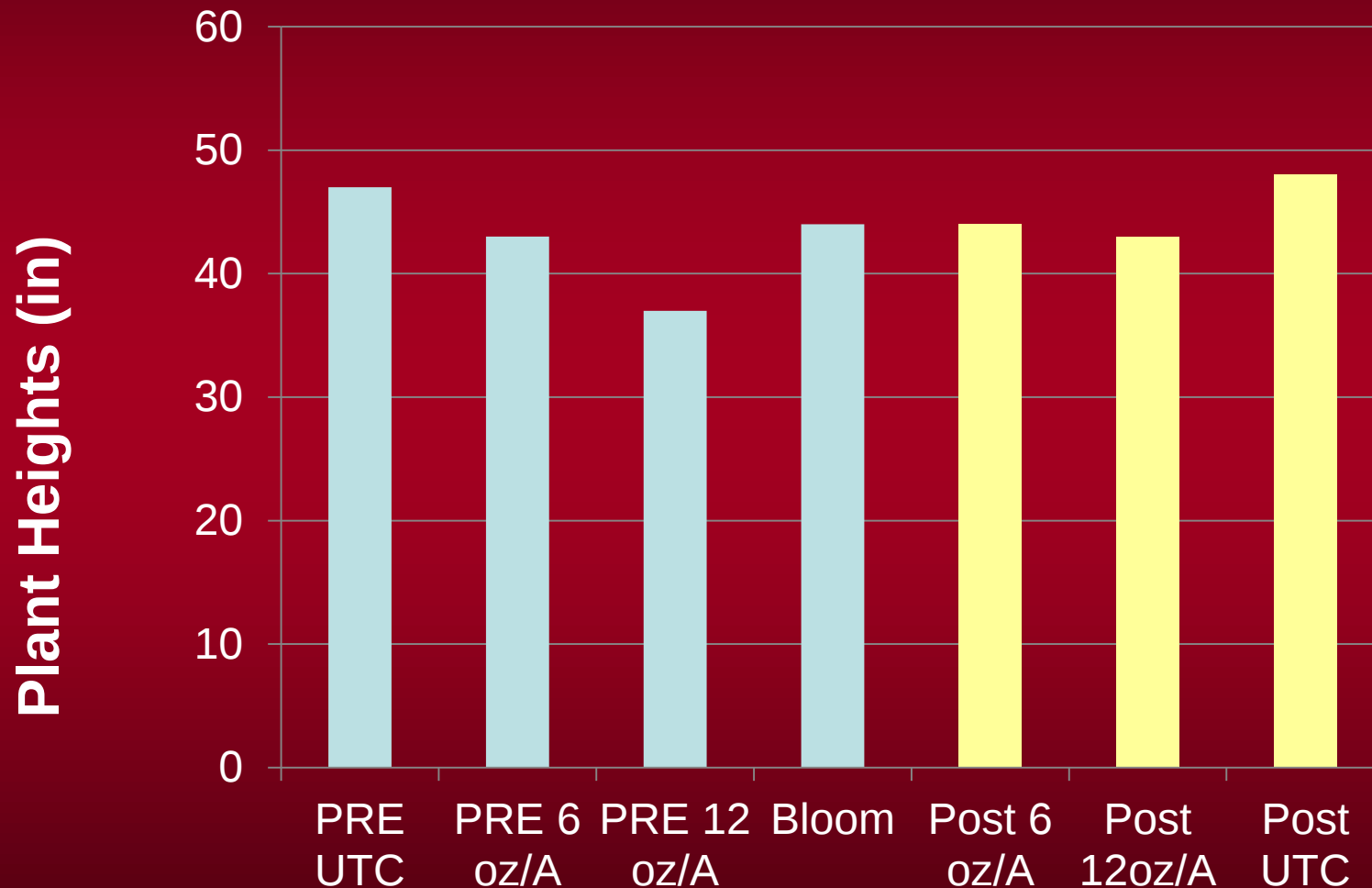
Main Effects PGR Application

Pre and Post Irrigation



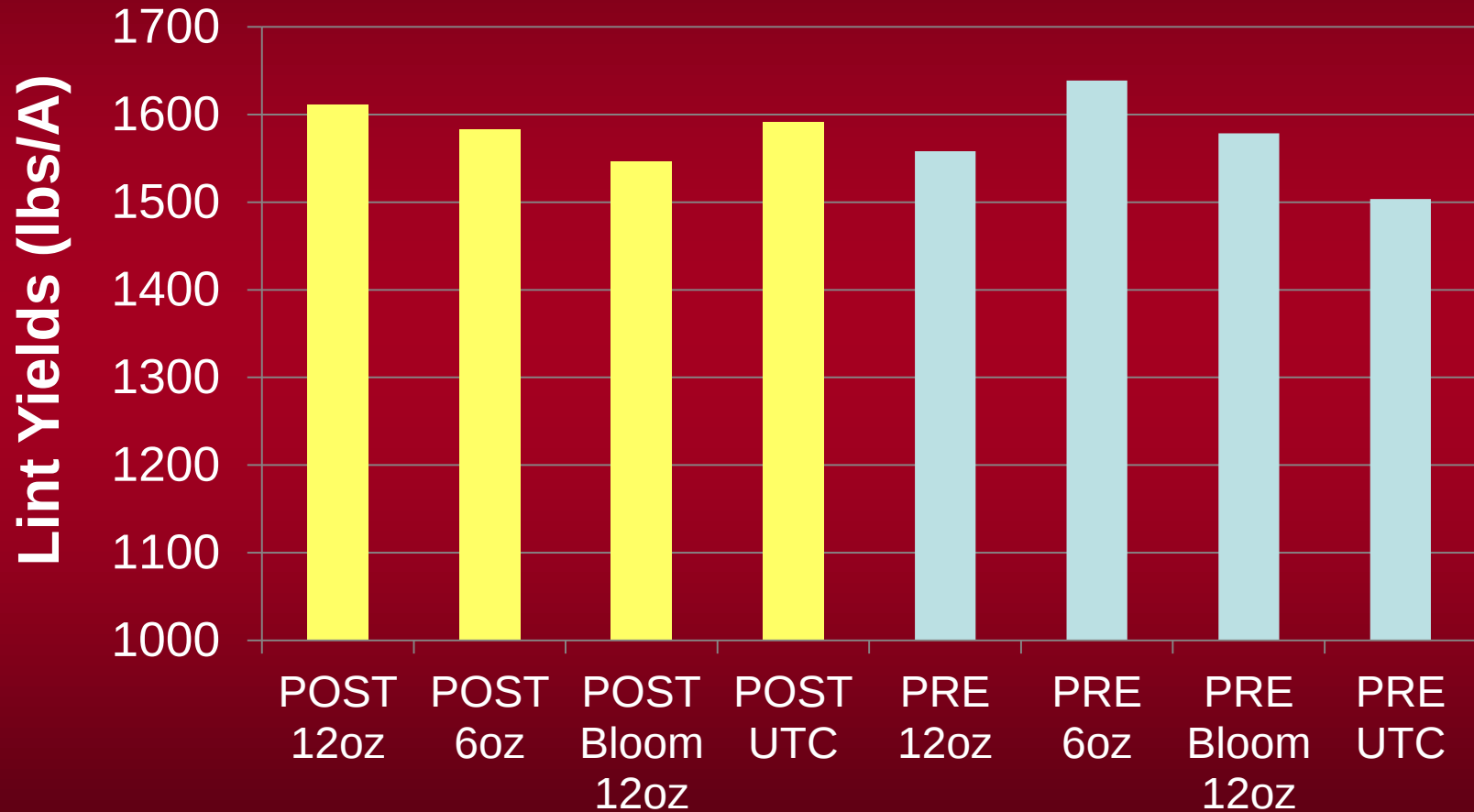
Irrigation X PGR

Plant Heights at Maturity Early Timing



Irrigation X PGR

Cotton Lint Yields: NS



Summary: Irrigation and PGR

- Week prior to bloom = Critical!
- Manage growth more efficiently by applying 6 - 10 oz Mepex prior to turning on water
 - Depends on variety and irrigation system
- Protect fiber quality - Mic
- 200 lb/A yield difference by waiting 1 week
- No differences in yield based on PGR App.



Questions

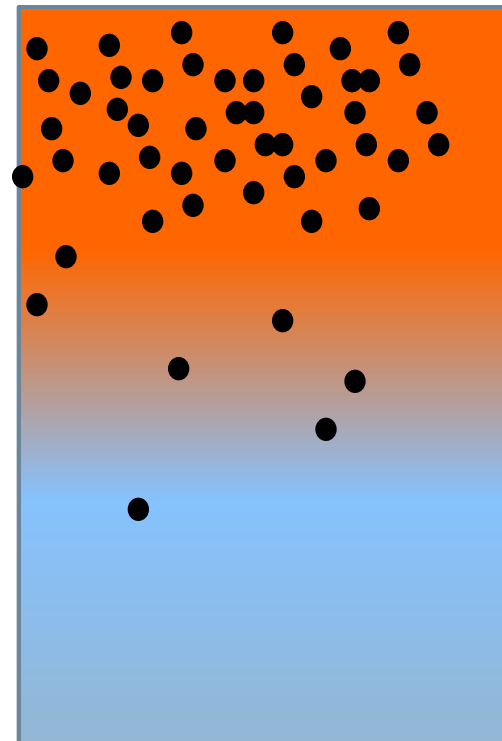


- **Can I activate residual herbicides?**
- Jason Norsworthy and Jason Bond 2011

Residual Herbicides



- ▣ **Activation**: placement of the herbicide in the soil region that maximizes opportunity for herbicide uptake by the germinating and emerging weed seedling.
- ▣ **Soil active** herbicides are only available when dissolved in the soil water
- ▣ **Activation dependent on**
 - Timing and amount of rainfall or incorporation
 - Herbicide selection
 - volatilization, photodegradation, solubility, partitioning to soil particles, mobility, etc.
- ▣ **Does not work on dry soil surfaces**
 - Volatilization, photodegradation, lack of uptake during germination/growth

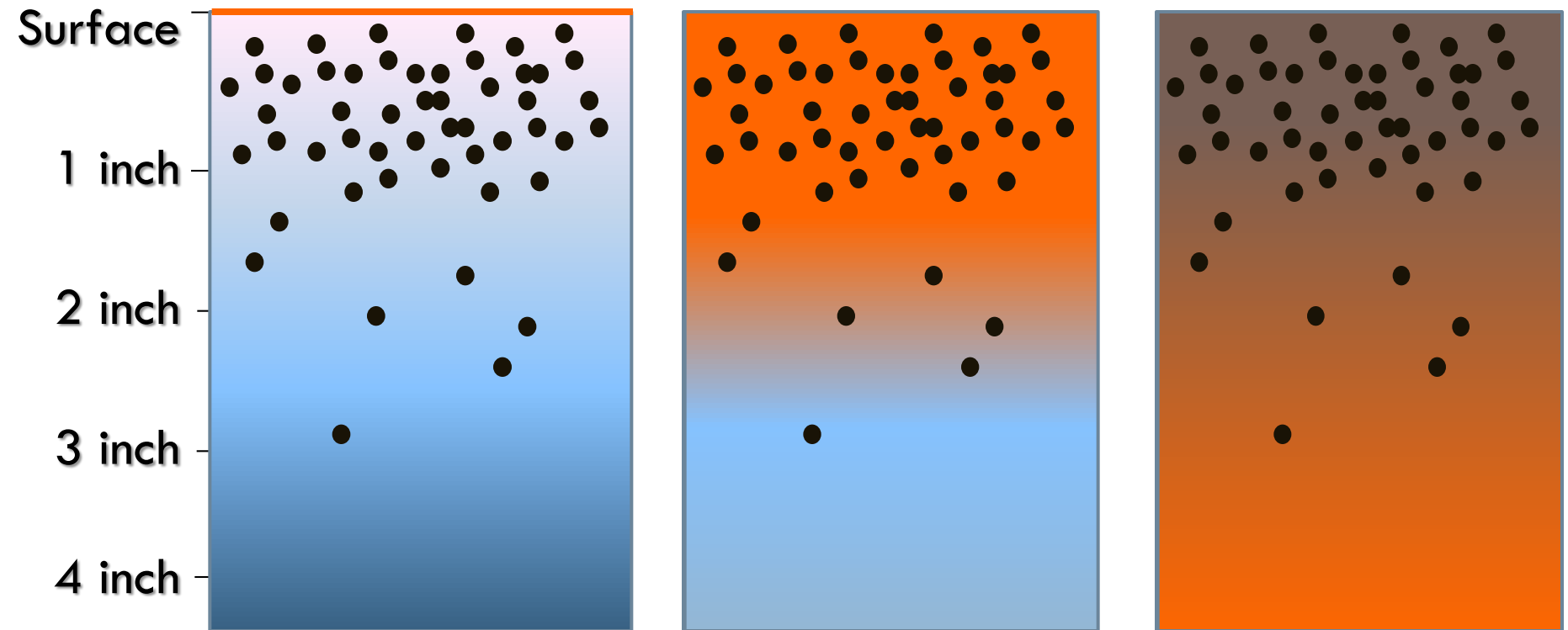




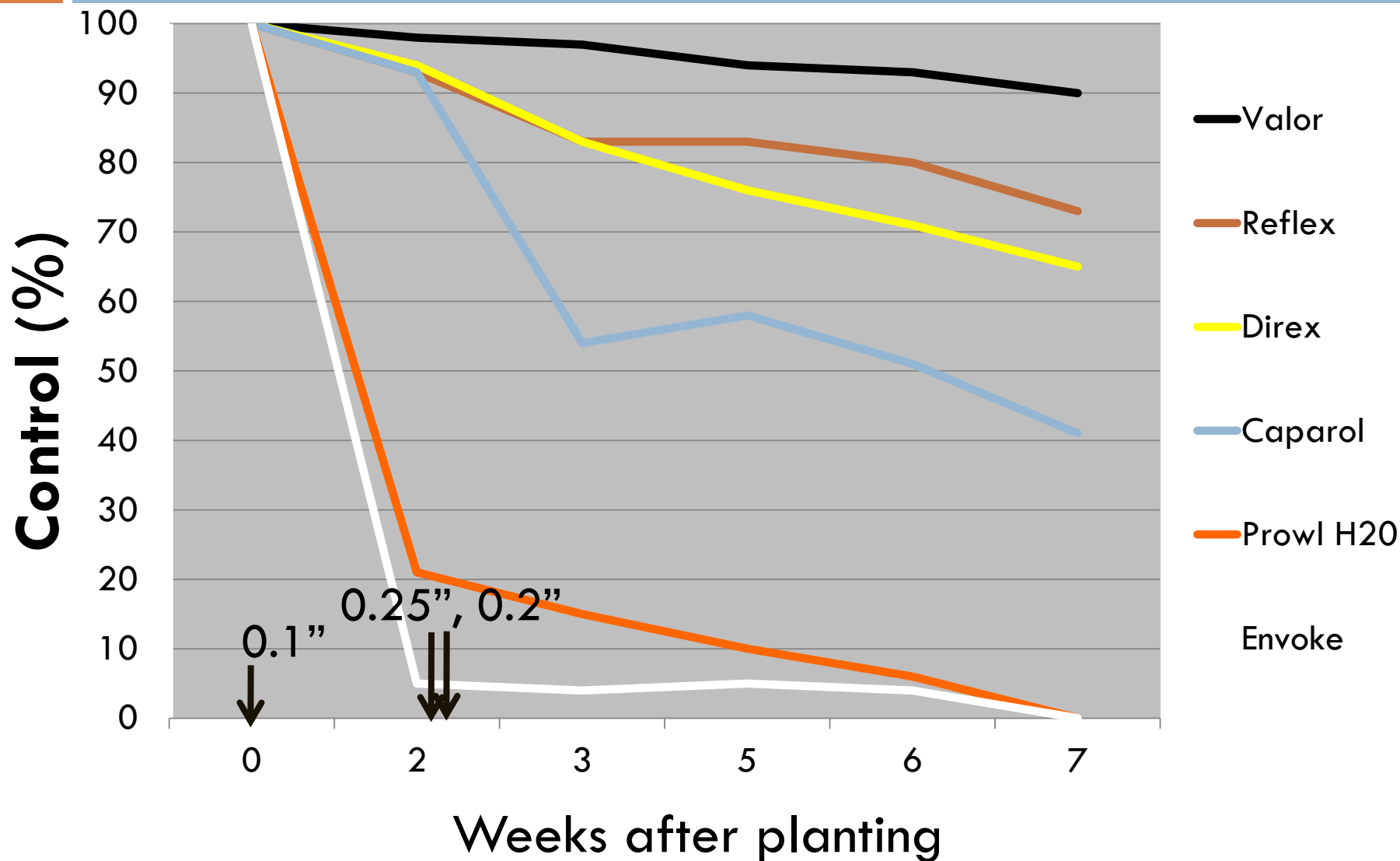
No rainfall
Non-incorporated

Rainfall
Incorporated

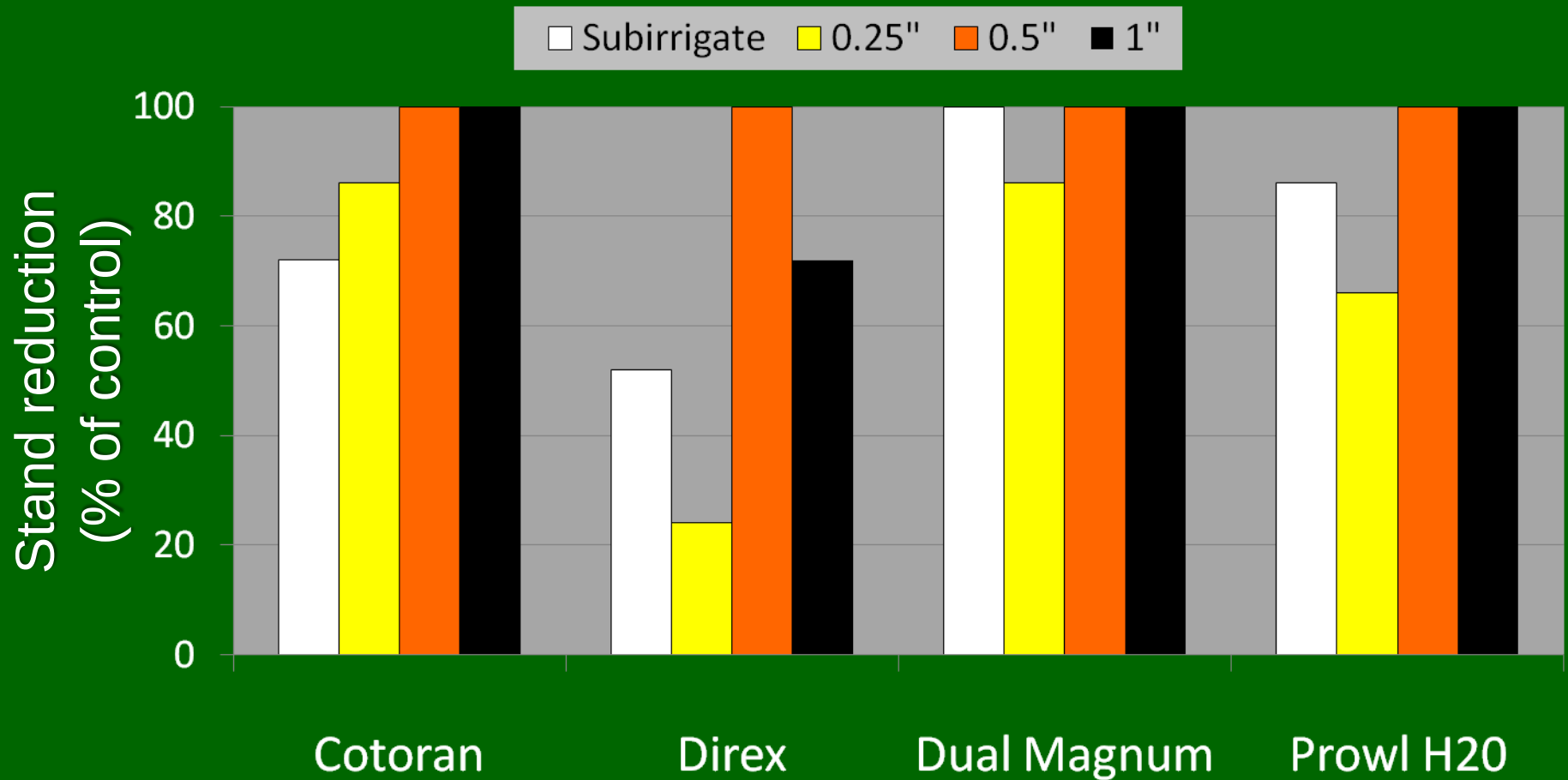
Too Much
Rainfall



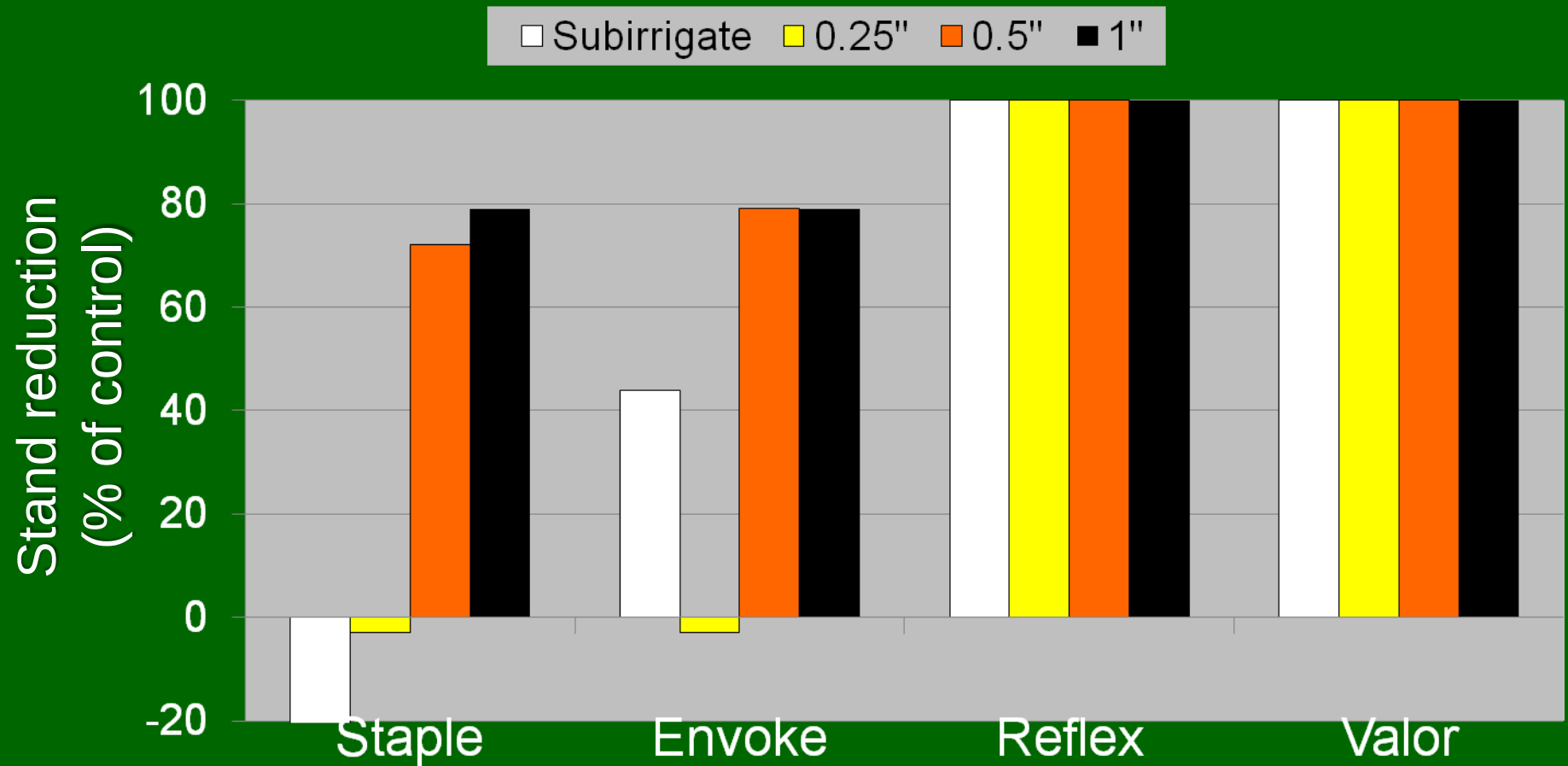
Palmer amaranth residual control (Marianna)



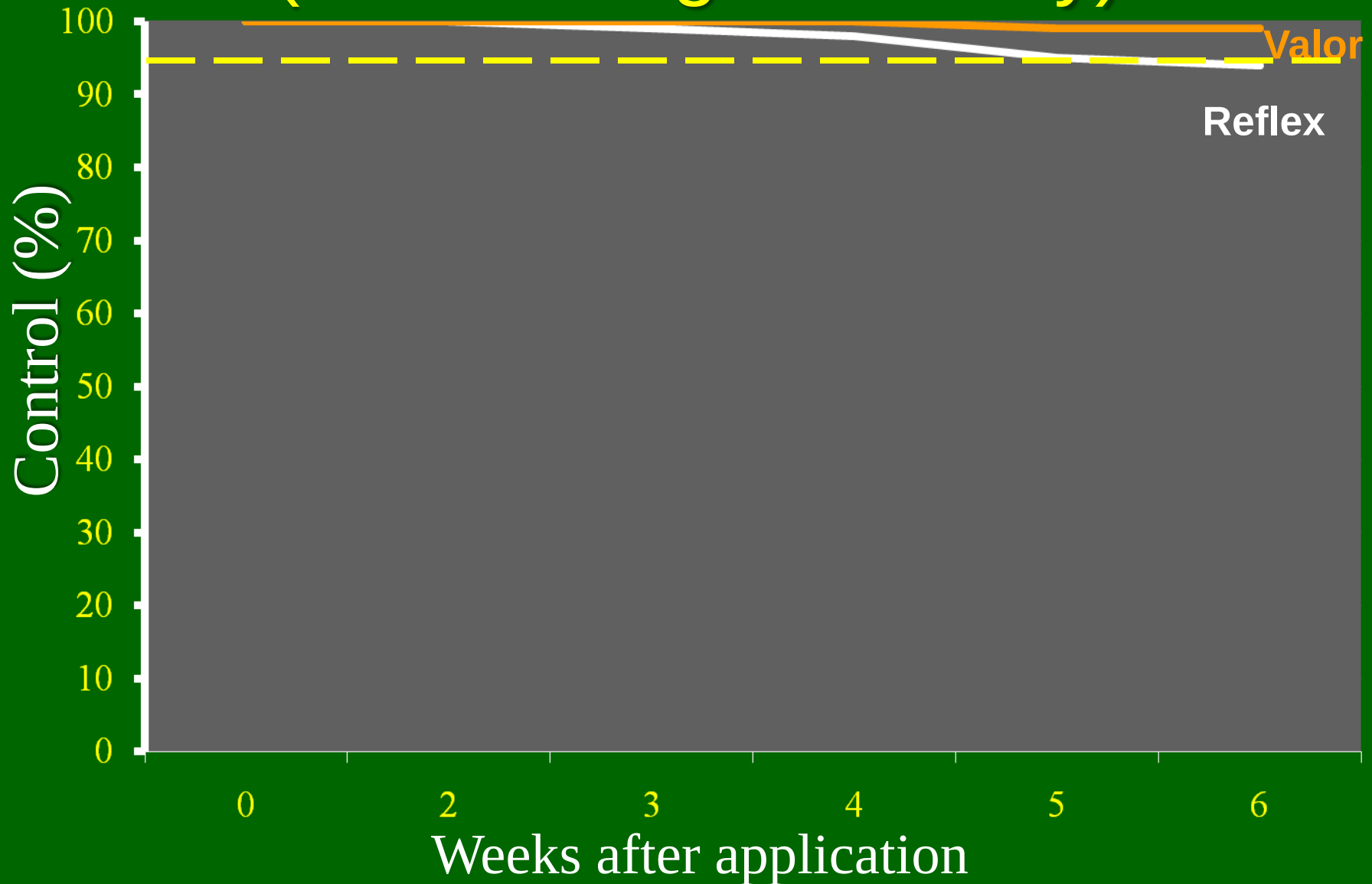
Palmer amaranth control



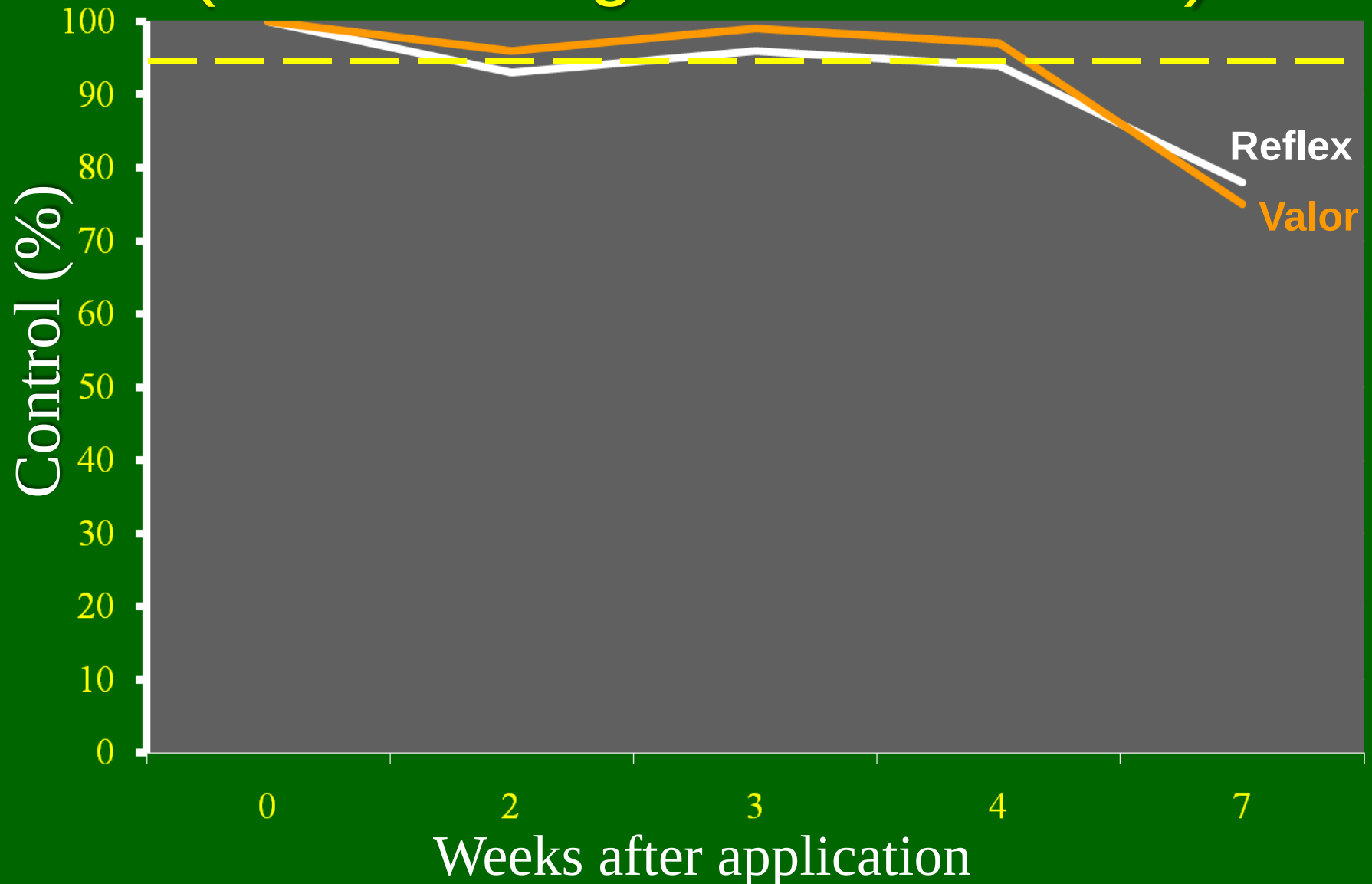
Palmer amaranth control



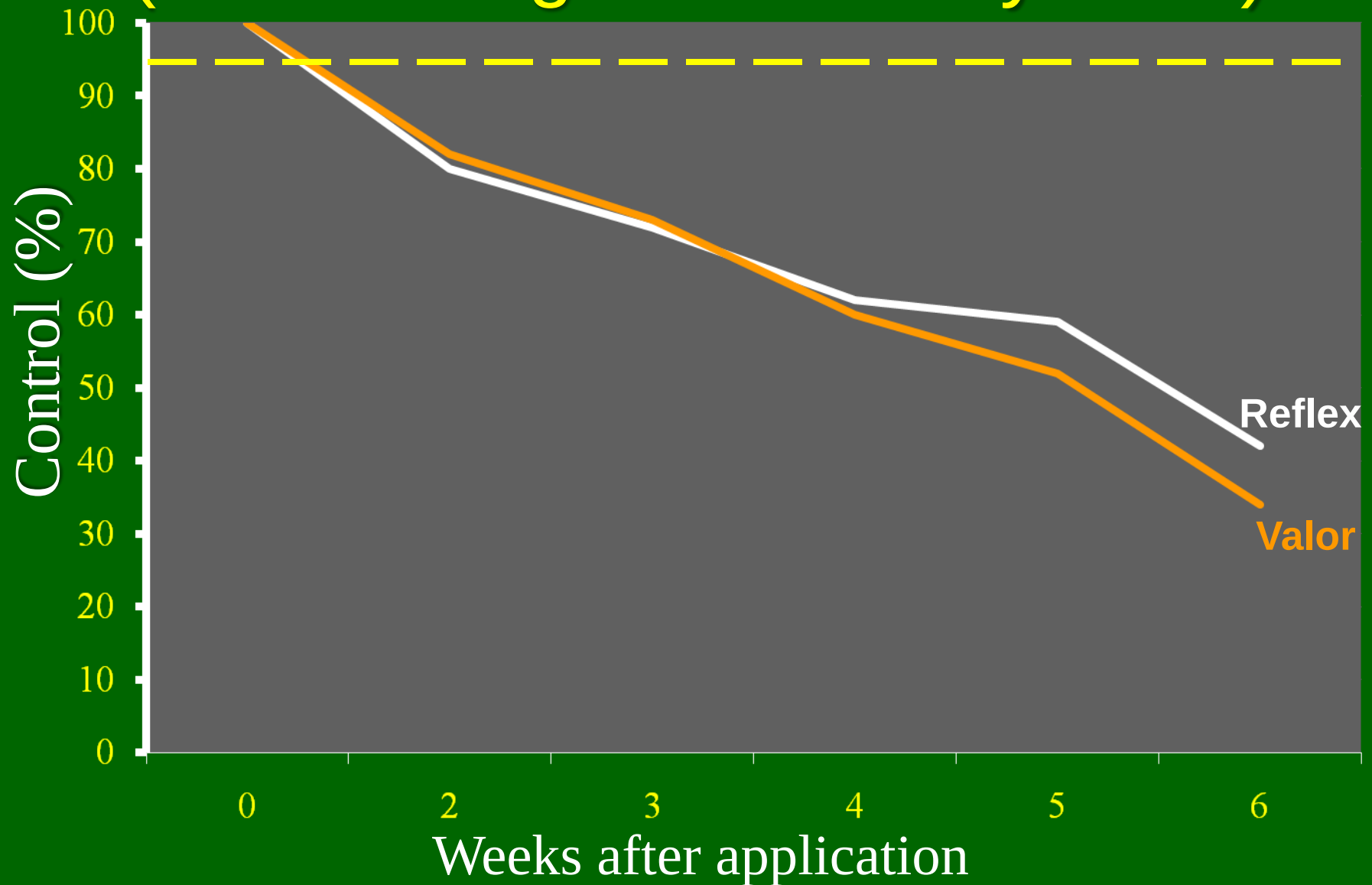
Palmer amaranth control (Furrow Irrigated - clay)



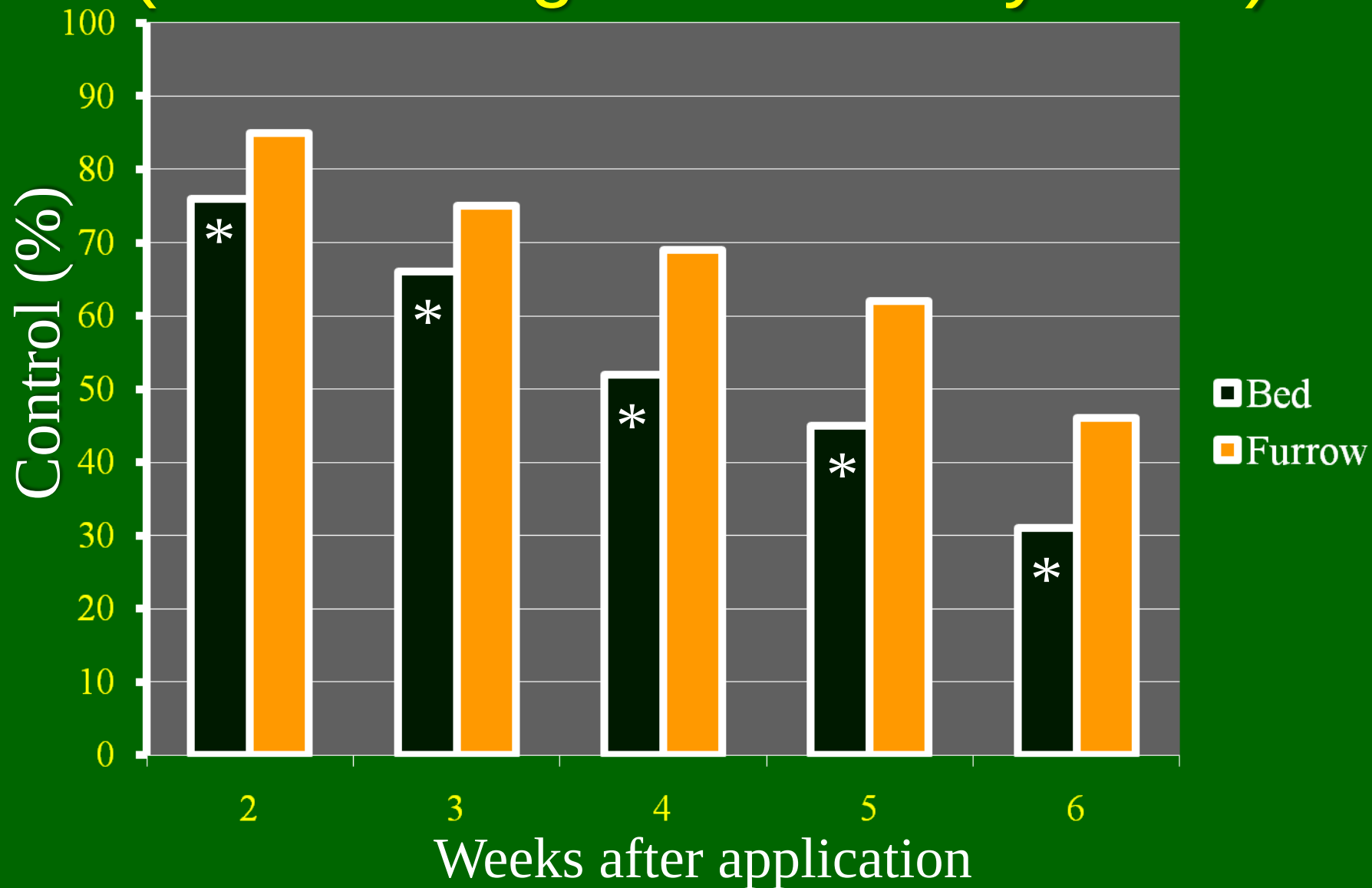
Palmer amaranth control (Furrow Irrigated – silt loam)



Palmer amaranth control (Furrow Irrigated – sandy loam)



Palmer amaranth control (Furrow Irrigated – sandy loam)



Reflex



Summary



- Sprinkler irrigation is more consistent in activating residual herbicides (across soil types)
- Furrow irrigation is effective in activating residual herbicides on fine textured soils
- Furrow irrigation will not fully activate herbicides on coarse soils.
- Residual herbicides will generally break first near the polypipe or in areas of standing water.

Questions



- **What about fertility especially nitrogen**

Nitrogen Activation



Conclusions



- **Pivots provide more flexibility**
 - ▣ **Stand establishment**
 - ▣ **Herbicide and nutrient activation**
- **Furrow most common in Arkansas**
 - ▣ **Infiltration issues**
 - ▣ **More plant size variability**
- **ALL BETTER THAN NOTHING!**

Acknowledgements:

Cotton Incorporated

Blake McClelland, Chris Main, Darrin Dodds,
Jason Norsworthy and many others

