Varieties: OVT trials – Highest yielding varieties, their characteristics, and how to manage

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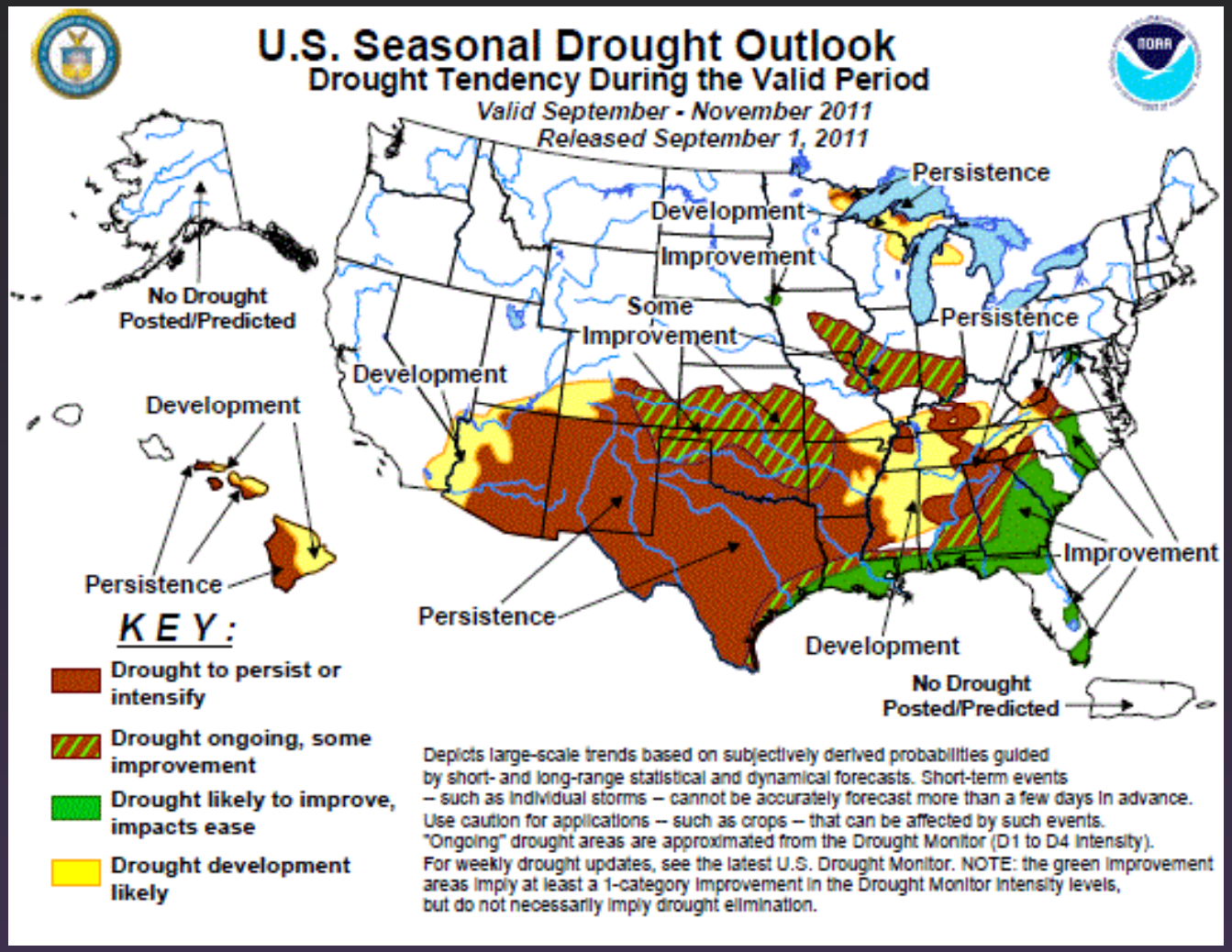
Drought and Heat



www.cpc.ncep.noaa.gov

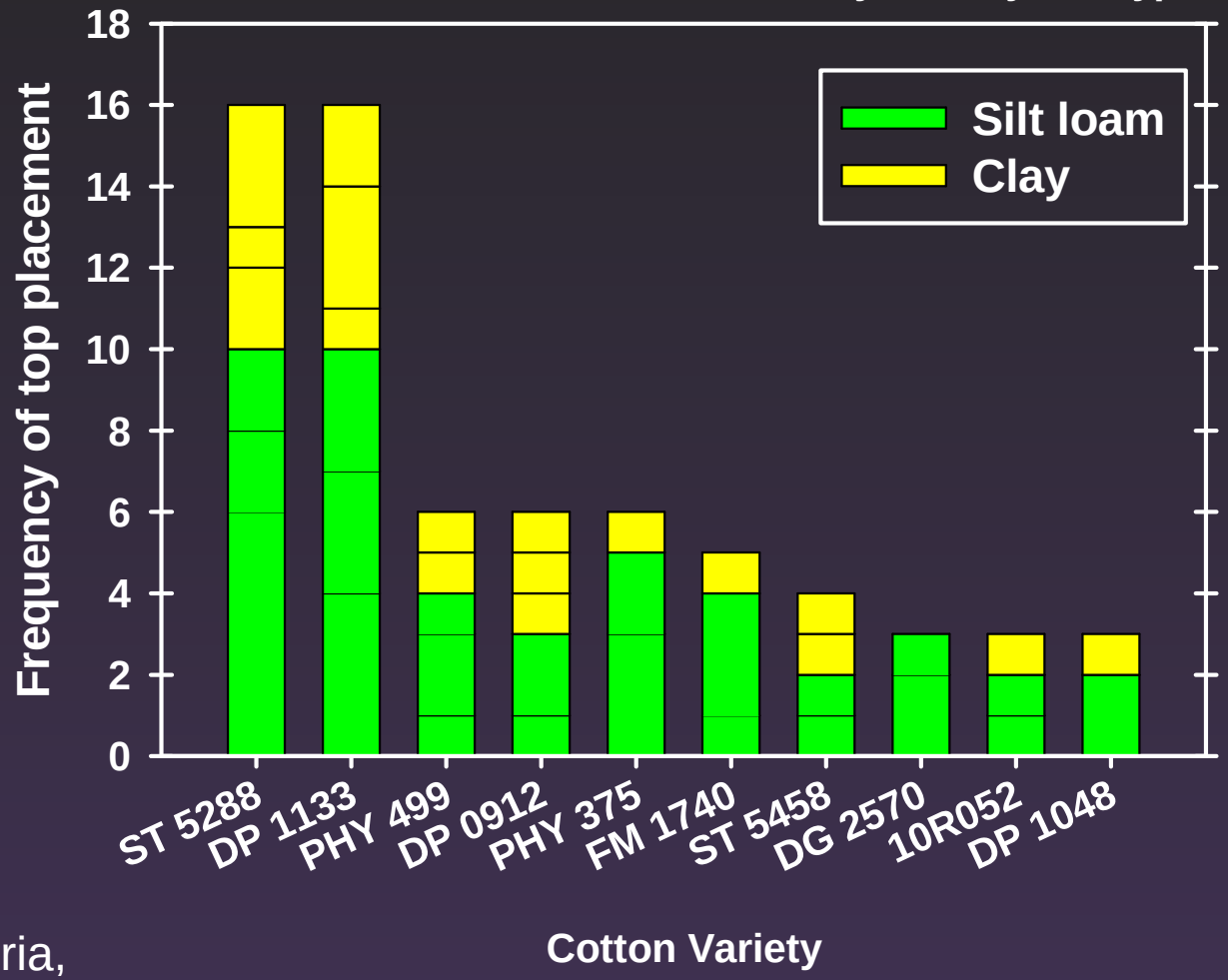
LA Cotton Varieties Planted in 2010, 2011

Louisiana			
Total Cotton Acreage		255,000	288,000
Stoneville	ST 5288 B2F	24.7	62.4
Deltapine	DP 0949 B2RF	17.5	0
Deltapine	DP 555 BG/RR	17.0	0
Deltapine	DP 1133 B2RF	<1	8.4
Phytogen	PHY 565 WRF	6.6	5.7
Phytogen	PHY 375 WRF	6.0	5.8
Deltapine	DP 1048 B2RF	5.8	4.5
Phytogen	PHY 485 WRF	5.7	1.4
Stoneville	ST 4554 B2RF	3.2	0
Deltapine	DP 0924 B2RF	2.7	0
Deltapine	DP 515 BG/RR	1.4	0
Stoneville	ST 5458 B2RF	<1	2.3
Deltapine	DP 0912 B2RF	<1	3.7

Sources: National Cotton Council, USDA

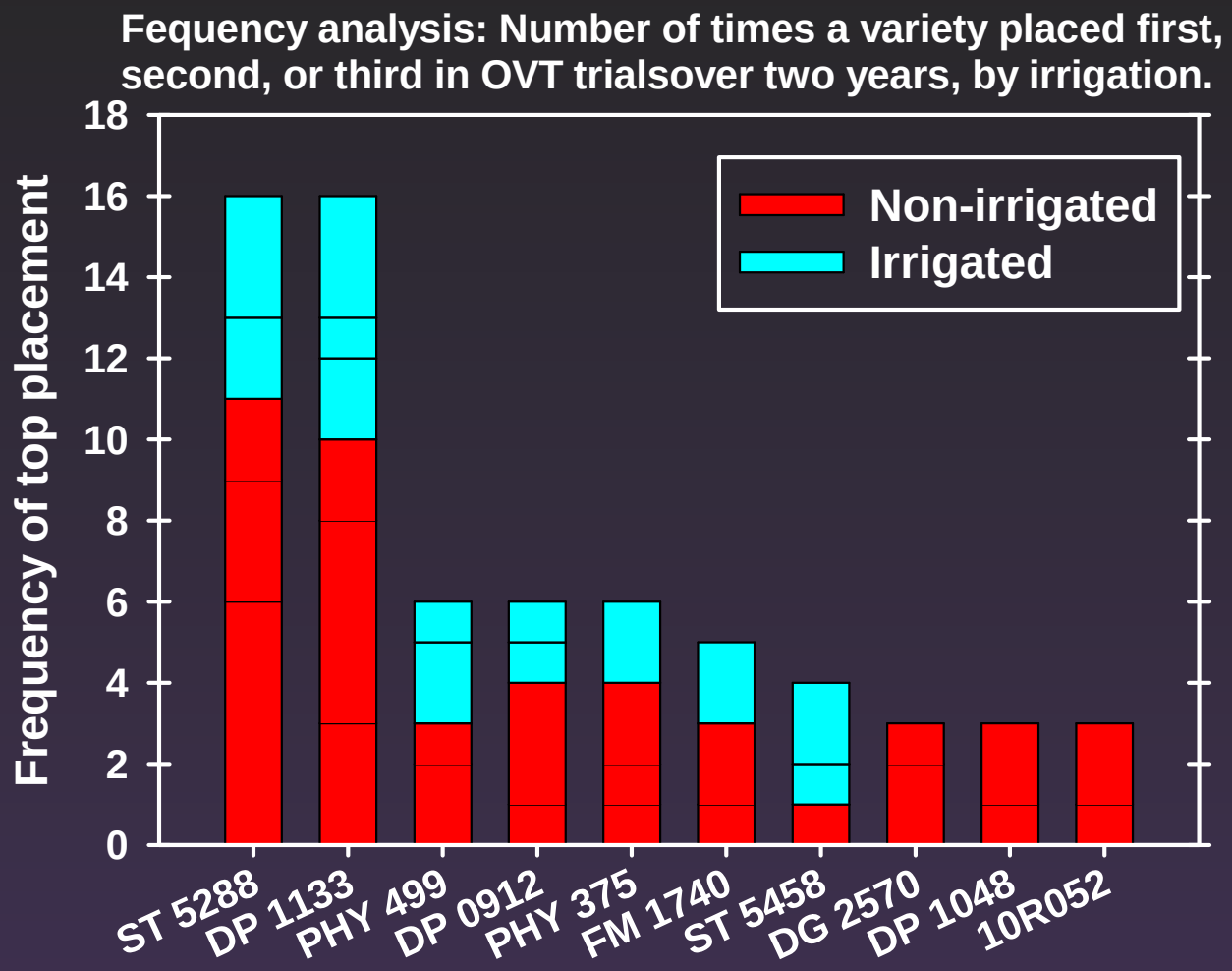
OVT Variety Performance by soil type – early and mid maturity

Frequency analysis: Number of times a variety placed first, second or third in OVT trials over two years, by soil type.



Sites: Alexandria, Winnsboro, St. Joseph

OVT Variety Performance by irrigation – early and mid maturity



Sites: Alexandria, Winnsboro, St. Joseph

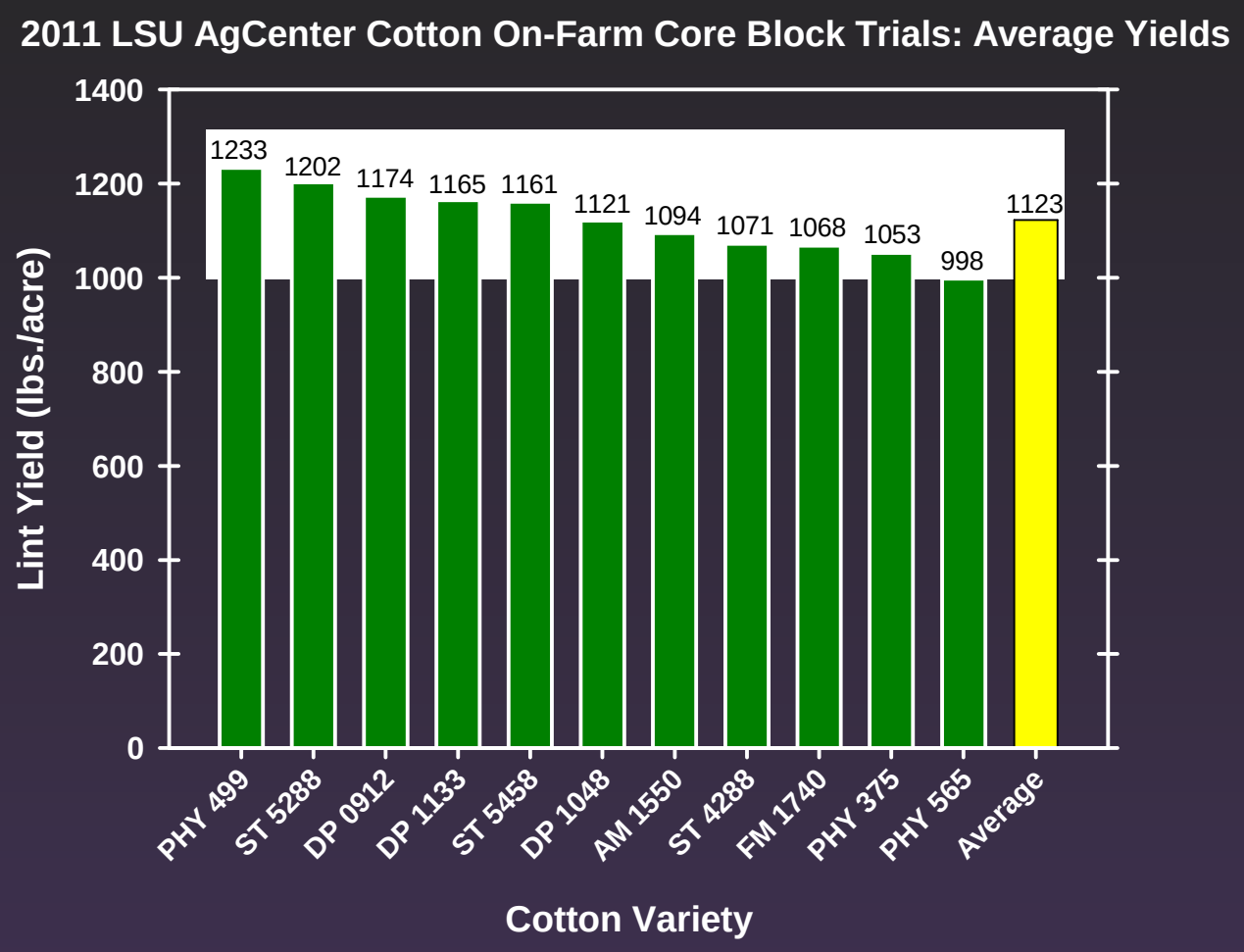
OVT Top Yielders by Region

Alexandria (Red River)	Winnsboro (Macon Ridge)	St. Joseph (Delta)
ST 5288 (early and mid)	ST 5288 (early and mid)	ST 5288 (early and mid)
DP 1133 (early and mid)	DP 1133 (early and mid)	ST 5458 (mid)
PHY 499 (mid)	PHY 499 (mid)	DP 0912 (early)
PHY 375 (early and mid)	PHY 375 (early and mid)	DP 1133 (early and mid)
DP 1050 (mid)	DG 2570 (early)	PHY 499 (mid)

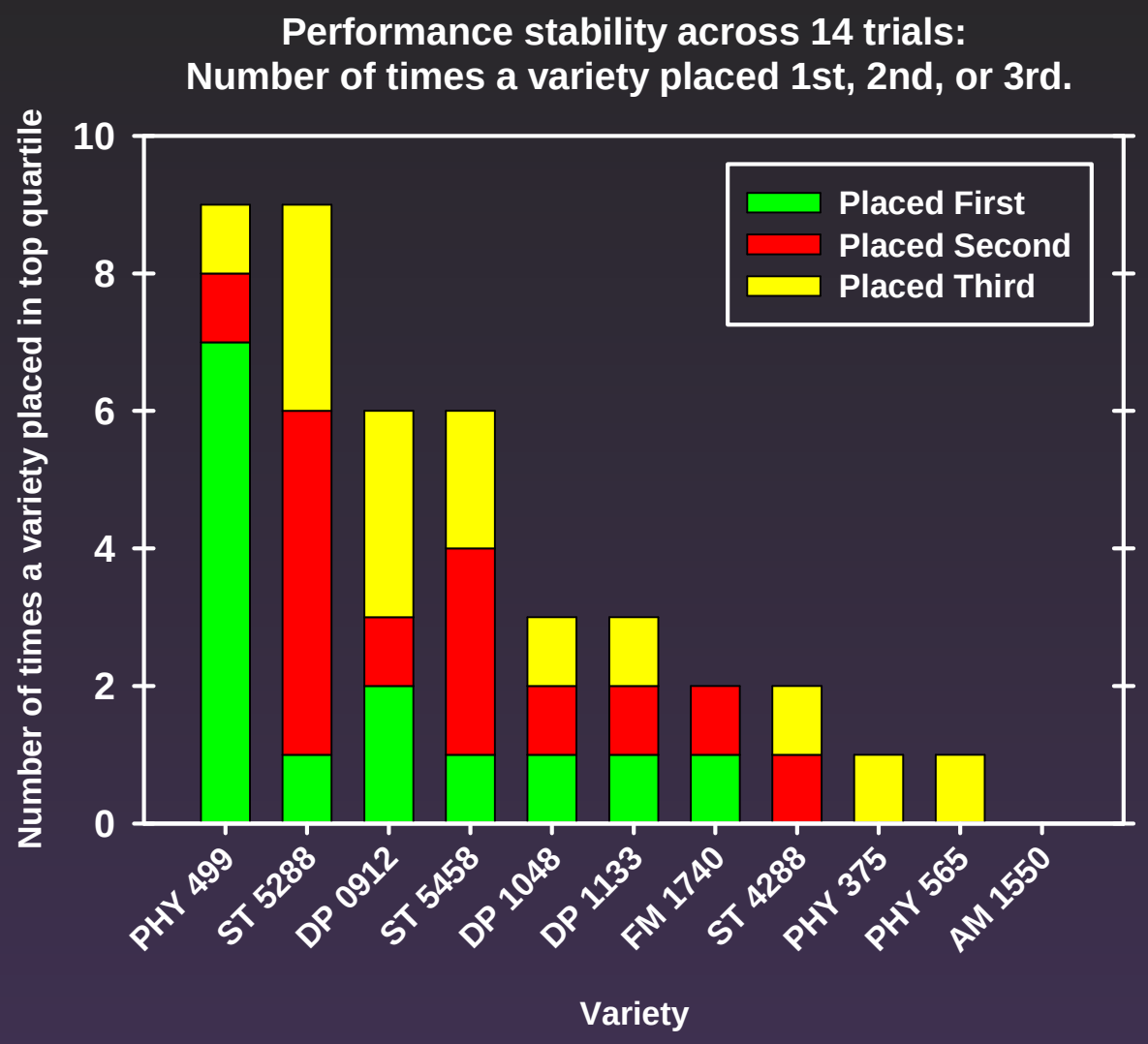
2011 Cotton On-Farm Core Block Trials

- 14 locations
- 11 varieties
- 5 Seed Brand Names
- 4 companies

Variety Performance: 14 Trial Avg.

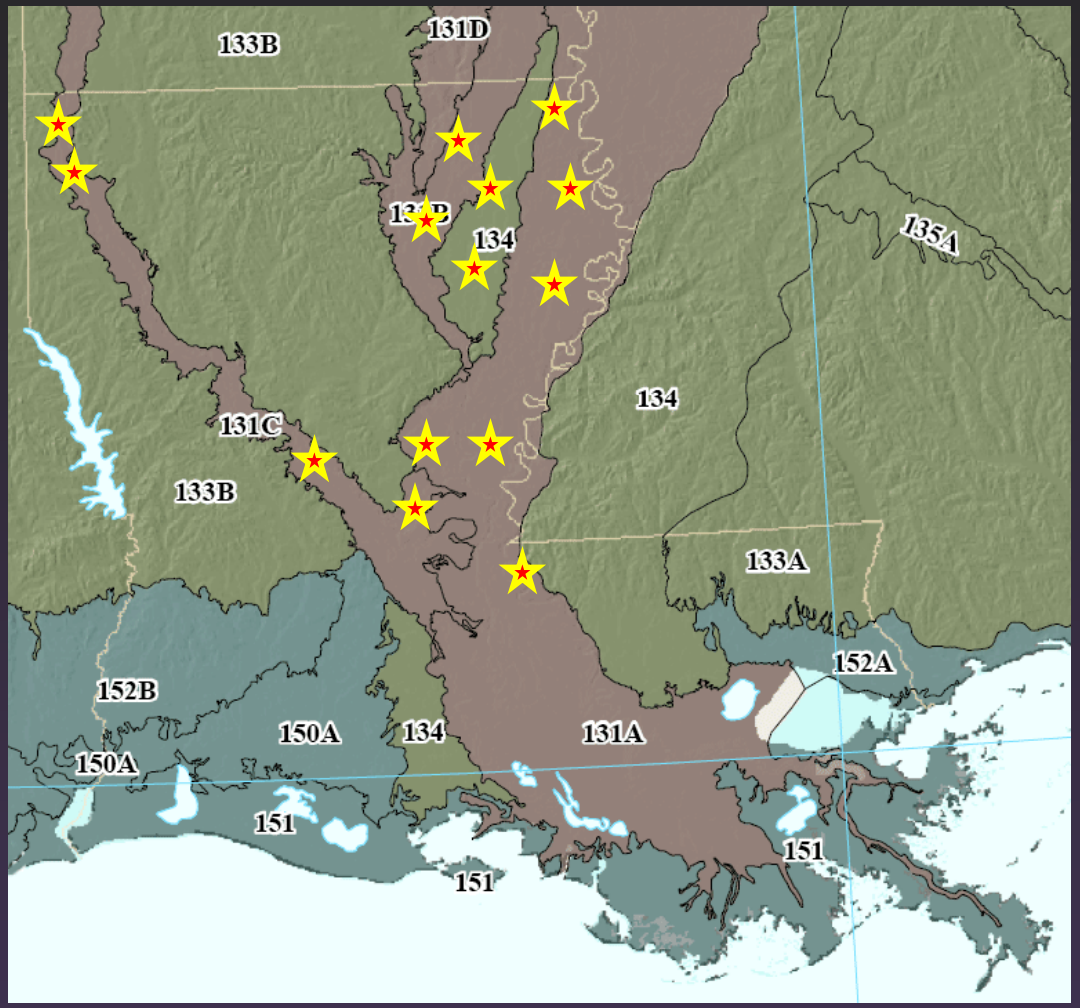


Variety Stability Across Environments



Performance by soil zone

- LA Delta
- Macon Ridge
- Ouachita River
- Red River



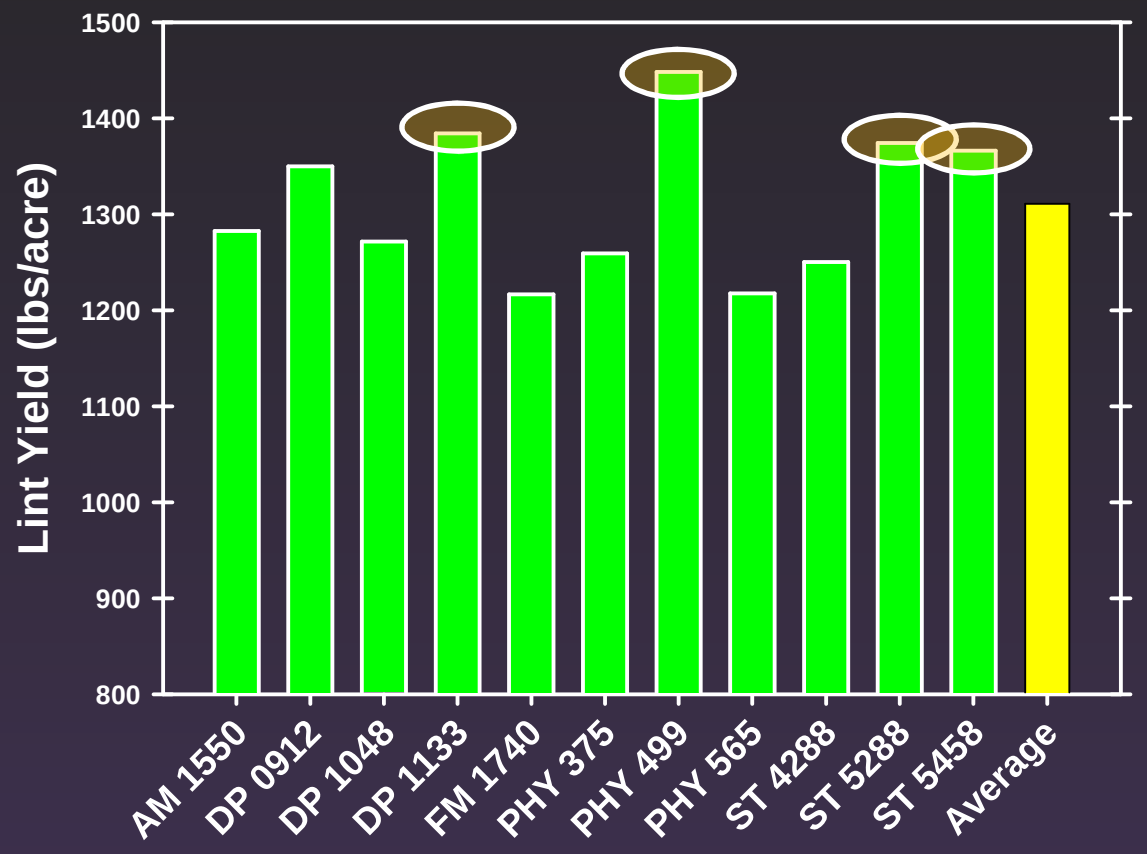
Core Block Trial Evaluations

Soil type	Placed First	Top Quartile
Clay to scl		
PHY 499	4	4
DP 1133	1	2
DP 0912	0	2
ST 5288	0	2
Silt Loam		
PHY 499	3	6
ST 5288	1	6
DP 0912	2	5
ST 5458	1	4
DP 1048	1	3

Credit: R.L. Frazier, Dennis Burns, Brandi Woolam

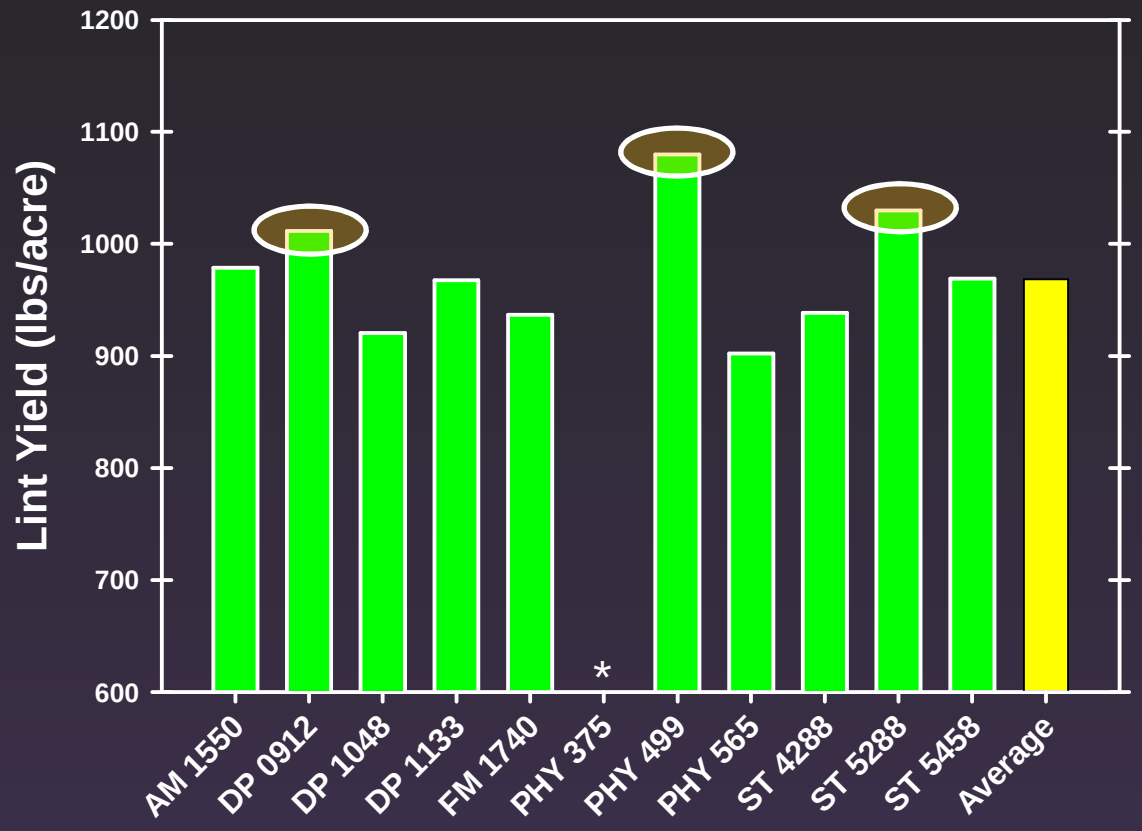
Mississippi River Delta

Mississippi River Delta: Catahoula, Concordia, East Carroll, Madison, Pt. Coupee, Tensas



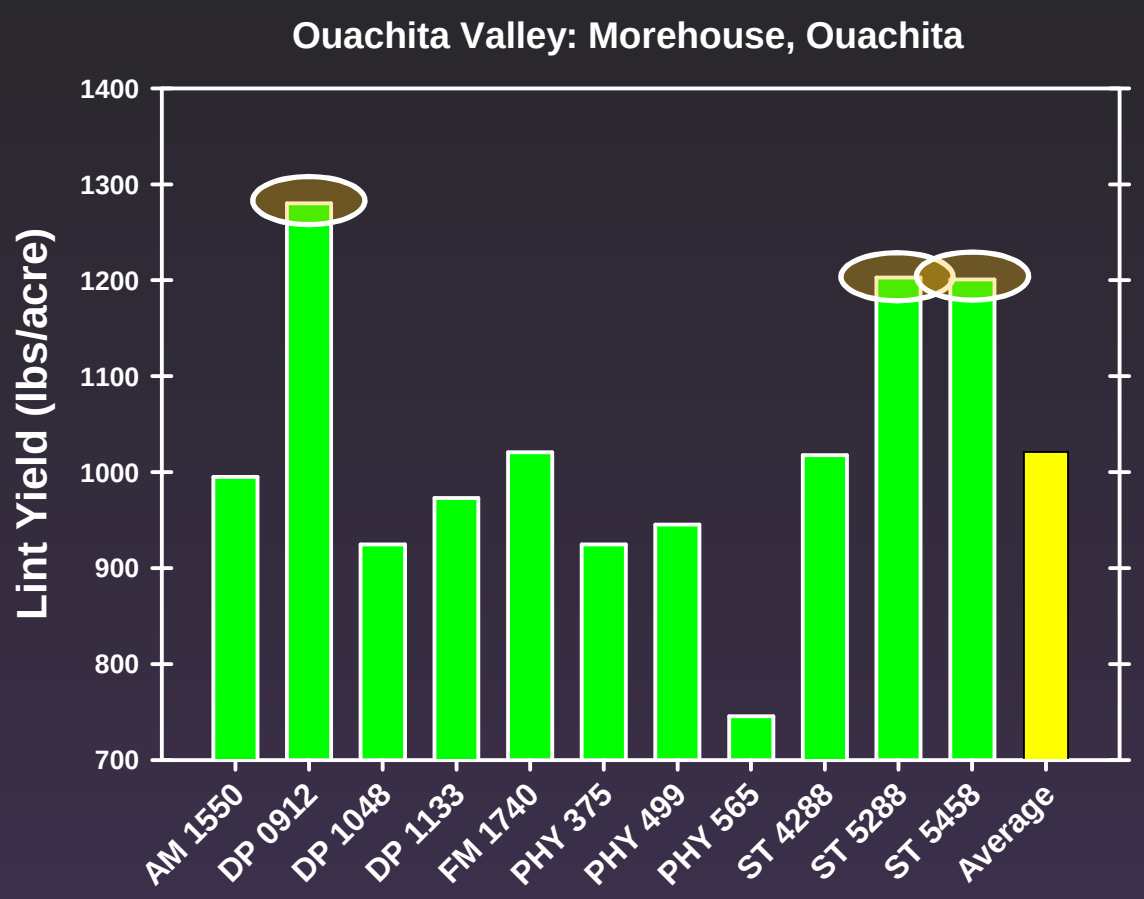
Macon Ridge

Macon Ridge: Franklin, Richland

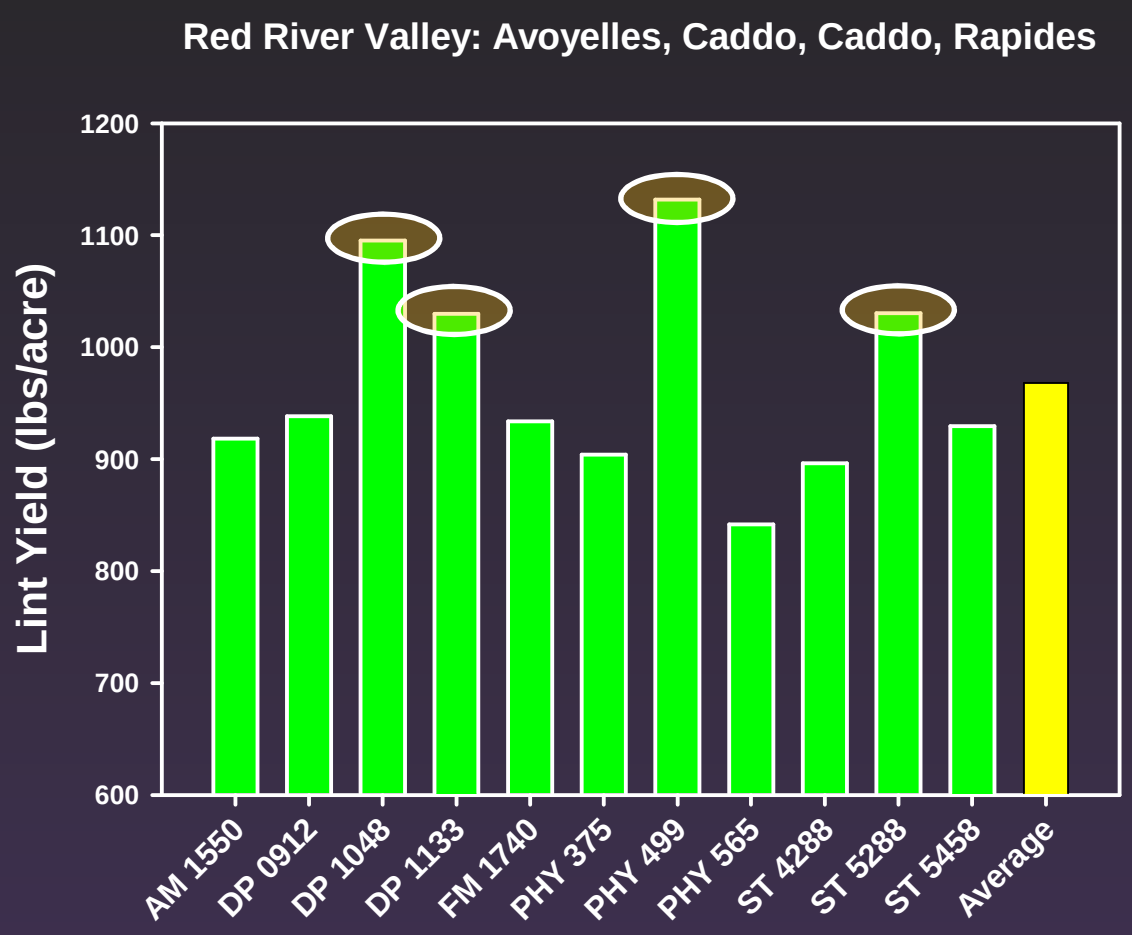


* Data point unavailable

Ouachita River Valley

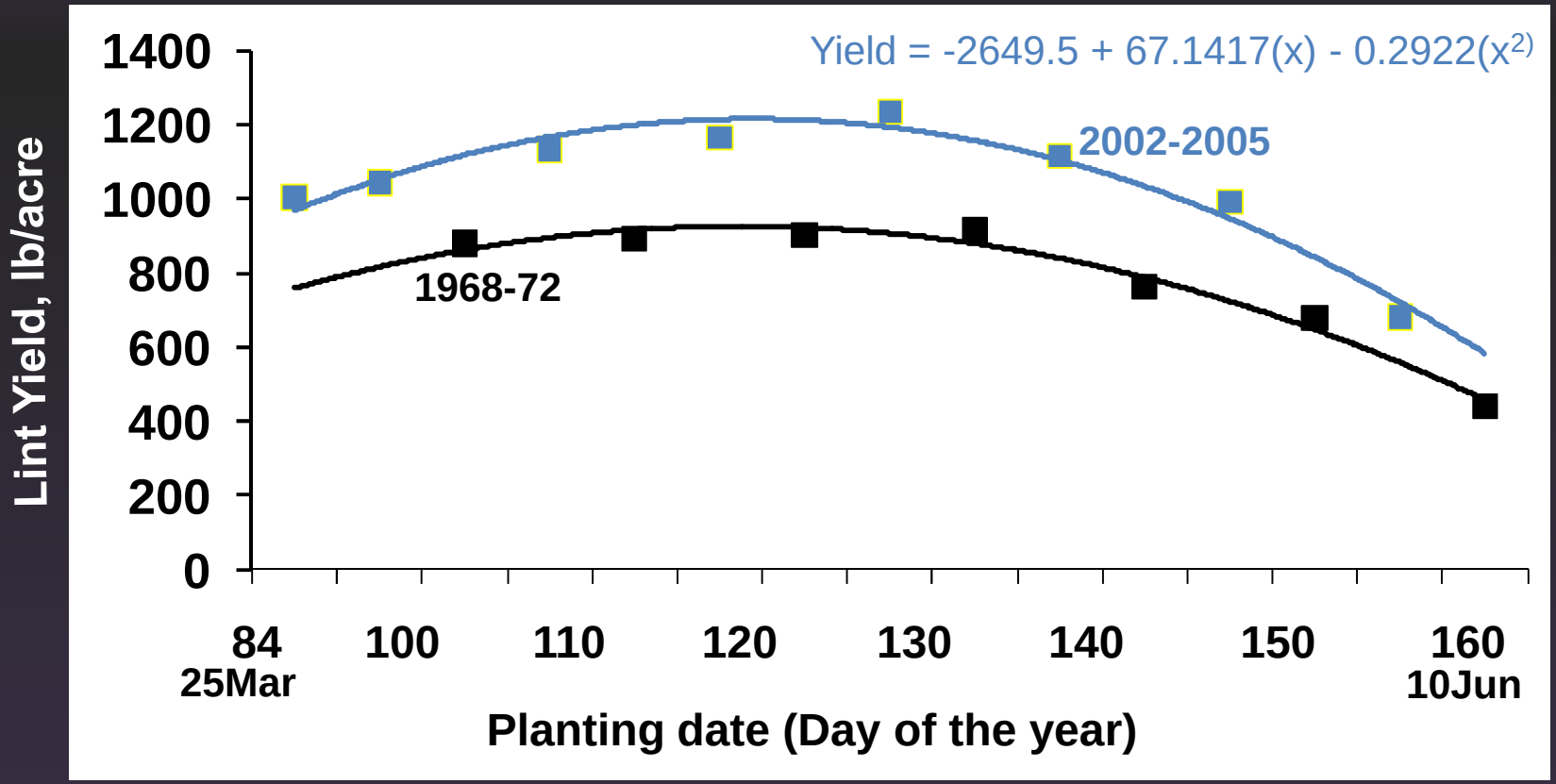


Red River Alluvial Soils



Management Considerations

- Germination: weed control and loss of aldicarb
- Irrigation: Critical window and termination
- Fertility: too much N, not enough K and S?
- PGRs: variety and weather dependent
- Termination: hairy leaves and last bolls

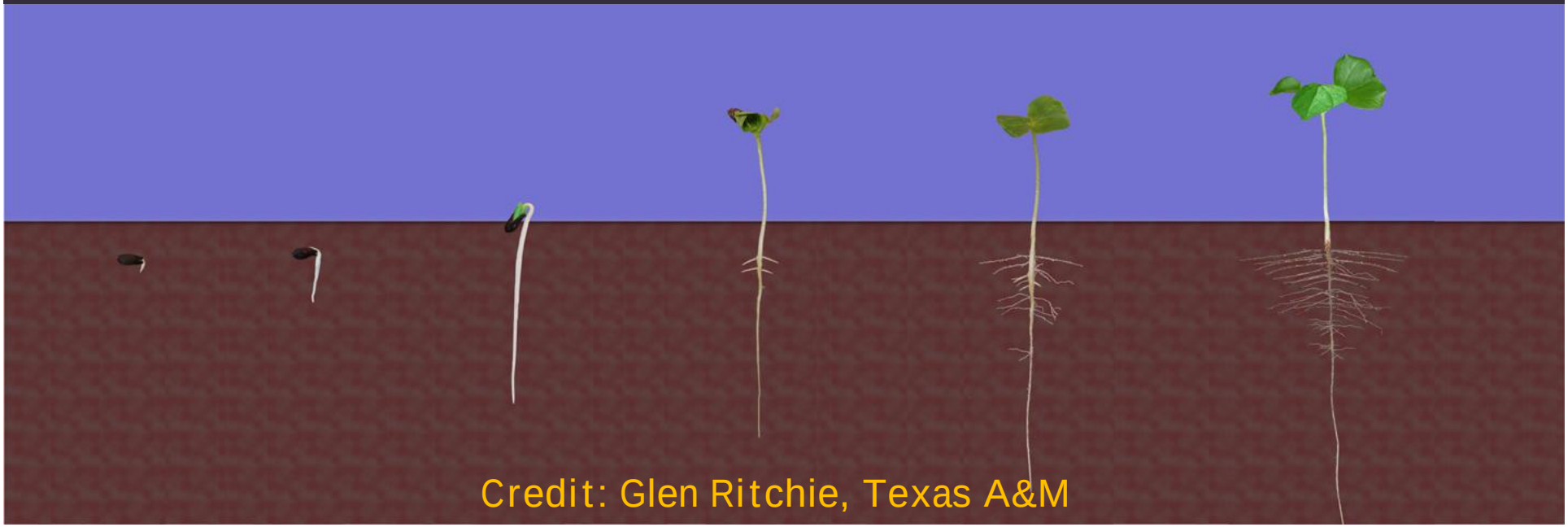


Yield response of cotton to planting date, 1968-1972 study and 2002-2005 study. LSU AgCenter Northeast Research Station and Macon Ridge Research Station.

Credit: Don Boquet

Germination

- Moisture critical for emergence and stand establishment
- Loss of Temik – seed treatment and thrips management
- Weed control – pre's and post's



Why not play it safe and over-water?

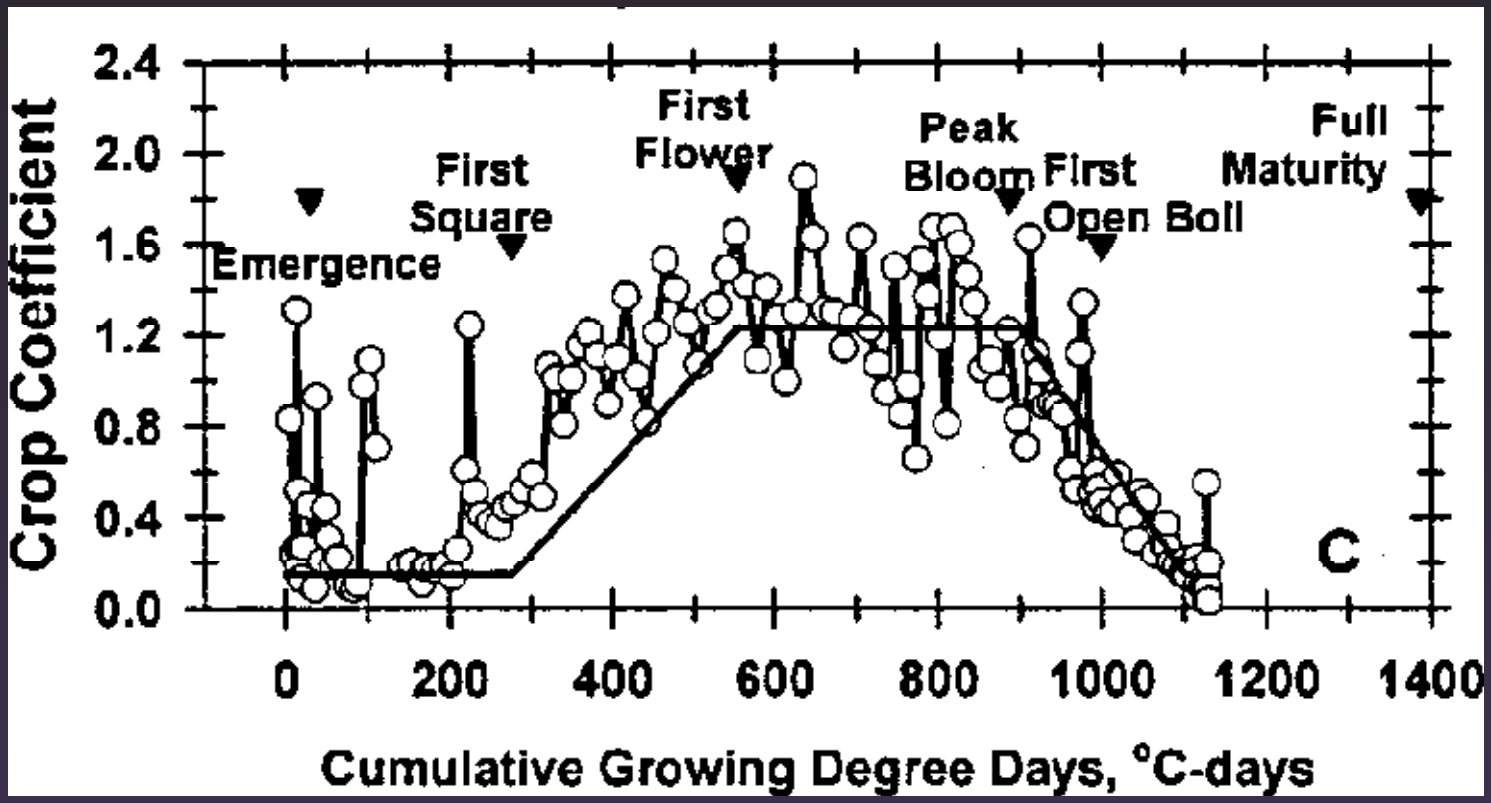
- Expensive
- Nitrogen leaching
- Roots become oxygen-starved
- And this…

Credit: Glen Ritchie, Texas A&M

How do we schedule?

Crop coefficient

Crop water requirement = PET x Kc x Eff



Credit: Leo Espinoza, U. of Ark.

Irrigation Timing

- Which crop stage is most sensitive to stress?
- Glen Ritchie conducted an experiment with 4 cultivars subjected to the following irrigation treatments:
  1. No irrigation from first square to first flower
  2. No irrigation from first flower to 3 weeks after first flower
  3. No irrigation from 3 to 6 weeks after first flower (peak bloom)
  4. No irrigation from 3 to 9 weeks after first flower (peak bloom)

Credit: Glen Ritchie, Texas A&M

First Square to First Flower

- Severe stunting
- Fewer bolls
- 20-25% yield decrease

Cultivars
DP0912B2RF
DP0935B2RF
FM9170B2F
FM9180B2F

Credit: Glen Ritchie, Texas A&M

First Flower to FF + 3 Weeks

- Nearly full crop height
- Massive shedding
- Yields reduced 60-70%

Credit: Glen Ritchie, Texas A&M

Peak Bloom (3 weeks)

- Yields decreased 20-30%
- Decreased boll numbers at the top of the plant
- Less sensitive to stress than early bloom

Credit: Glen Ritchie, Texas A&M

Peak Bloom (6 weeks)

- Yields decreased 30-35%
- Decreased boll numbers at the top of the plant
- Less sensitive to stress than early bloom

Credit: Glen Ritchie, Texas A&M

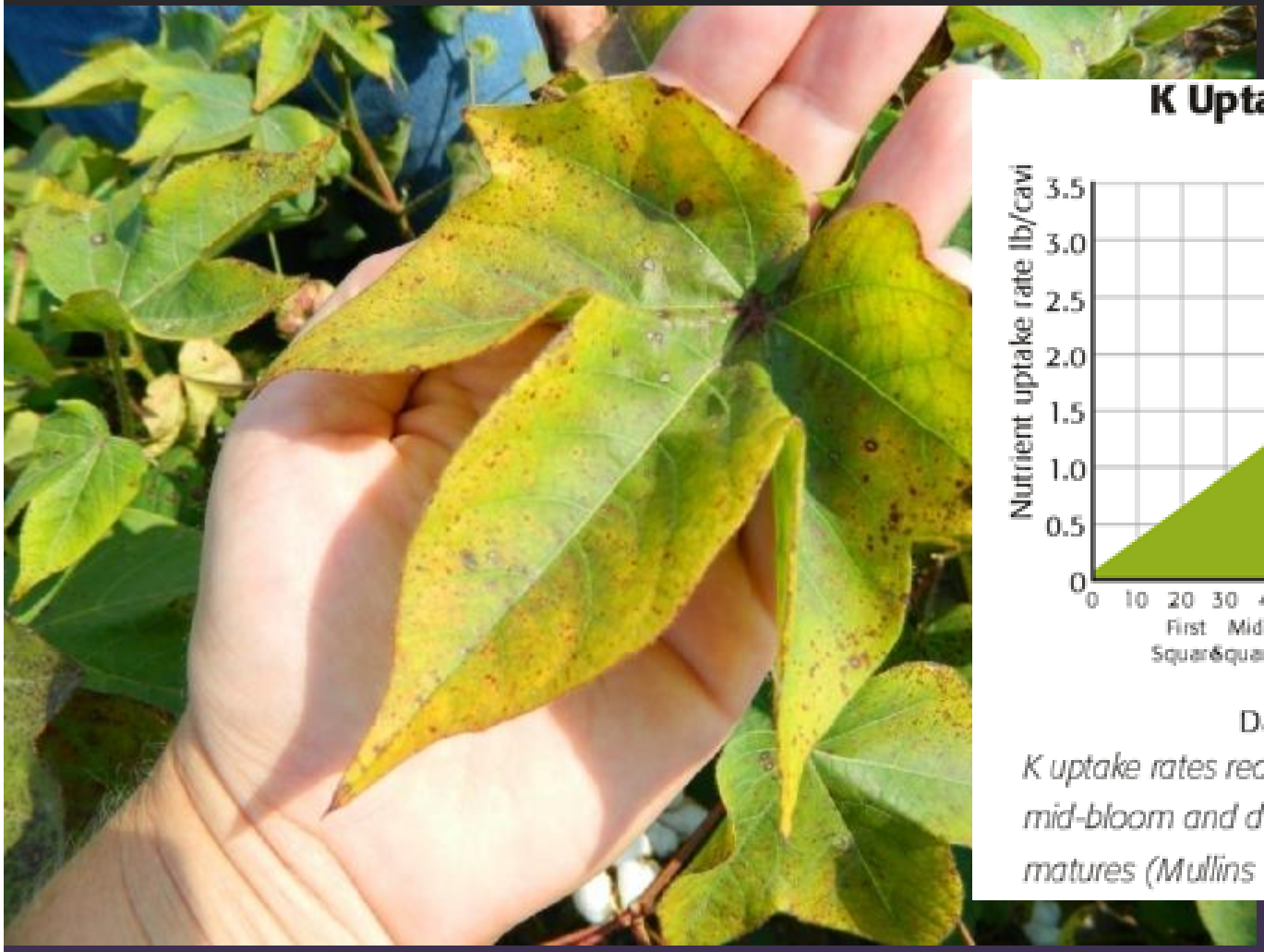
View of field where irrigation was scheduled Compared to a non-scheduled field

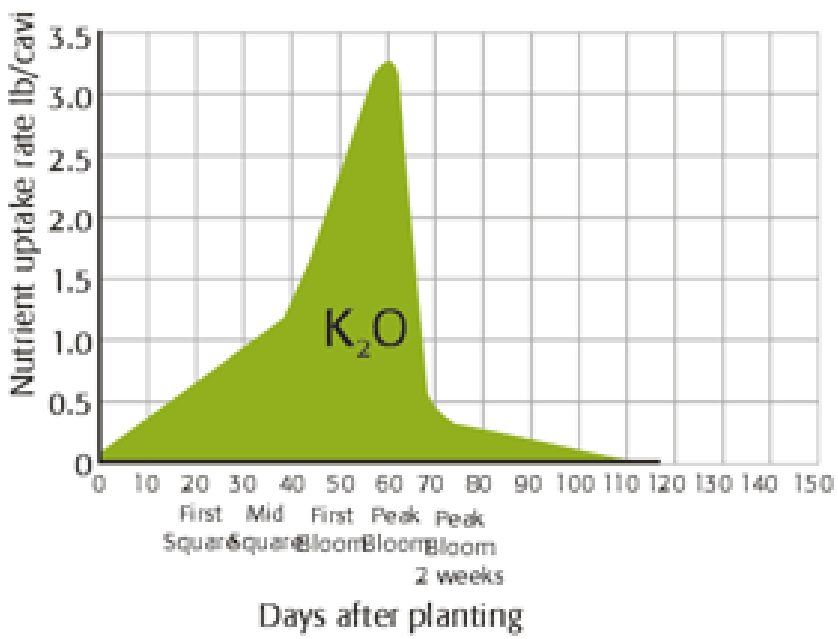
Irrigation scheduled

Non-scheduled

Credit: Leo Espinoza, U. of Ark.

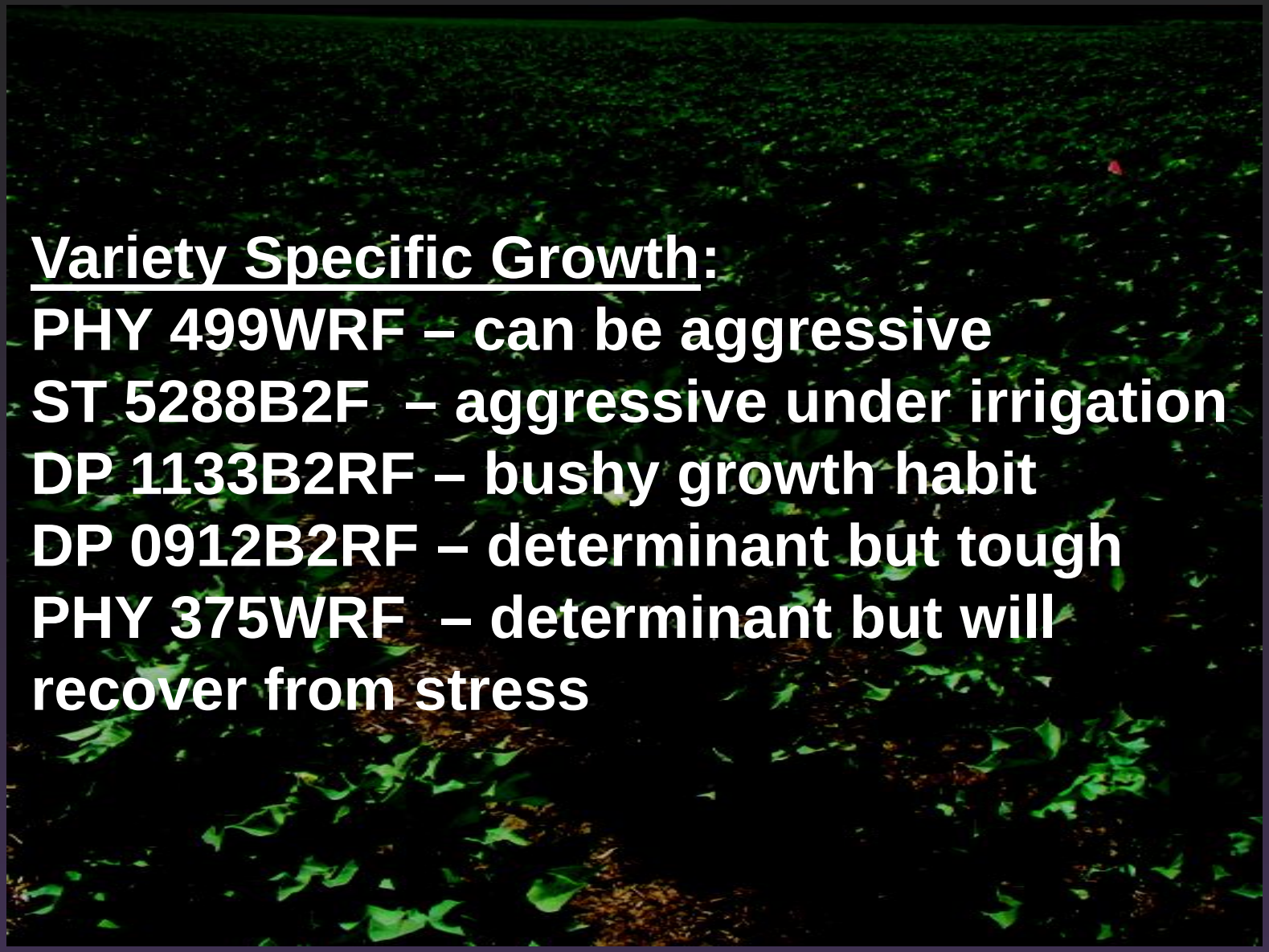
Potassium deficiency





K uptake rates reached maximum during mid-bloom and declined rapidly as the boll matures (Mullins and Burmester, 1990).

Variety Characteristics



<u>Variety Specific Growth</u>:

PHY 499WRF – can be aggressive

ST 5288B2F – aggressive under irrigation

DP 1133B2RF – bushy growth habit

DP 0912B2RF – determinant but tough

PHY 375WRF – determinant but will recover from stress

PGR Initiation (No moisture stress)

- Aggressive Potential
- Start prior to bloom:
- ST 5288 (don't continue to hammer)
- ST 5458
- PHY 499
- DP 0912
- DP 1133
- DP Classes '10 & '11

- Less Aggressive
- Start at bloom:
- ST 4288
- FM 1740
- PHY 375

Credit: Tom Barber

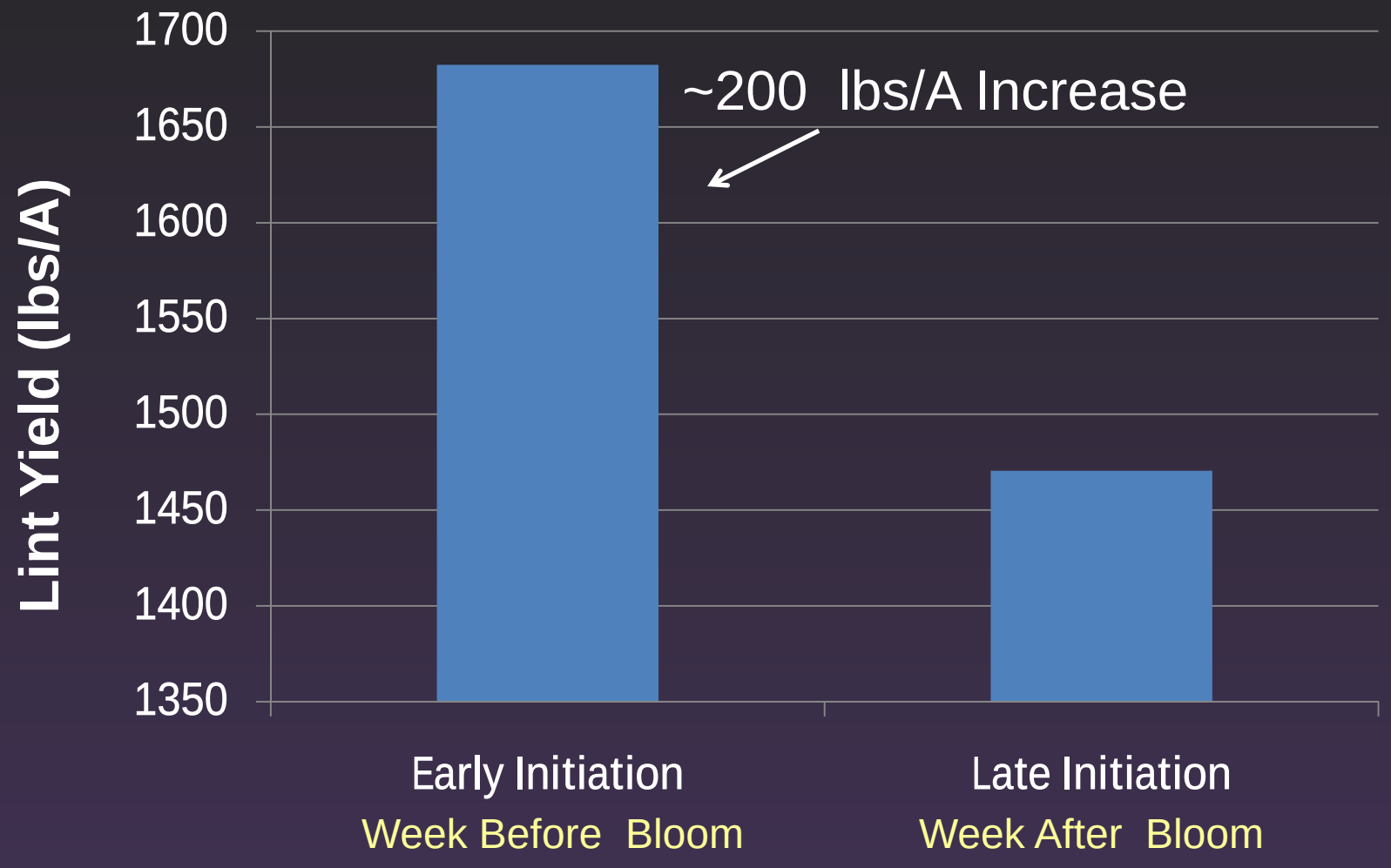
Irrigation and PGR Timing

- ST 5288B2F
- Irrigation Treatments
  - Early – 12 node cotton ~ week prior to bloom
  - Late – 14 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

Credit: Tom Barber, U. of Ark.

2010 Cotton Yields Irrigation Response

ST 5288B2F



Credit: Tom Barber, U. of Ark.

Summary: Irrigation and PGR

- Week prior to bloom = Critical!
- Manage growth more efficiently by applying 10 - 12 oz Mepex prior to turning on water
  - Depends on variety and irrigation system
- Protect fiber quality – Mic (data not shown)
- 200 lb/A yield loss by waiting till bloom to irrigate
- No differences in yield based on PGR App.

Credit: Tom Barber, U. of Ark.

Management - Termination

- Questions about the timing of irrigation termination
  - Cultivar-specific
  - UGA and Texas A&M studies have shown that stepping down irrigation at about 4 weeks after cutout can save water and maintain yield and quality

	Contribution of Uppermost 2 node cohort to yield (%)	
cultivar	Dryland	Irrigated
DP0935 B2RF	2.1	4.5
DP0949 B2RF	3.8	3.4
DP555 BG/RR	4.0	8.6
PHY375 WRF	1.9	0.6
PHY565 WRF	2.9	2.3
ST5288 B2F	0.6	2.2
ST5458 B2RF	2.7	0.9

Credit: Glen Ritchie, Texas A&M

Questions or comments?

Acknowledgements:
Brandi Woolam, Bobby Golden, Sarah Sterling, Brooks Blanche, Grayson Close, Millie Deloach, John Stapp, Tim Talbot, Theo Udeigwe, Parish Agents, Glen Ritchie, Tom Barber, Leo Espinoza, Don Boquet

2010 Research by Tom Barber

- Stoneville Varieties
  - ST 5288 and ST 5458 - most aggressive in growth, need to start earlier to manage growth all season (prior to bloom)
  - ST 5288 really responds to PGR, start early but don't continue to hammer every 10 days etc.
  - FM 1740 and ST 4288 respond well to PGR
    - Pinhead may be too early for 4288 (wait to bloom)

2010 Research by Tom Barber

- Standard - Mepex 16 oz/A @ Bloom fb 16 oz/a as needed
- Aggressive – Mepex 8 oz/A @ MH fb 8oz 14 DAT fb 16oz mid bloom

- Deltapine Varieties
  - DPL 0912, 1028 and 1133 B2RF varieties all yielded better with the aggressive approach.

- Irrigated: DPL Classes of '10 and '11 may need a more aggressive approach. (start pinhead to matchhead 8 to oz Pix)
- Dryland: may not start as early unless you see rain event coming. If you have good soil moisture, go ahead and start.

Observations of Phytogen Varieties

- PHY 499 WRF can exhibit aggressive growth, treat similar to ST 5288 (or more)
- PHY 375 WRF is more determinant, but can continue to make a late crop, moderate PGR approach
- PHY 565 WRF can get leggy, maybe due to fruit shed