



Cotton Production in Thermally Limited Regions of the Southern Great Plains: Kansas Research Updates

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Kansas Cotton 2021 Data

- Total Irrigation 4 inches
- Rainfall:6.62 inches
- Seeding rate: 100K/ac
- Early Planted: May 27 Late planted: June 7 failed

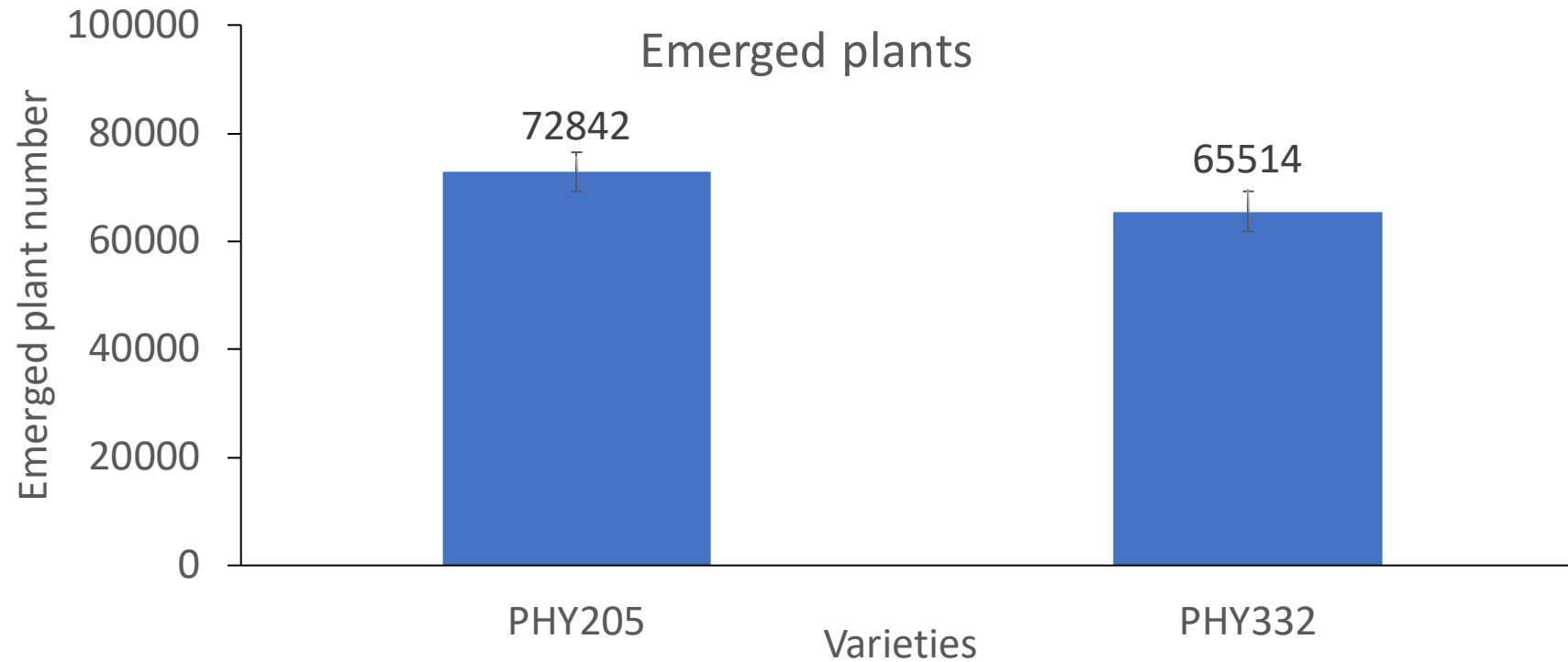
Variety	Average of Emerged	Min of Emerged	Max of Emerged	Turnout Avg.	Average of Yield (lb/ac)
PHY205	45,883	17,424	69,696	45.9	813
PHY332	45,157	26,136	64,469	46.3	728
Average	45,520	17,424	69,696	46.1	770

Kansas Cotton 2022 Data

- Total Irrigation: 2.75 - 7.75 inches
- Rainfall: 4.38 - 6.16 inches
- Seeding rate: 150K/ac
- Early Planted: May 9 Late planted: May 31

Row Labels	Average of Emerged	Min of Emerged	Max of Emerged	Average of Gross Yield
5/9/22	62,592	19,747	91,766	1,776
PHY205	57,458	19,747	91,766	1,930
PHY332	68,583	45,302	91,766	1,596
5/31/22	75,456	41,818	114,998	1,659
PHY205	73,810	41,818	97,574	1,629
PHY332	77,101	42,979	114,998	1,688
Grand Total	68,767	19,747	114,998	1,720

Kansas Cotton 2022 Data



Kansas Cotton 2023 Data (preliminary)

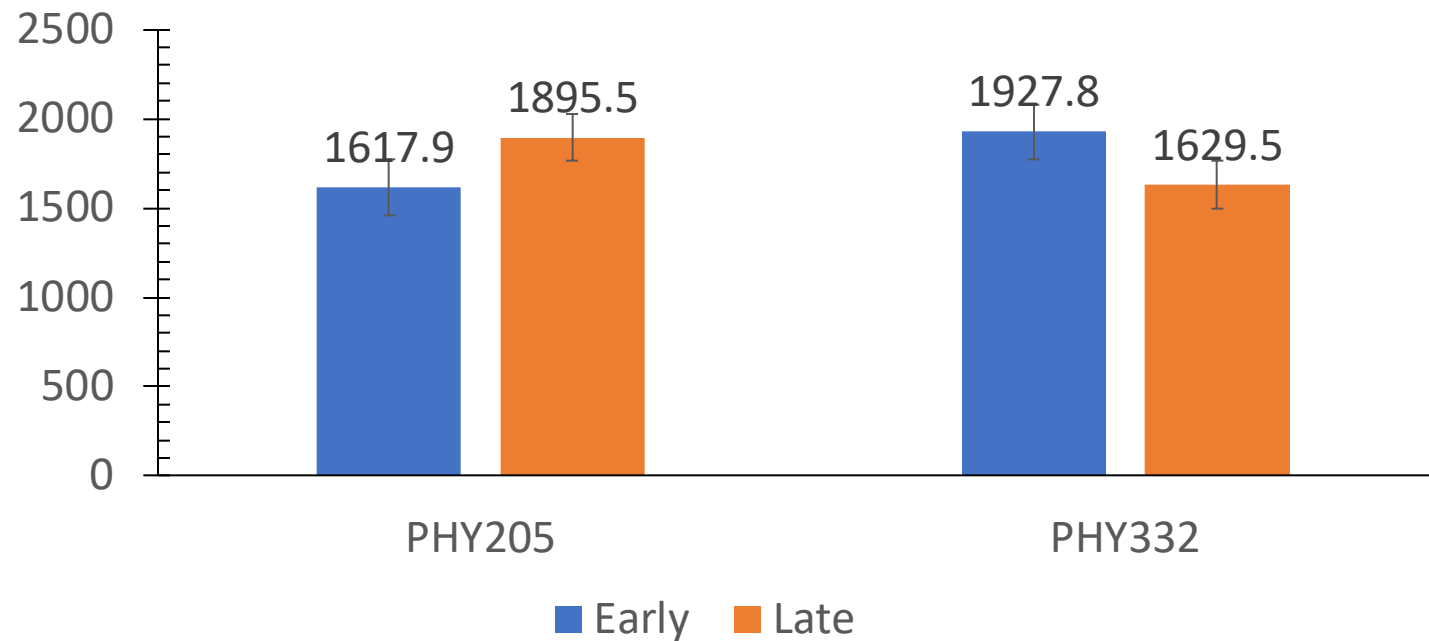
- Total Irrigation: 2.75 - 4.75 inches
- Rainfall: 14.72 - 18.06 inches
- Seeding rate: 150K/ac
- Early Planted: May 4 Late planted: May 18
- Hailed June 9, 2023 (and maybe June 17th)
- First freeze Oct. 15, 2023



Row Labels	Average Population Harvested	Average Yield
5/4/23	49,128	886
PHY205	47,553	993
PHY332	55,931	759
5/18/23	35,392	940
PHY205	35,937	1120
PHY332	34,847	759
Grand Total	42,114	914

Kansas Cotton 2022 Data *(preliminary)*

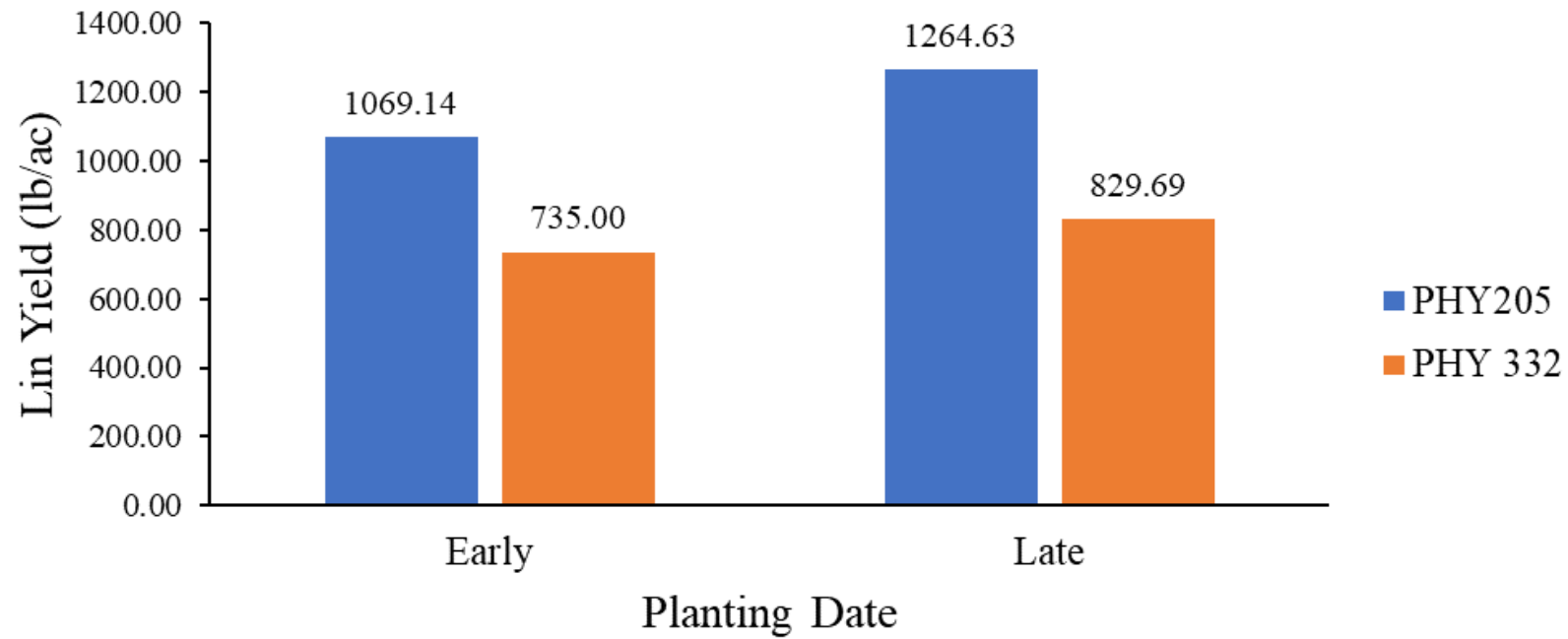
Interactions of cotton varieties and planting date



The comparison of means results showed no significant difference between the effects of cotton varieties and planting date on the plant yield. However, the results indicate that the early planted PHYTOGEN 332 had highest yield comparing to other treatments

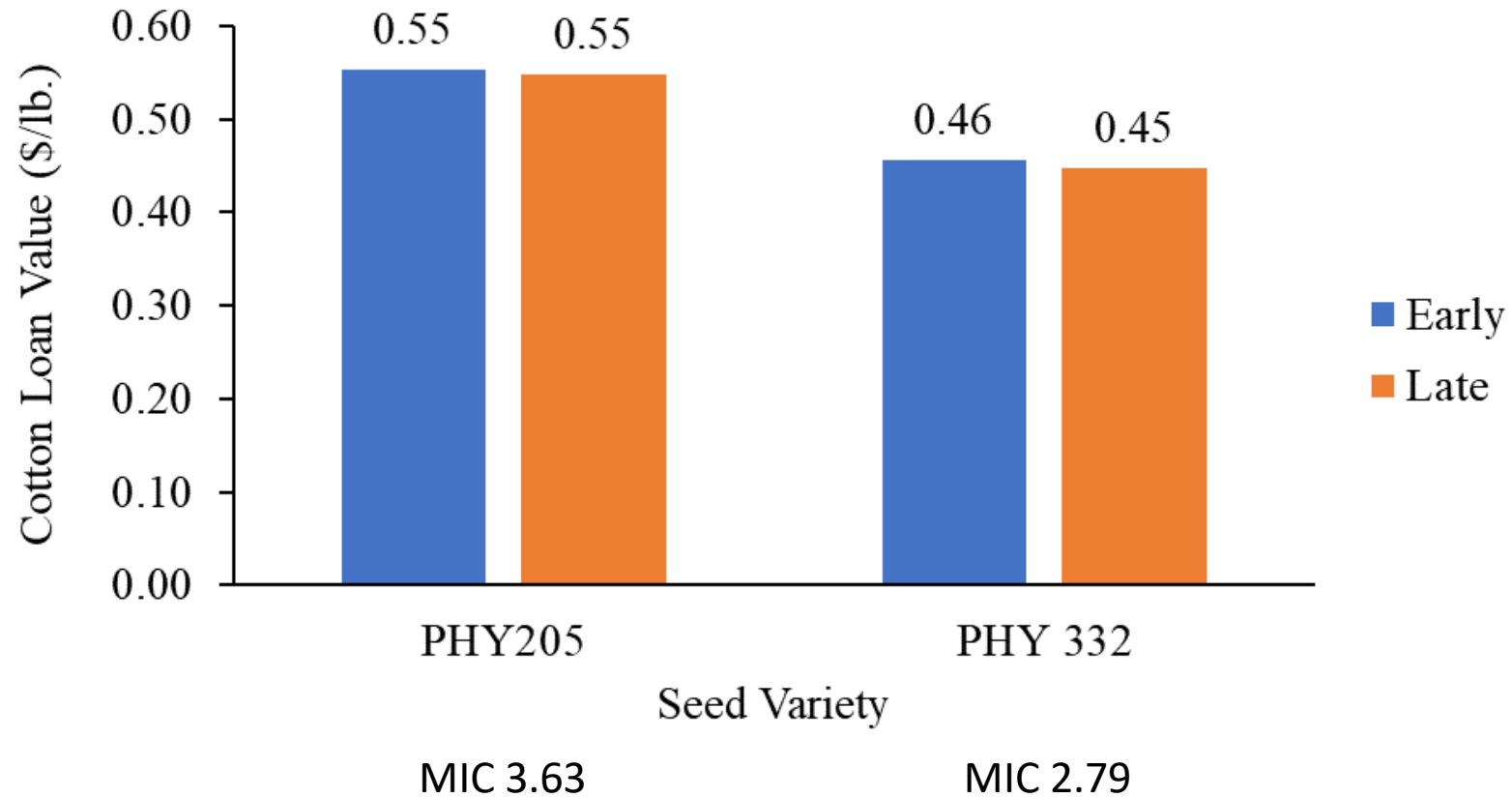
Kansas Cotton 2023 Data

Cotton Lint Yield as Affected by Interactions of Planting Date and Seed Variety

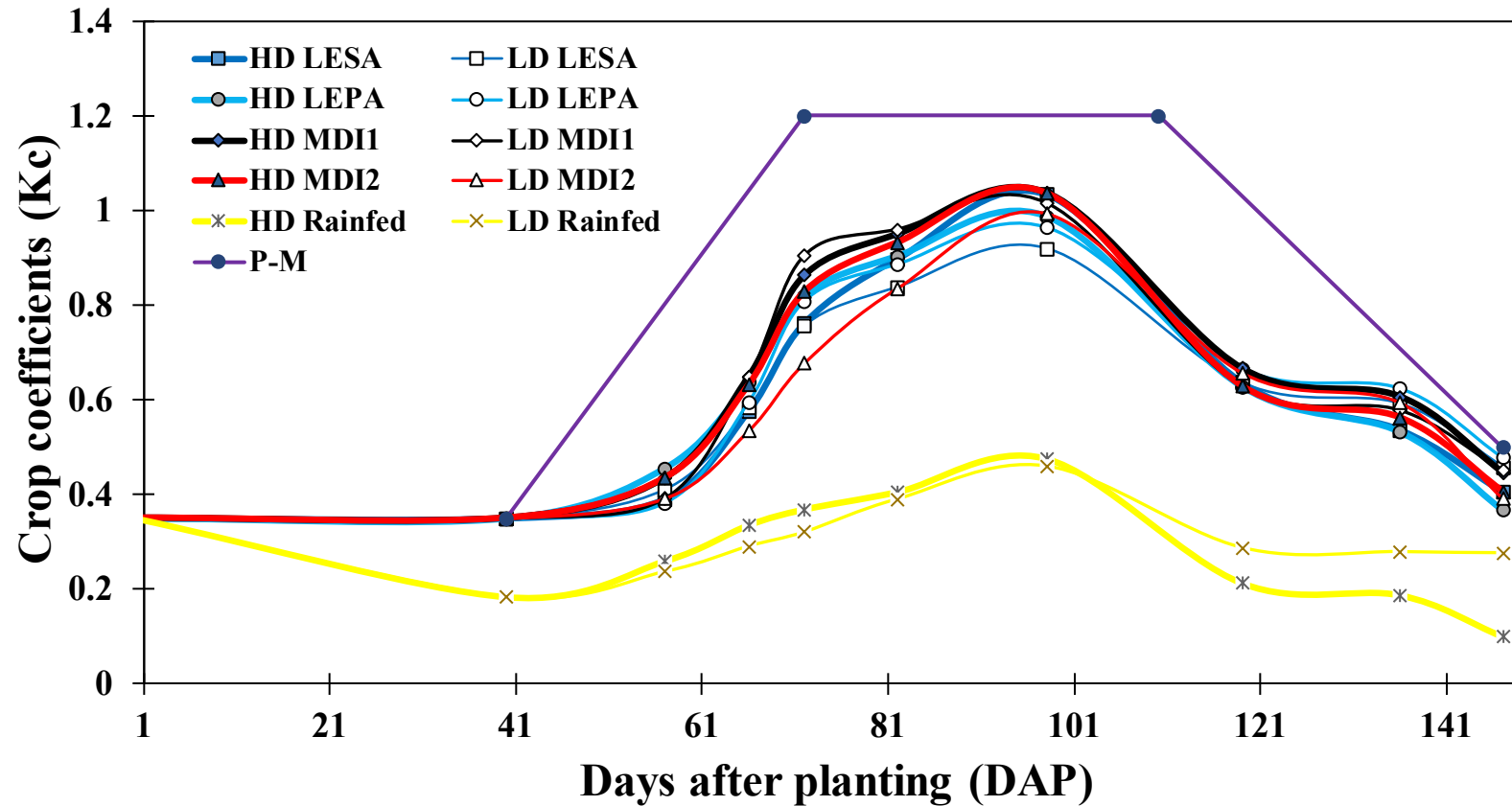


Kansas Cotton 2023 Data

Cotton Loan Value as Affected by Seed Variety and Planting Date



3.3. Crop coefficients under different irrigation technologies and rainfed treatments



- Irrigated cotton crop coefficients were estimated at 0.35, 0.92 to 1.04, and 0.39 to 0.48 for initial, mid, and late season stages, respectively.
- Rainfed conditions Kc were 0.18, 0.46 to 0.48, and 0.10 to 0.28 for the respective growth stages.



Challenges

- Germination rate is very low (<50%)
- Limited cotton varieties available
- Support (agronomic and machinery) is limited or far
- Some BMPs developed in the south needs to be tweaked for implementation in the region
- Irrigation strategies are yet to be honed
- Inadequate information on production curve and ET estimates

Thank you



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Timeline of Texas Events

2021

Planting Date 1:
5/3/2021

Hailstorm 5/21/2021

Planting Date 2:
5/24/2021

Harvested 11/3 –
11/4/21

2022

Planting Date 1:
5/6/2022

Windstorm 5/10/2022

Planting Date 2:
5/31/2022

Harvested 11/21-
11/22/23

2023

Planting Date 1:
5/2/2023

Waterlogged Field 5/15-
6/15/2023

Planting Date 2:
6/19/2023

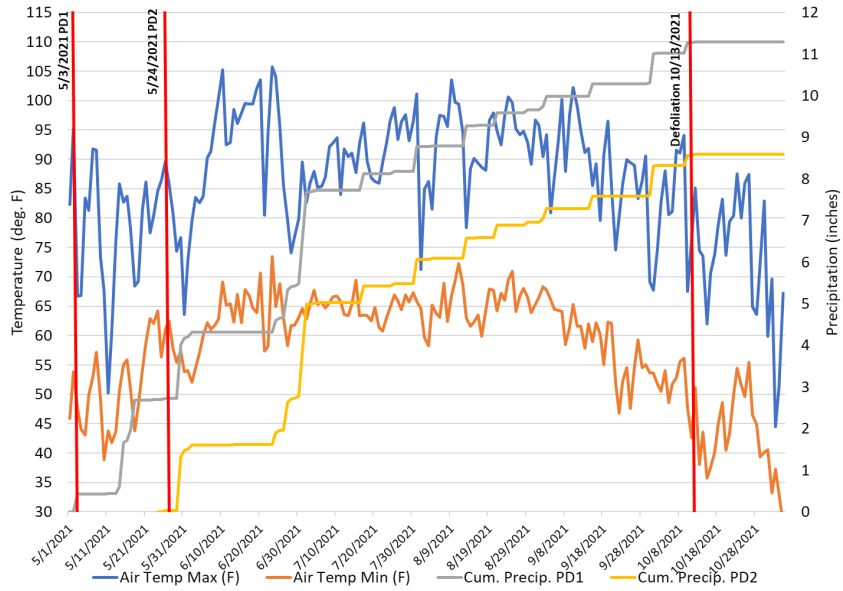
Harvested 11/6 –
11/7/23



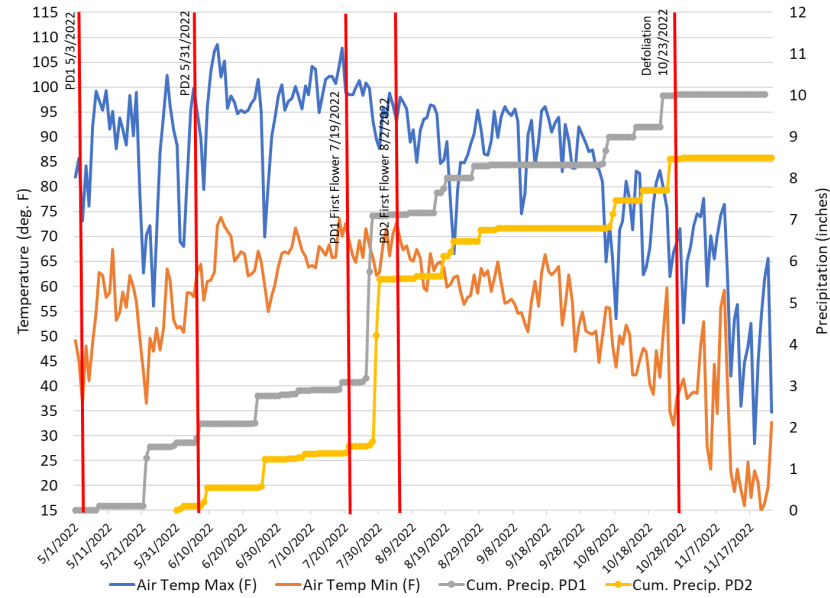
Texas Field Methods

- USDA-ARS Conservation and Production Research Laboratory and Texas A&M AgriLife Research Farm at Bushland under center pivot irrigation.
- Treatments represent genetic x environmental x management interactions and follow the same protocol at both locations.
- Two Enlist (2,4-D tolerant) varieties evaluated
 - Phytogen 205 W3FE: a broadly adapted early, more determinant variety
 - Phytogen 332 W3FE: early-med maturing less determinant variety
- Three populations (25K, 50K, and 75K plants ac⁻¹). Plots over planted and thinned to the desired population.
- Two planting dates (early- and late- May) and two irrigation levels (2- and 6- gallon per minute per acre well capacities).
 - Irrigation limited to capacity – no applications in response to soil MAD level

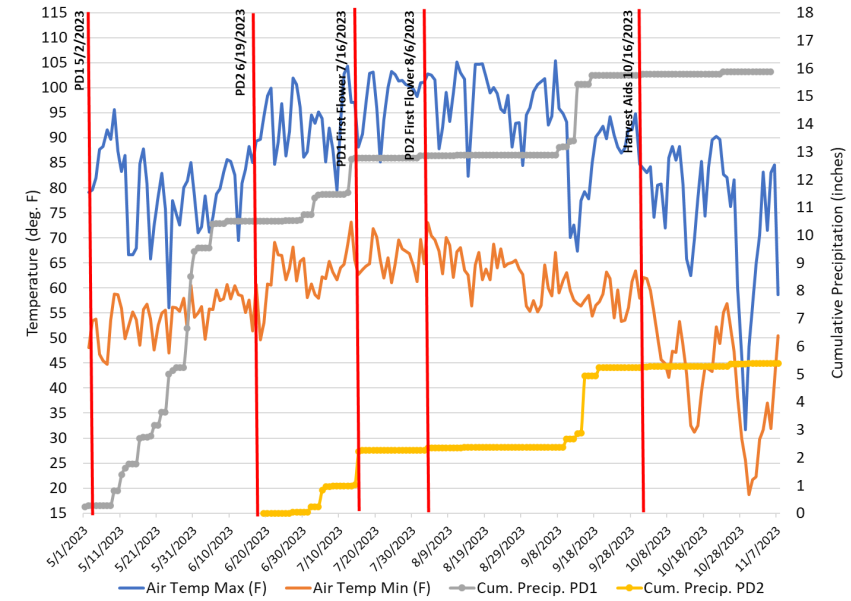
2021



2022



2023



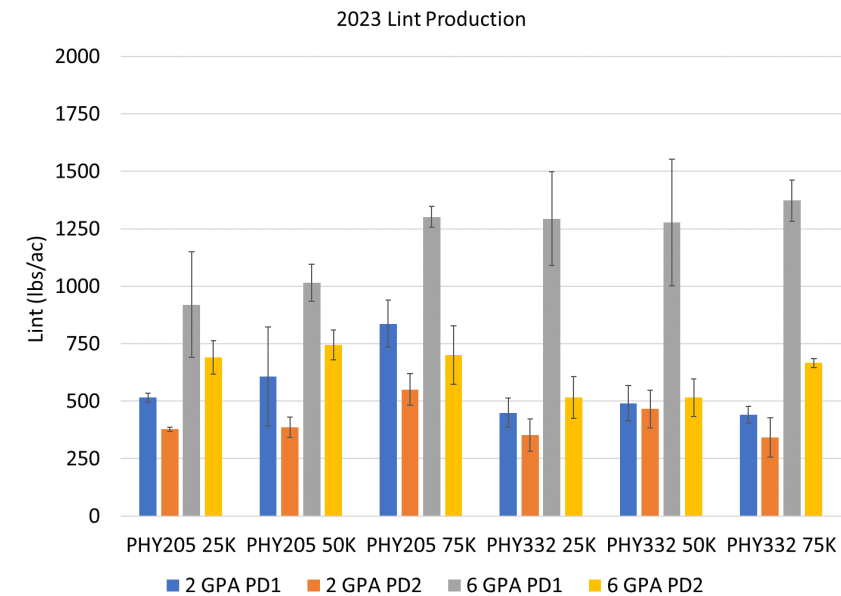
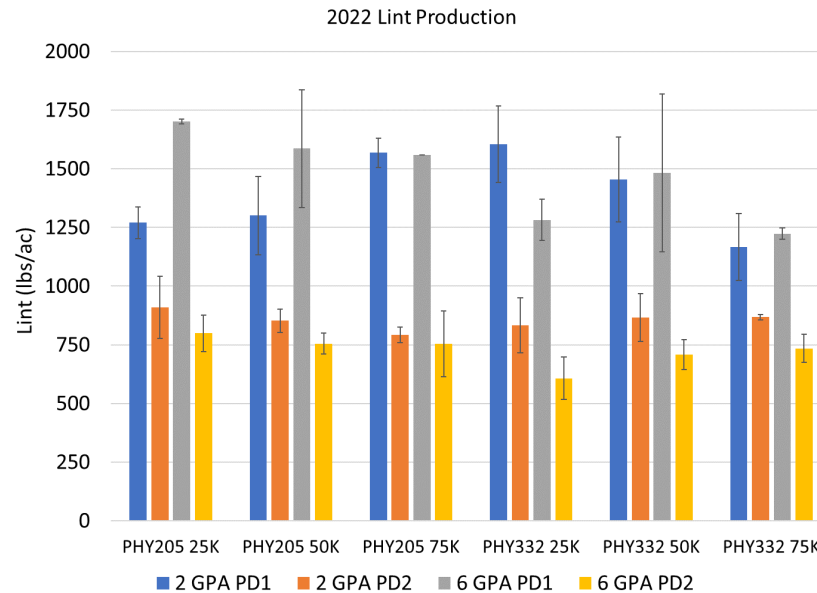
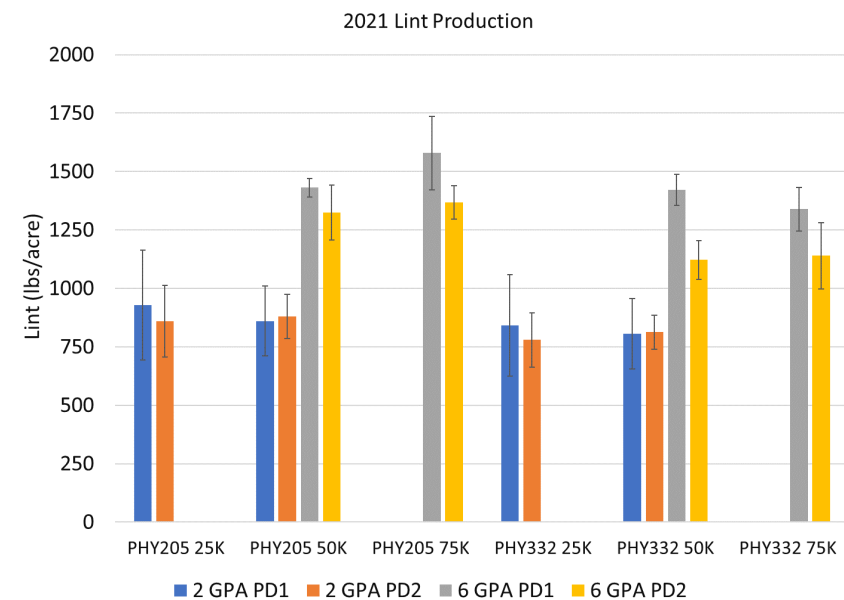
Weather Driven Fiber Development

- Long staple (>35 or 1.08")
- **Premium mic (3.8-4.6)**
- High strength (>28 g/tex)
- High uniformity (>82)
- Smooth leaf (21/31 grades; 2-3 lf)



3-year Texas Lint Yields

- Variable results
- Planting date one significantly greater in 2022 and 2023
- Variety (Maturity) only different in 1 of 3 years (2021)
- Seeding rates only significantly different in 1 of 3 years (2023)
- Irrigation x PD response significant in all years.



OAP Cotton
PD1
May 22, 2022

Texas 3-year Summary

- 2021 – PD1 “hailed” out but yielded as well or numerically better than PD2
 - No benefit to replant
- 2022 – PD1 outyielded PD2
 - PD1 “blown” out but retained
 - Yield loss by replanting
- 2023 – PD1 yielded the same or outyielded PD2
 - PD1 sat in water logged soils for ~3 weeks
 - PD2 planted on June 19 did not “fail” although harvest not economically viable
- Plant early!
- Is it worth replanting?
 - 3-year data shows either no difference or yield benefit by replanting
 - time, labor, and seed cost

