

Cotton Variety Performance, Agronomics, and Associated Issues

An aerial photograph of a vast cotton field. Six green cotton harvesters are positioned in parallel rows, moving away from the viewer towards the horizon. The rows of harvested cotton are visible as dark, textured paths between the machines. The field extends to the horizon under a clear sky.

Photo Courtesy of Clint Dunn
Delta Island, MS

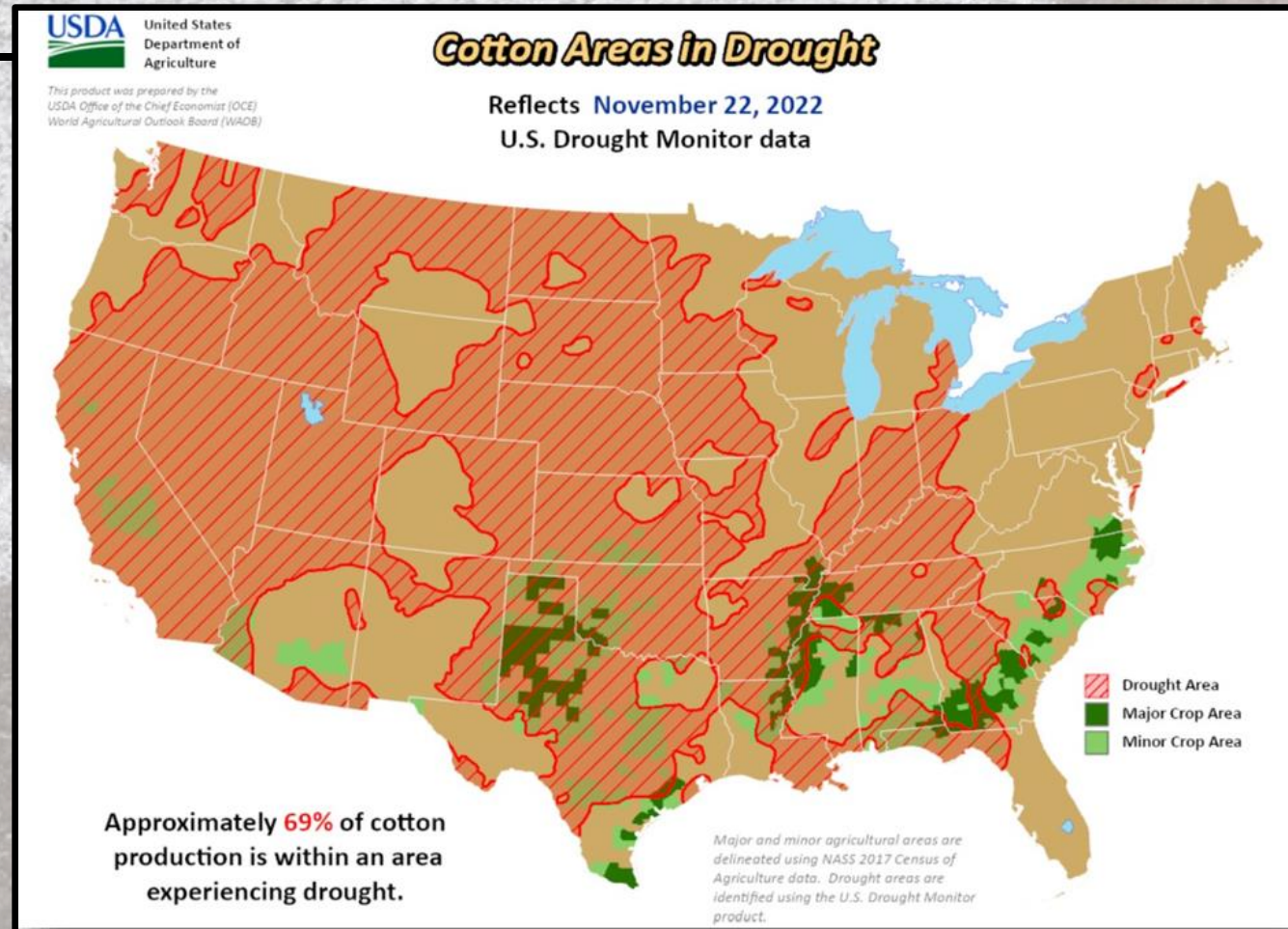
Statewide Outlook

Mississippi 2021 ~ 450,000 acres
Mississippi 2022
Acres harvested: 525,000
(+15.7%)

Yield: 1006 lb./acre

2021: 997 lb./acre

<https://quickstats.nass.usda.gov/results>



Statewide Outlook

Mississippi 2023 – Relatively flat?

Acres approximately +/- 525,000

- December cotton 2021 ~\$1.10
- December cotton 2022 ~\$0.86 (Dec.6, 2022)



Statewide Outlook

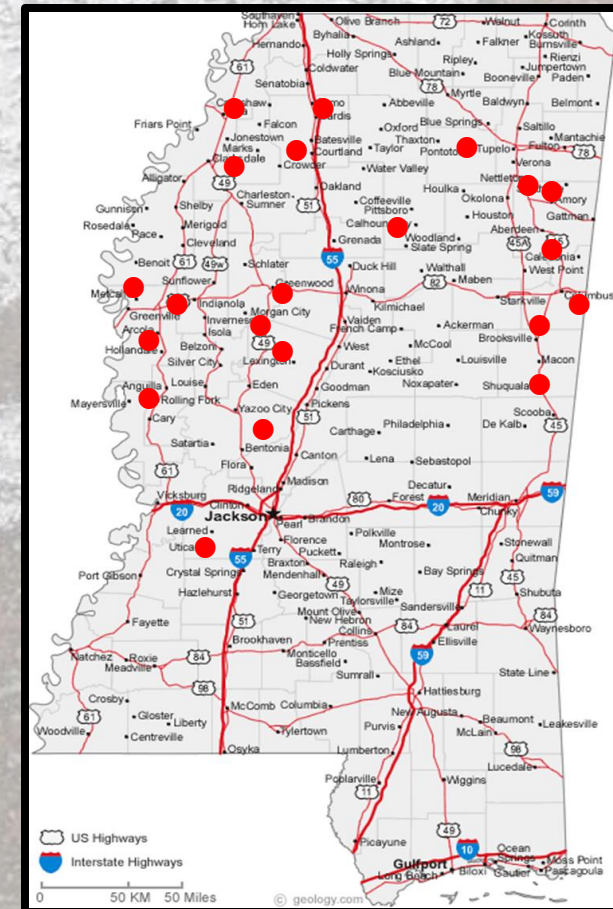
Considerations for 2023 crop

- Secure variety selection and acres
- Affordable fertility strategy



2021 Cotton Variety Testing

- Mississippi on-farm county demonstration (12)
- Mississippi Official Variety Trials (9)





**Break even point:
~1300 lbs @ \$0.85**



Table 2.B Summary of estimated costs and returns per acre
Cotton, 12R-38" solid, conserv. tillage, furrow irr.,
B3XF variety, 10.5 ac-in., Delta Area, Mississippi, 2023

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
				dollars	dollars
INCOME					
Cotton Lint	lb	0.73	1500.0000	1108.35	_____
Cotton Seed	lb	0.11	2025.0000	222.75	_____
TOTAL INCOME				1331.10	_____
DIRECT EXPENSES					
CUSTOM SPRAY	acre	55.80	1.0000	55.80	_____
HARVEST AIDS	acre	17.98	1.0000	17.98	_____
GINNING	acre	165.00	1.0000	165.00	_____
FERTILIZERS	acre	217.64	1.0000	217.64	_____
FUNGICIDES	acre	20.00	1.0000	20.00	_____
HERBICIDES	acre	128.29	1.0000	128.29	_____
INSECTICIDES	acre	104.38	1.0000	104.38	_____
IRRIGATION SUPPLIES	acre	7.92	1.0000	7.92	_____
SEED/PLANTS	acre	105.75	1.0000	105.75	_____
GROWTH REGULATORS	acre	11.22	1.0000	11.22	_____
ADJUVANTS	acre	1.32	1.0000	1.32	_____
CUSTOM FERTILIZE	acre	7.50	1.0000	7.50	_____
ERADICATION FEE	acre	1.00	1.0000	1.00	_____
CUSTOM LIME	acre	38.63	1.0000	38.63	_____
CROP CONSULTANT	acre	8.00	1.0000	8.00	_____
SOIL TEST	acre	3.33	1.0000	3.33	_____
HAND LABOR	hour	9.06	0.3135	2.82	_____
IRRIGATE LABOR	hour	9.06	0.3625	3.30	_____
OPERATOR LABOR	hour	16.54	0.7101	11.74	_____
UNALLOCATED LABOR	hour	16.54	0.5052	8.36	_____
DIESEL FUEL	gal	4.48	20.7109	92.79	_____
REPAIR & MAINTENANCE	acre	48.36	1.0000	48.36	_____
INTEREST ON OP. CAP.	acre	29.10	1.0000	29.10	_____
TOTAL DIRECT EXPENSES				1090.23	_____
RETURNS ABOVE DIRECT EXPENSES				240.87	_____
TOTAL FIXED EXPENSES				232.00	_____
TOTAL SPECIFIED EXPENSES				1322.23	_____
RETURNS ABOVE TOTAL SPECIFIED EXPENSES				8.87	_____

Note: Cost of production estimates are based on 2022 input prices.
Fertilization decisions should be based on soil tests



<https://www.agecon.msstate.edu/whatwedo/budgets.php>

**Delta Region -2 year
13 Varieties > 1300 lbs
Should be profitable**

	Stoneville		Clarksdale		Sidon		Tunica		Average across location and year
	2021	2022	2021	2022	2021	2022	2021	2022	
Lint yield (lb lint/acre)									
DP 2127 B3XF	1695	2214	1608	1169	899	1184	1781	1490	1505
PHY 411 W3FE	1573	2112	1845	1000	1250	700	1628	1654	1470
NG 3195 B3XF	1668	2017	1625	1250	955	915	1893	1319	1455
PHY 390 W3FE	1421	2239	1505	856	1191	1064	1559	1664	1437
PX1140A383-04	1390	2170	1519	1197	1061	942	1375	1544	1400
Armor 9371 B3XF	1608	2100	1546	864	906	874	1503	1551	1369
PHY 443 W3FE	1434	2064	1495	897	1078	804	1550	1575	1362
ST 4595B3XF	1400	2052	1475	1423	1122	1006	1372	1046	1362
PHY 400 W3FE	1378	1834	1484	927	1134	917	1430	1743	1356
PHY 332 W3FE	1363	2032	1710	1014	1029	916	1206	1473	1343
DP 2115 B3XF	1641	1908	1501	868	1054	860	1314	1462	1326
PHY 360 W3FE	1424	2010	1542	998	971	992	1437	1196	1321
DP 2020 B3XF	1477	1728	1435	1007	987	988	1302	1554	1310
NG 4190 B3XF	1447	2046	1454	816	1051	985	1558	1039	1299
DG 3456 B3XF	1585	1708	1402	1098	1048	893	1286	1300	1290
ST 5091 B3XF	1662	1870	1169	1142	807	1007	1274	1325	1282
DG 3555 B3XF	1412	1757	1447	886	827	797	1502	1465	1262
20R733 B3XF	1285	1737	1152	1116	816	1108	1399	1433	1256
ST 4990 B3XF	1582	1719	1336	718	898	1066	1483	1211	1252
DP 2012 B3XF	1353	1777	1421	850	1011	859	1291	1264	1228
DP 2038 B3XF	1472	1914	1258	850	936	971	1205	1217	1228
DG 3535 B3XF	1263	1978	1246	761	906	873	1364	1415	1226
DP 1646 B2XF	1399	1909	1339	898	919	1007	1054	1210	1217
Armor 9831 B3XF	1218	1979	1250	737	780	869	1323	1158	1164



Table 9.B Summary of estimated costs and returns per acre
 Cotton, 12R-38" solid, no-till
 B3XF variety, Non-Delta Area, Mississippi, 2023

ITEM	UNIT	PRICE	QUANTITY	AMOUNT	YOUR FARM
		dollars		dollars	
INCOME					
Cotton Lint	lb	0.73	900.0000	665.01	_____
Cotton Seed	lb	0.11	1215.0000	133.65	_____

TOTAL INCOME				798.66	_____
DIRECT EXPENSES					
HARVEST AIDS	acre	17.98	1.0000	17.98	_____
GINNING	acre	99.00	1.0000	99.00	_____
FERTILIZERS	acre	149.02	1.0000	149.02	_____
FUNGICIDES	acre	20.00	1.0000	20.00	_____
HERBICIDES	acre	114.43	1.0000	114.43	_____
INSECTICIDES	acre	50.09	1.0000	50.09	_____
SEED/PLANTS	acre	105.75	1.0000	105.75	_____
GROWTH REGULATORS	acre	7.04	1.0000	7.04	_____
ADJUVANTS	acre	1.32	1.0000	1.32	_____
CUSTOM FERTILIZE	acre	7.50	1.0000	7.50	_____
ERADICATION FEE	acre	1.00	1.0000	1.00	_____
CUSTOM LIME	acre	38.63	1.0000	38.63	_____
CROP CONSULTANT	acre	8.00	1.0000	8.00	_____
SOIL TEST	acre	3.33	1.0000	3.33	_____
HAND LABOR	hour	9.06	0.3220	2.89	_____
OPERATOR LABOR	hour	16.54	0.5709	9.41	_____
UNALLOCATED LABOR	hour	16.61	0.4567	7.59	_____
DIESEL FUEL	gal	4.48	10.3205	46.25	_____
REPAIR & MAINTENANCE	acre	36.83	1.0000	36.83	_____
INTEREST ON OP. CAP.	acre	21.23	1.0000	21.23	_____

TOTAL DIRECT EXPENSES				747.29	_____
RETURNS ABOVE DIRECT EXPENSES				51.37	_____

TOTAL FIXED EXPENSES				154.00	_____

TOTAL SPECIFIED EXPENSES				901.29	_____
RETURNS ABOVE TOTAL SPECIFIED EXPENSES				-102.63	_____



**Break even point:
 ~910 lbs @ \$0.85**

<https://www.agecon.msstate.edu/whatwedo/budgets.php>



**Hills Region -2 year
15-20 Varieties > 900 lbs
Should be profitable**

	Location and Year						Average across location and year
	Brooksville		MSU		Verona		
	2021	2022	2021	2022	2021	2022	
	Lint yield (lb lint/acre)						
ST 5091 B3XF	554	1393	572	1144	1176	1653	1082
DP 1646 B2XF	673	1179	627	1206	1165	1477	1055
Armor 9371 B3XF	618	1345	435	1238	937	1536	1018
PHY 400 W3FE	686	1228	622	998	1086	1435	1009
DP 2020 B3XF	690	1328	453	1073	1069	1344	993
DP 2038 B3XF	573	1069	620	953	1157	1574	991
DG 3456 B3XF	798	1176	427	988	1023	1492	984
ST 4595B3XF	976	1278	287	840	892	1617	981
PHY 390 W3FE	617	1252	491	874	1044	1600	980
NG 4190 B3XF	739	1098	548	1173	709	1557	971
DP 2012 B3XF	661	1277	336	1127	1067	1309	963
PHY 332 W3FE	731	1199	507	764	955	1621	963
ST 4990 B3XF	616	1271	484	1109	1030	1252	960
DP 2127 B3XF	786	1450	514	880	686	1442	960
DG 3535 B3XF	484	1290	549	852	960	1566	950
20R733 B3XF	691	1364	423	833	873	1511	949
PHY 443 W3FE	707	896	624	1113	929	1407	946
PX1140A383-04	652	1280	490	985	899	1356	944
Armor 9831 B3XF	433	1178	415	1136	895	1469	921
DP 2115 B3XF	777	1202	415	722	999	1355	911
PHY 360 W3FE	690	1364	358	783	807	1431	905
NG 3195 B3XF	597	1284	399	933	741	1339	882
PHY 411 W3FE	612	1015	439	754	812	1634	878
DG 3555 B3XF	455	1023	584	916	902	1382	877



Cotton Variety Selection

2022 MSU On-Farm Variety Trial Data (Pieralisi et al., 2022)			
MSU OVT (All Locations)		MS On-Farm Variety Trials (All Locations)	
Variety	Yield (lbs ac ⁻¹)	Variety	Yield (lbs ac ⁻¹)
DP 2127 B3XF	1449	DP 2127 B3XF	1303
PX1140A383-04	1424	ST 4595 B3XF	1278
ST 5091B3XF	1422	ST 5091 B3XF	1238
Armor 9371 B3XF	1419	DP 2115 B3XF	1232
PHY 400 W3FE	1414	NG 3195 B3XF	1225
NG 3195 B3XF	1393	PHY 411 W3FE	1220
PHY 390 W3FE	1370	NG 4190 B3XF	1197
PX1140B373-04	1366	DP 2239 B3XF	1179
ST 4595B3XF	1365	PHY 443 W3FE	1171
20R733B3XF	1358	DG 3511 B3XF	1136

LSD (0.05) 110 lbs/A

LSD (0.05) 73 lbs/A



Cotton Variety Selection

2022 MSU On-Farm Variety Trial Data (Pieralisi et al., 2022)			
MSU OVT (Delta)		MS On-Farm Variety Trials (Delta)	
Variety	Yield (lbs ac ⁻¹)	Variety	Yield (lbs ac ⁻¹)
DP 2127 B3XF	1483	DP 2127 B3XF	1522
PHY 390 W3FE	1482	ST 4595 B3XF	1483
PX1140A383-04	1463	DP 2115 B3XF	1444
PHY 400 W3FE	1461	ST 5091 B3XF	1419
PHY 411 W3FE	1436	PHY 411 W3FE	1402
NG 3195 B3XF	1422	NG 3195 B3XF	1388
PHY 332 W3FE	1409	PHY 443 W3FE	1361
ST 4595B3XF	1382	DP 2239 B3XF	1349
DG 3519 B3XF	1365	NG 4190 B3XF	1303
20R733B3XF	1348	DG 3511 B3XF	1276

LSD (0.05) 156 lbs/A

LSD (0.05) 71 lbs/A



Cotton Variety Selection

2022 MSU On-Farm Variety Trial Data (Pieralisi et al., 2022)			
MS OVT (Hills)		MS On-Farm Variety Trials (Hills)	
Variety	Yield (lbs ac ⁻¹)	Variety	Yield (lbs ac ⁻¹)
Armor 9371 B3XF	1520	NG 4190 B3XF	1103
ST 5091B3XF	1513	DP 2127 B3XF	1070
NG 4190 B3XF	1426	NG 3195 B3XF	1063
PX1140B373-04	1425	ST 4595 B3XF	1060
PX1140A383-04	1402	ST 5091 B3XF	1053
ST 4990B3XF	1387	PHY 411 W3FE	1036
DP 2127 B3XF	1380	DP 2115 B3XF	1012
PHY 400 W3FE	1374	DP 2239 B3XF	1009
20R733B3XF	1369	DG 3511 B3XF	1002
Armor 9831 B3XF	1369	PHY 443 W3FE	980

LSD (0.05) 160 lbs/A

LSD (0.05) NS



Cotton Variety Selection

2022 MSU On-Farm Variety Trial Data (Pieralisi et al., 2022)			
Irrigated Locations		Dryland Locations	
Variety	Yield (lbs ac ⁻¹)	Variety	Yield (lbs ac ⁻¹)
DP 2127 B3XF	1295	NG 4190 B3XF	1127
ST 4595 B3XF	1247	DP 2127 B3XF	1100
DP 2115 B3XF	1205	ST 4595 B3XF	1096
ST 5091 B3XF	1184	ST 5091 B3XF	1093
PHY 411 W3FE	1175	NG 3195 B3XF	1081
NG 3195 B3XF	1171	PHY 411 W3FE	1066
PHY 443 W3FE	1134	DP 2115 B3XF	1049
DP 2239 B3XF	1127	DG 3511 B3XF	1042
NG 4190 B3XF	1091	DP 2239 B3XF	1033
DG 3511 B3XF	1047	PHY 443 W3FE	1010

LSD (0.05) 73 lbs/A

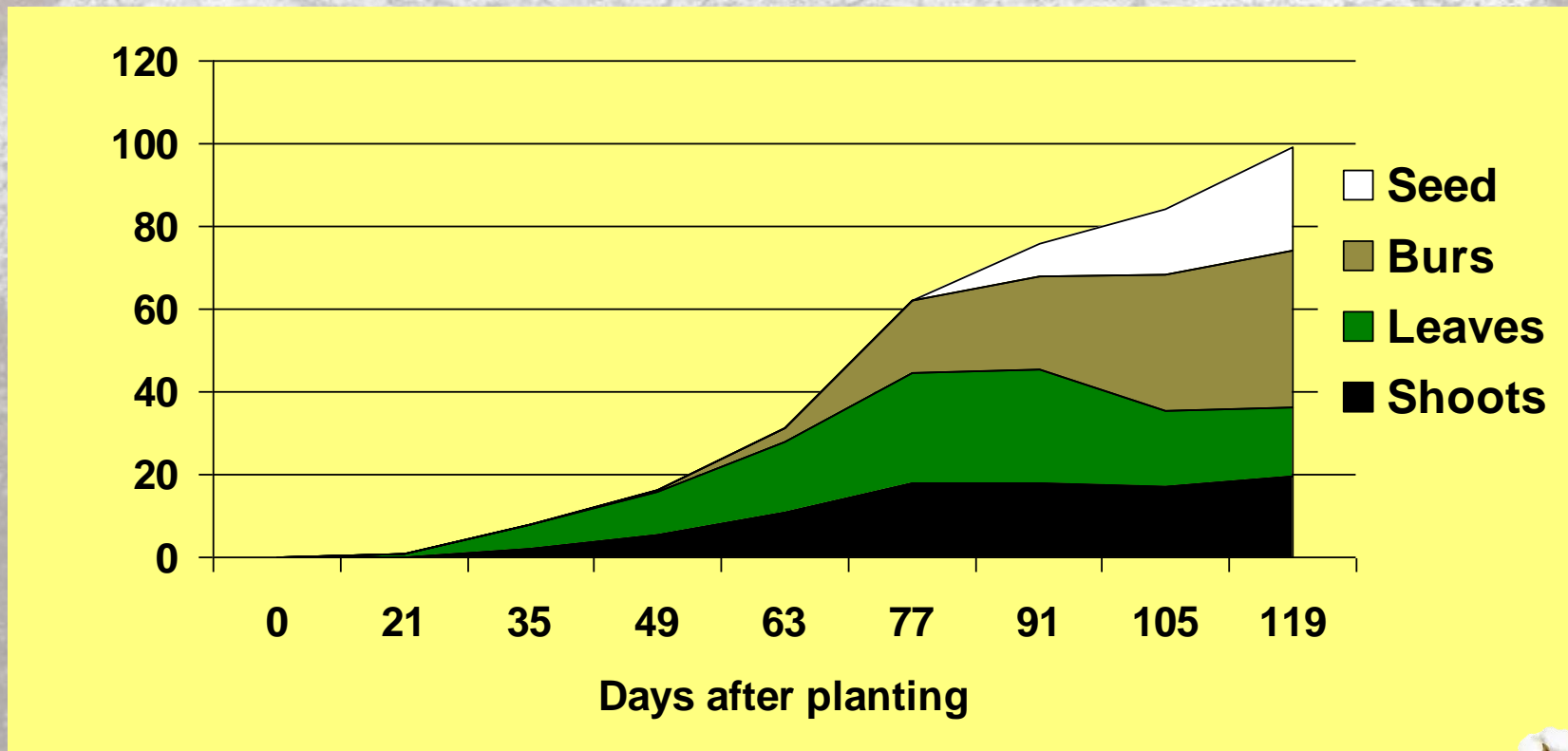
LSD (0.05) NS



Potassium



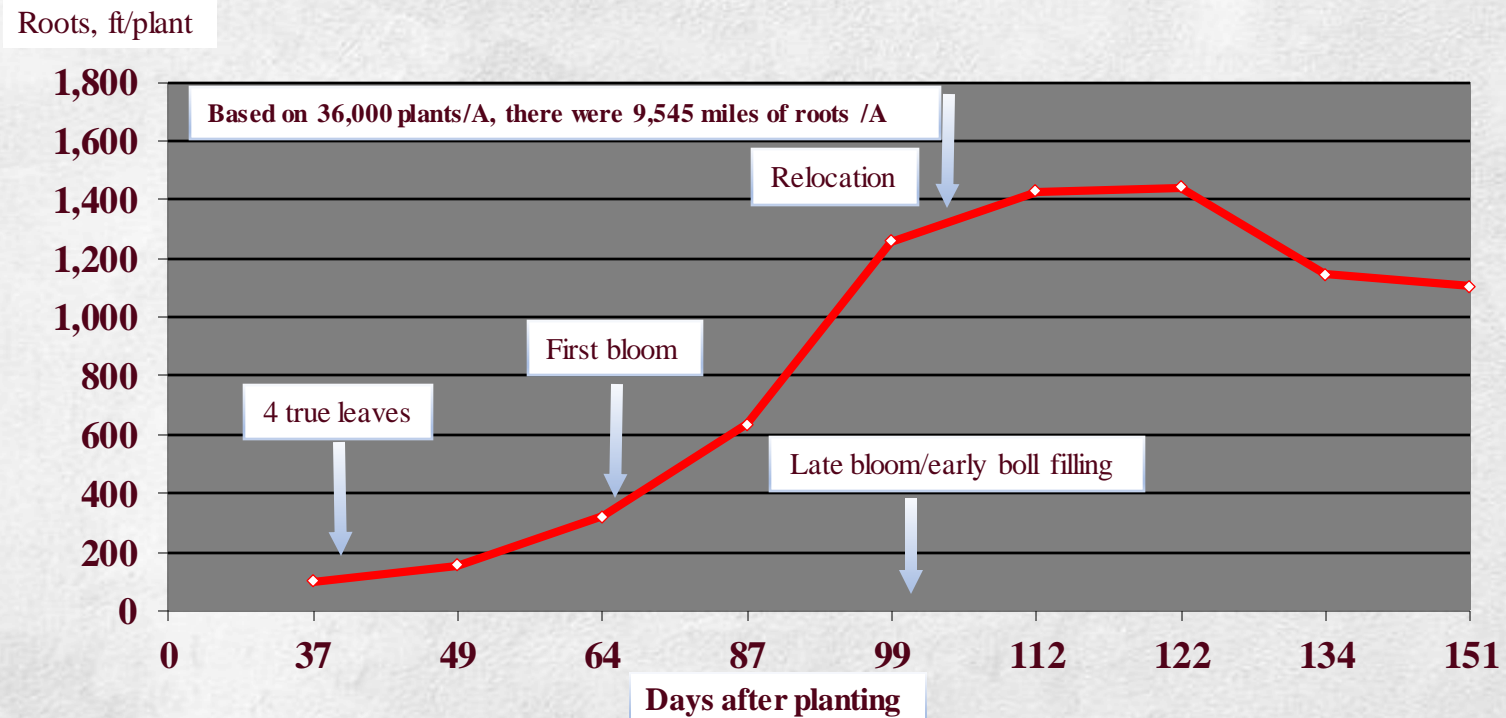
Potassium



~ 25% of total uptake is removed at harvest



Potassium Fertilizer Timings



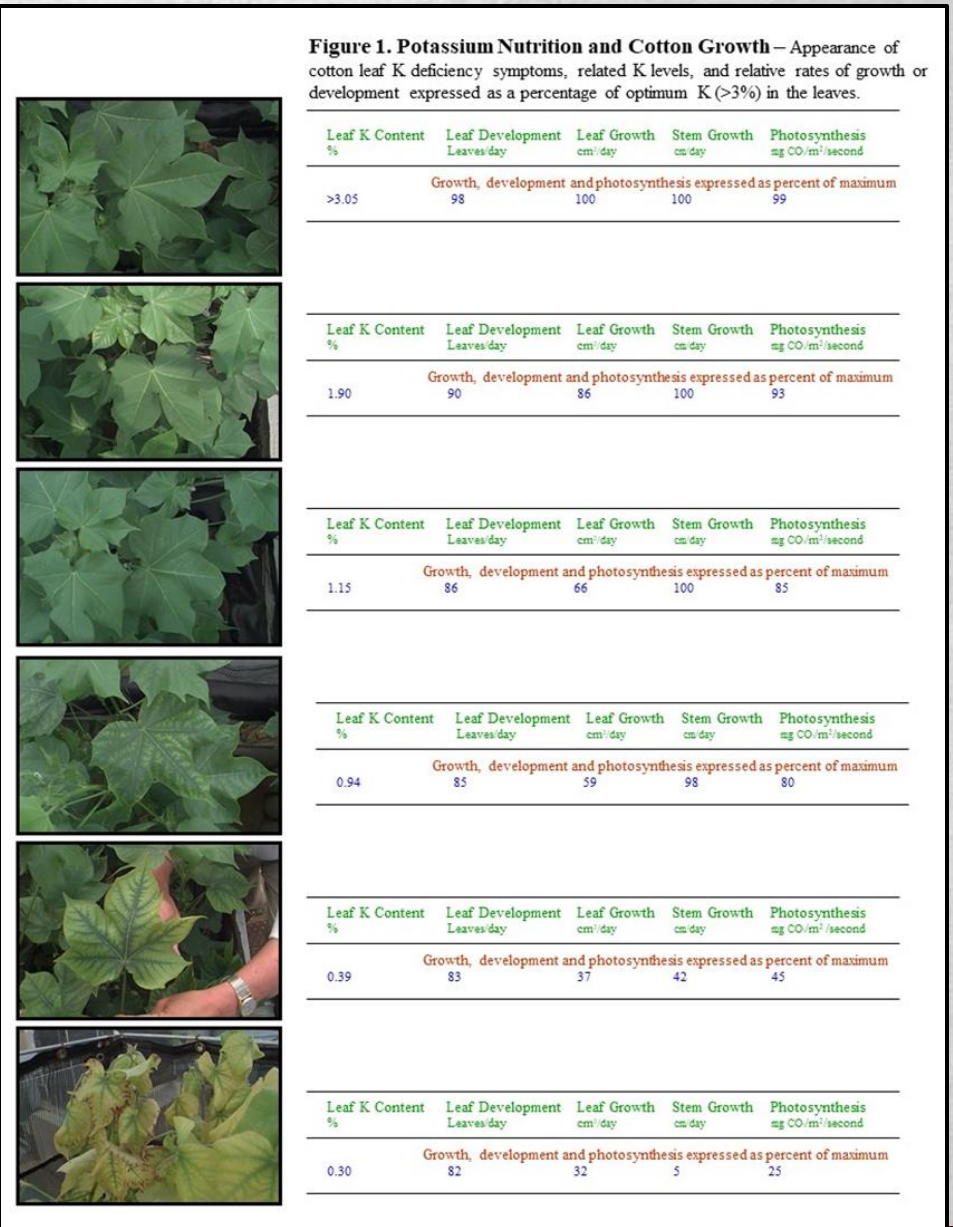
Schwab, Mullins & Burmester, 2000



Foliar Potassium Applications

- 4 to 10 pounds per week
- Buffer solution 4-6 pH
- Tissue sample prior to bloom
- Needs to be applied to healthy leaves prior to symptomology to get most benefit

(Reddy et al., 2000)



Materials and Methods

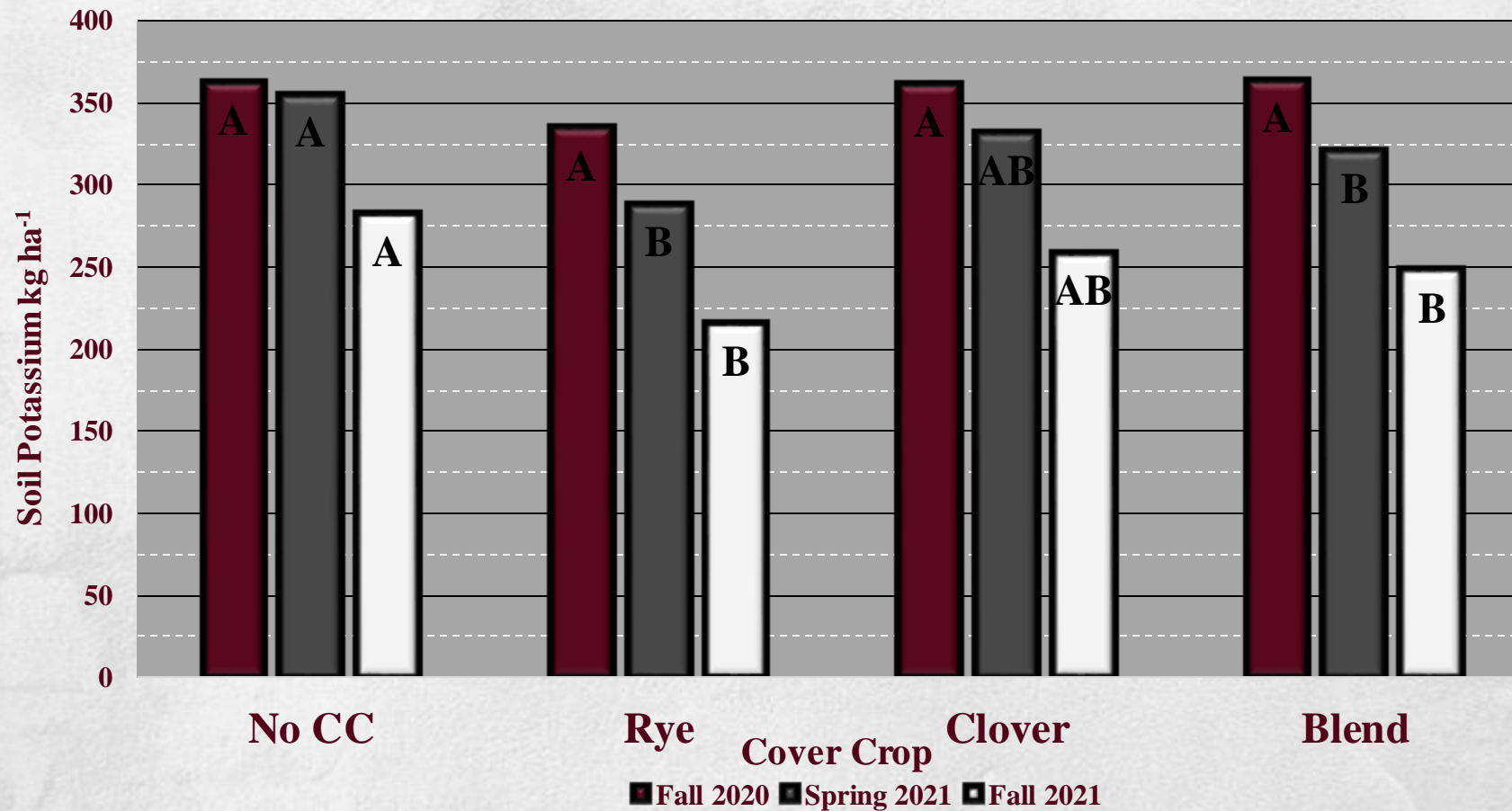
- **Experimental Design: Factorial Arrangement of TRT**
 - **Factor A:**
 - Cover Crop
 - No cover crop
 - Cereal rye
 - Crimson clover
 - 50/50 blend
 - **Factor B:**
 - Fertilizer Application
 - No fertilizer
 - 168 kg ha⁻¹ pre plant
 - 168 kg ha⁻¹ at pinhead square
 - Split application pre-planting and pin head square



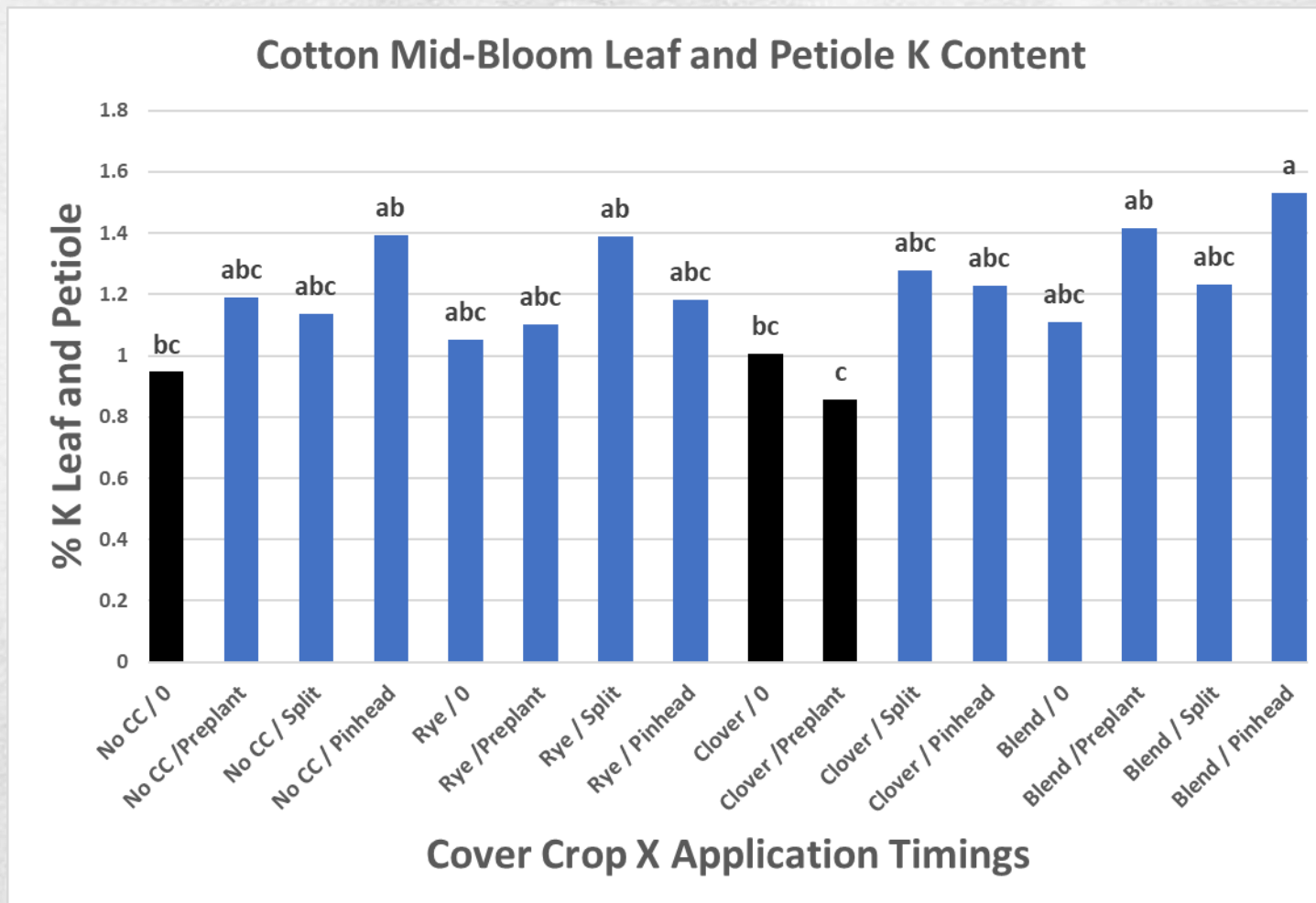
Hobbs 2021



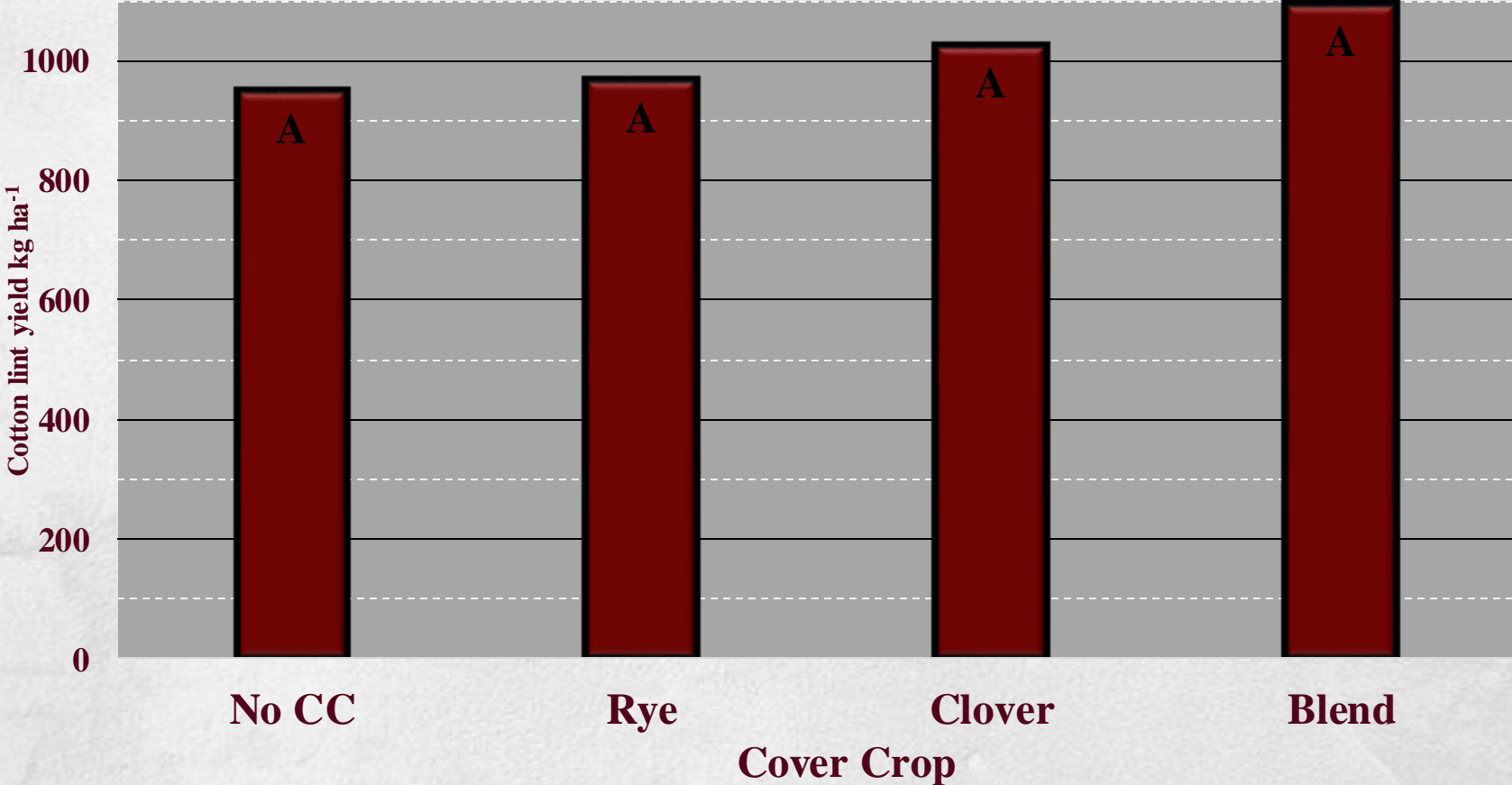
Soil Test Potassium



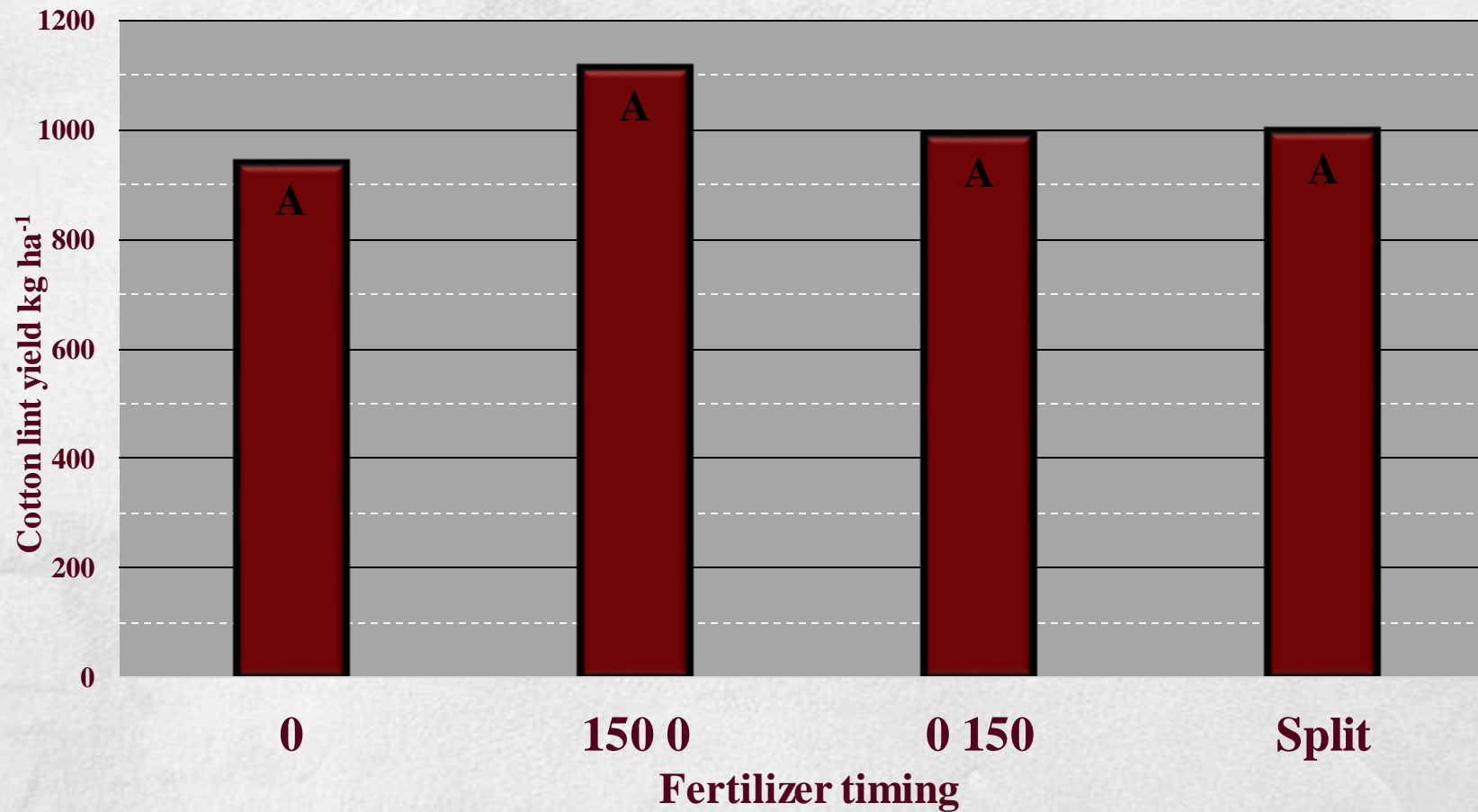
Cotton Leaf and Petiole K Content



Cotton Lint Yield 2021



Cotton Lint Yield 2021



Impact of Planting Pattern and Planting Population In a Cotton Production System

William J. Rutland, B. Perialisi, D. Dodds, J. Lowe, W. Crow, J. McCoy, T. Soignier, B. Norris, E. Hobbs



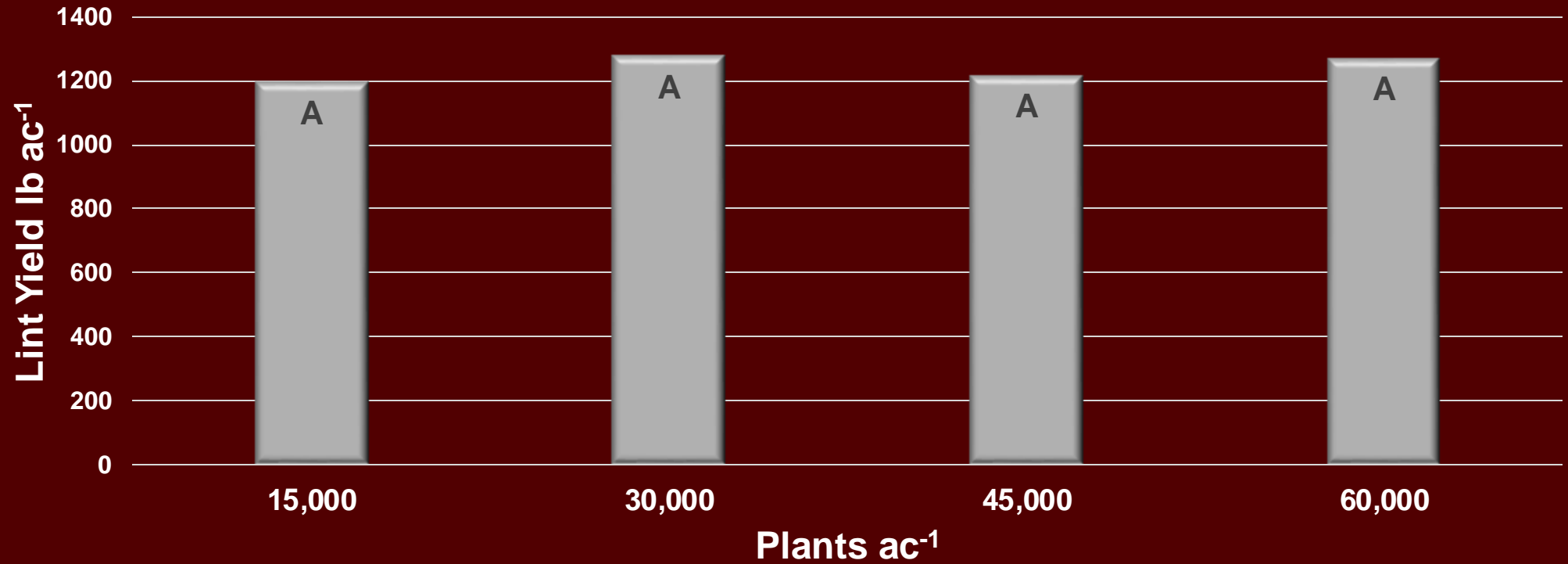
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Results

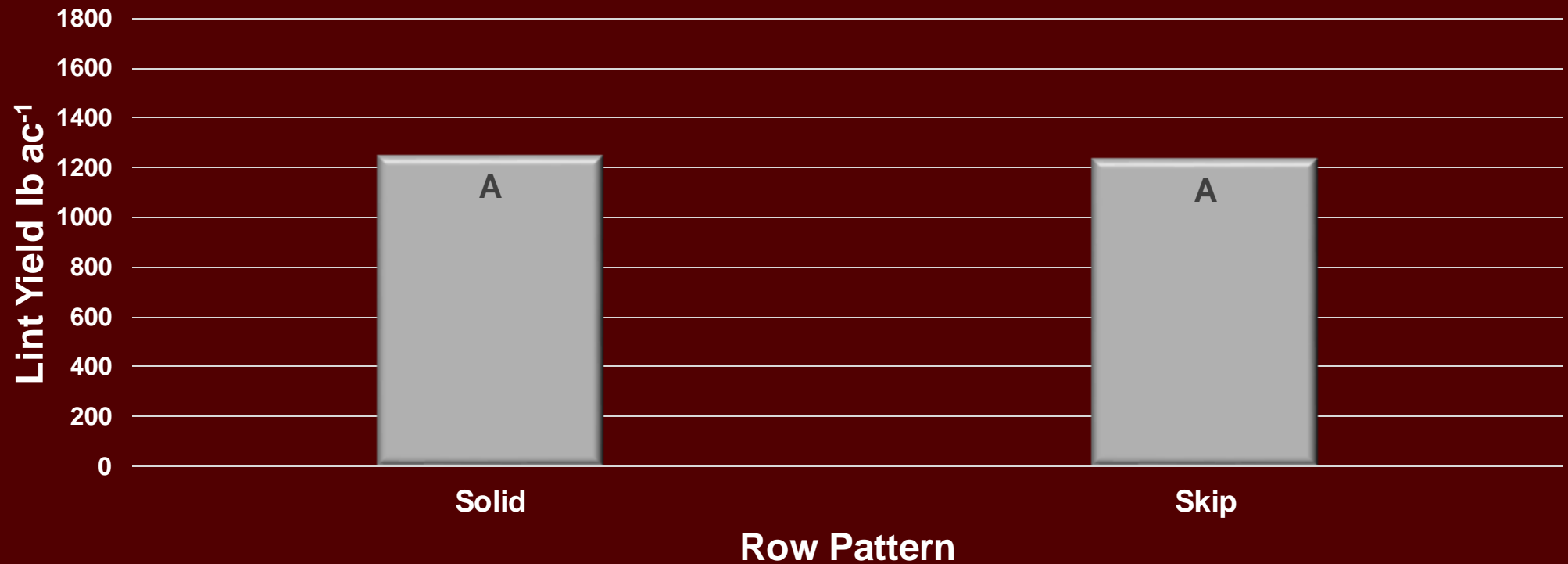
Yield by Population





Results

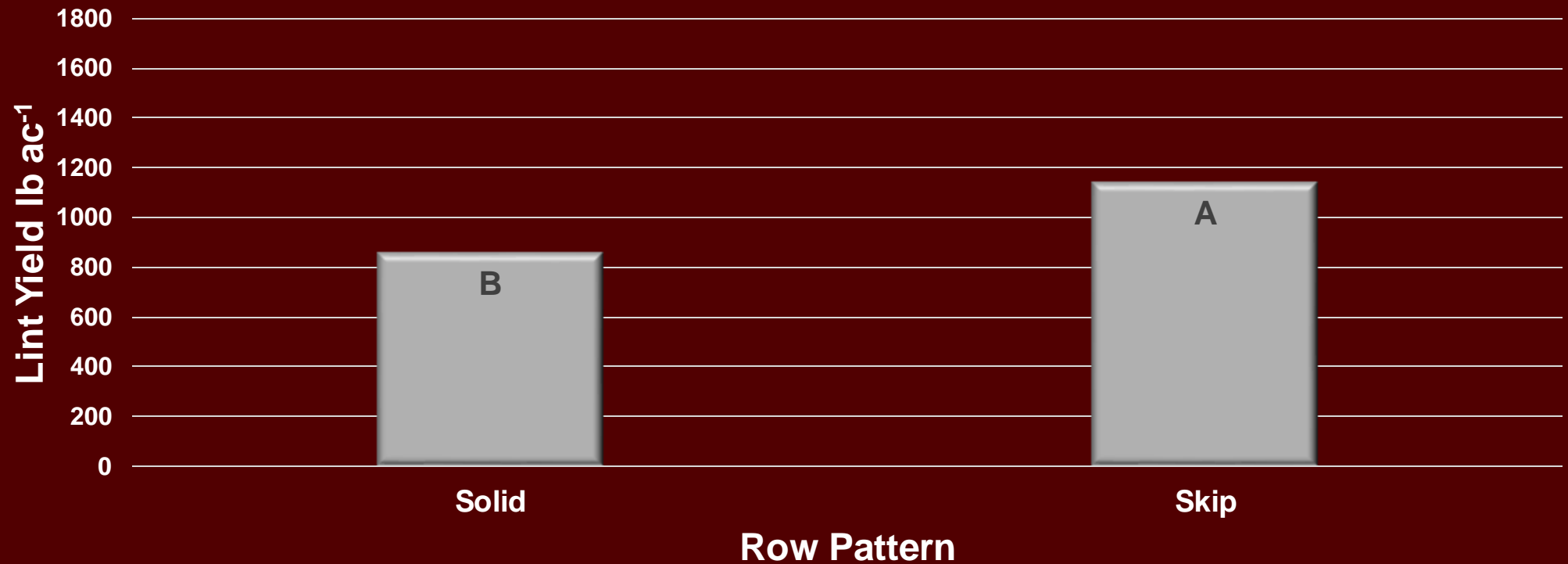
Yield by Row Pattern





Results

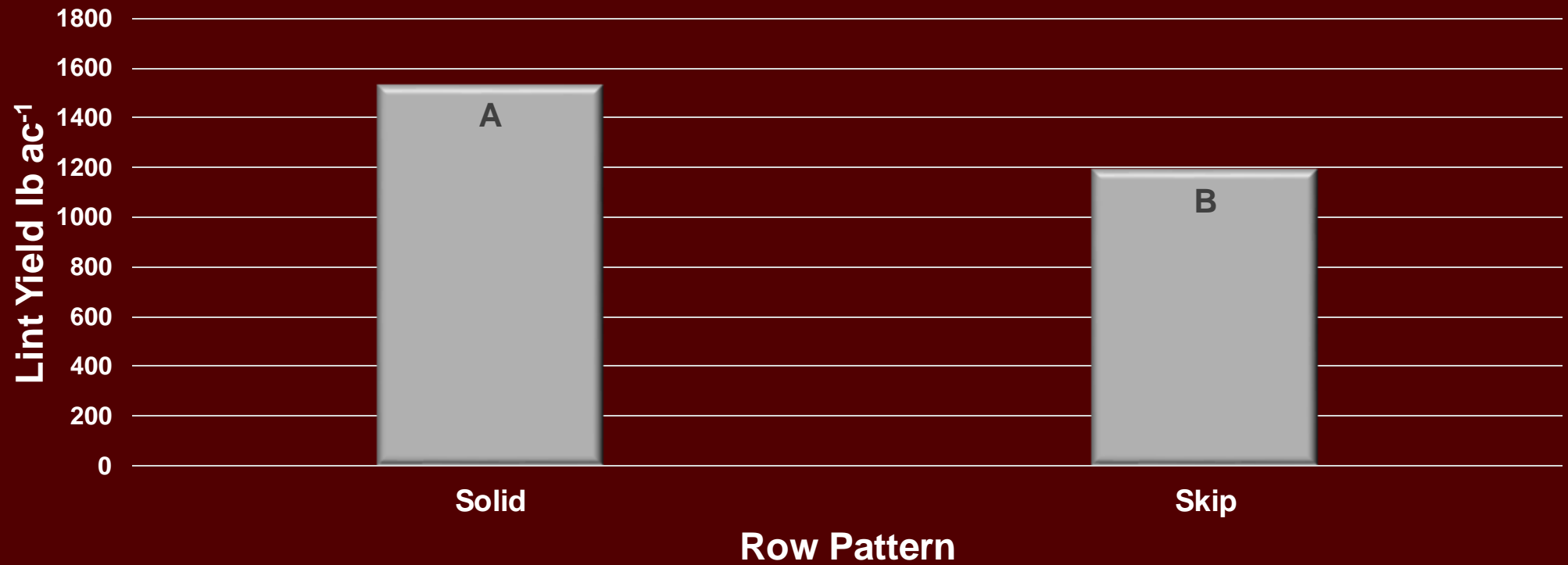
Yield by Row Pattern 2021





Results

Yield by Row Pattern 2022



Supplemental Data

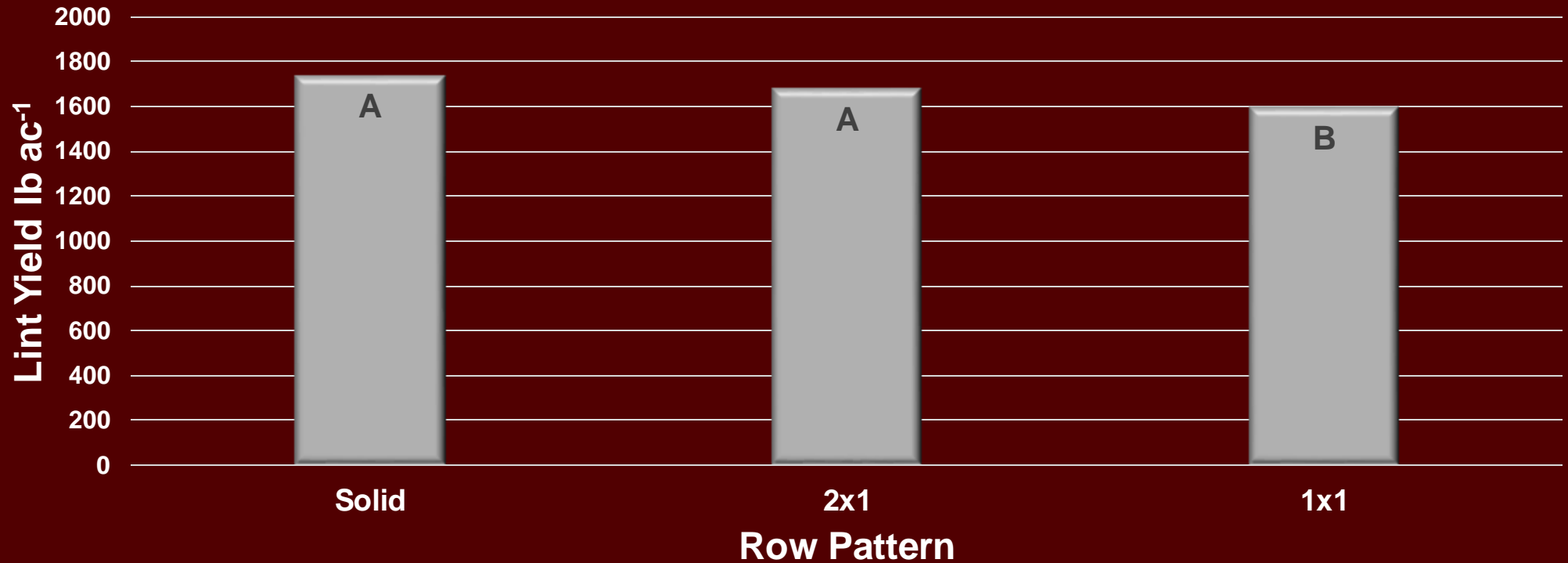
- 2 Varieties
 - ST 5091 B3XF
 - ST 4595 B3XF
- 3 Row Configurations
 - Solid
 - 2x1 Skip
 - 1x1 Skip





Supplemental Data

On-Farm Yield by Row Pattern



Supplemental Data

- Considerations
 - Plant growth regulators
 - Harvest efficiency
 - Insect pressure
 - Irrigation scheduling



Thank You

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- **Eli Hobbs**
- **Tyler Soignier**
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- **North Farm Crew**



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