

Cotton Varieties and Nitrogen Management



Choosing varieties is one of the most important decisions for cotton production

- Fertility levels
- Soil type
- Irrigation or not
- Nematodes levels
- Pest resistance
- Yield potential and stability across locations
- No variety will win every yield trial so choose those that are in the top
- Etc.

2021 Cotton Variety Trial Statewide, UGA								
Brand	Variety	Tifton	Tifton	Bainbridge	Plains	Midville	Midville	Statewide
		Irrigated	Dryland	Irrigated	Irrigated	Dryland	Irrigated	Intelyield
-----lb/acre-----								
<u>OVT</u>								
Armor	9371 B3XF	1,432	1,451	1,771	1,681	2,131	2,531	1,833
Stoneville	BX 2295B3XF	989	1,422	1,939	1,725	2,120	2,481	1,779
Deltapine	DP 2127 B3XF	1,170	1,546	1,783	1,685	2,018	2,416	1,770
Dyna-Gro	DG 3799 B3XF	1,368	1,725	1,784	1,812	1,820	2,104	1,769
Armor	9831 B3XF	1,409	1,359	1,484	1,858	2,027	2,422	1,760
Deltapine	DP 1646 B2XF	1,021	1,572	1,469	1,620	2,356	2,376	1,736
NexGen	AMX20B037B3XF	1,426	1,818	1,601	1,611	1,878	2,025	1,726
Deltapine	DP 2115 B3XF	1,217	1,422	1,784	1,442	2,099	2,339	1,717
Stoneville	BX 2296B3XF	1,096	1,489	1,670	1,687	1,934	2,311	1,698
Stoneville	ST 5091B3XF	1,240	1,576	1,366	1,526	2,054	2,400	1,694
Stoneville	BX 2297B3XF	1,089	1,507	1,725	1,736	1,809	2,275	1,690
NexGen	NG 4190 B3XF	897	1,382	1,695	1,667	1,813	2,506	1,660
Deltapine	DP 2038 B3XF	1,252	1,422	1,547	1,556	1,862	2,266	1,651
Bayer	20R745NR B3XF	1,058	1,595	1,863	1,603	1,755	2,018	1,649
Stoneville	ST 4990B3XF	1,419	1,507	1,344	1,528	1,915	2,147	1,643
Dyna-Gro	DG 3615 B3XF	936	1,715	1,579	1,616	1,894	2,097	1,640
PhytoGen	PHY 545 W3FE	900	1,361	1,702	1,807	1,876	2,143	1,631
PhytoGen	1140A385-04	1,213	1,305	1,755	1,288	1,961	2,217	1,623
Deltapine	DP 2012 B3XF	1,164	1,444	1,574	1,589	1,876	2,078	1,621
Deltapine	DP 2020 B3XF	1,176	1,461	1,453	1,573	1,852	2,209	1,621
Stoneville	BX 2298B3XF	1,173	1,282	1,706	1,546	1,826	2,137	1,612
PhytoGen	PHY 400 W3FE	1,421	1,345	1,438	1,472	1,816	2,178	1,612
Deltapine	DP 2055 B3XF	922	1,219	1,427	1,583	2,054	2,423	1,605
PhytoGen	1150A450-04	1,010	1,263	1,494	1,472	2,000	2,297	1,589

2021 GA On-Farm Cotton Variety Trial Results

	County (Lint yield per acre)																											
	Cook	Colquitt	Lowndes	Toombs	Turner	Macon	Cook	Jeff Davis	Bulloch	Sumter	Ben Hill	Grady	Mitchell	Miller	Worth	Pulaski	Seminole	Berrien	Evans	Tattnall	Wilcox	Oconee	Burke	Burke	Screven	All	LSD	% Above
Variety	DRY	IRR	DRY	DRY	DRY	DRY	IRR	IRR	IRR	IRR	IRR	DRY	IRR	IRR	IRR	IRR	IRR	DRY	DRY	DRY	DRY	DRY	IRR	DRY	IRR	Loc. Avg.	P=0.1	Trial Avg.
DG 3615 B3XF	527	689	868	901	1094	1206	1341	1304	1262	1499	1348	1384	1244	1482	1513	1316	1520	1591	1511	1272	1555	1476	1406	1513	1521	1294	a	84
DG 3799 B3XF	661	745	817	942	1135	1251	1173	1257	1236	1022	1363	1273	1350	1384	1420	1278	1582	1529	1405	1861	1786	1265	1430	1353	1540	1282	a	84
ST 5091 B3XF	449	586	828	808	1173	1116	1130	1196	1219	1169	1142	1257	1260	1146	1387	1296	1337	1357	1409	1405	1532	1635	1534	1490	1732	1224	b	72
DP 2038 B3XF	460	743	741	891	1138	1146	1197	1160	1276	1260	1189	1144	1207	1188	1175	1383	1258	1340	1464	1395	1477	1486	1568	1587	1539	1216	bc	60
DP 1646 B2XF	451	734	735	813	1062	1009	1225	1199	1156	1146	1269	1283	1289	1024	1218	1397	1298	1380	1461	1571	1215	1379	1445	1591	1670	1201	bcd	56
DP 2055 B3XF	528	813	702	833	1074	988	1098	1158	1173	1092	1192	1216	1184	1178	1245	1386	1222	1486	1249	1214	1371	1591	1680	1560	1523	1190	bcd	36
AR 9831 B3XF	615	766	774	714	796	1132	1144	1069	1133	1135	1310	1108	1242	1318	1258	1266	1487	1362	1357	1314	1339	1392	1500	1481	1482	1180	bcd	44
NG 3195 B3XF	590	562	718	747	1069	1171	1215	1102	1197	1215	1191	1251	1113	1077	1145	1298	1196	1358	1423	1265	1504	1505	1505	1538	1485	1178	cd	52
ST 4990 B3XF	479	700	676	682	945	1089	1131	1170	1128	1309	1061	1171	1114	1273	1363	1273	1263	1177	1373	1343	1460	1571	1454	1463	1390	1162	de	32
PHY 545 W3FE	580	675	1039	764	1168	1090	981	1108	1233	1006	985	974	1168	1192	1059	1075	1124	1267	1242	1294	1422	1444	1367	1346	1581	1127	e	24
PHY 400 W3FE	615	575	797	747	1002	882	1012	1110	1068	1187	1106	1217	1183	1108	1211	1175	1153	1284	1305	1313	1297	1457	1358	1447	1493	1124	e	16
NG 4936 B3XF	487	526	533	768	846	807	1037	1113	1091	1182	1221	1102	1208	1317	1202	1175	1211	1239	1353	1416	1425	1488	1457	1431	1399	1121	e	16
Trial Average	537	676	769	801	1042	1074	1140	1162	1181	1185	1198	1198	1214	1224	1266	1276	1304	1364	1379	1389	1449	1474	1475	1483	1530			

DRY – Dryland

IRR – Irrigated

Bolded varieties – Top yielding group

Shaded green and green font – Above location average

Red line (between Sumter and Ben Hill) represents the overall trial average (1,192 lbs/acre)

Contact your local UGA County Extension Agent for more information on variety selection and performance.

Santa
Rosa-
Mickey
Diamond

		LINT	
ENTRY	VALUE	YIELD	TURNOUT
	(\$/acre)	(lbs/acre)	(%)
ARMOR 9371 B3XF		1166	42.3%
PHY 332 W3FE		1103	39.1%
PX 4B08		1095	42.3%
DP 2055 B3XF		1071	42.0%
DP 2141NR B3XF		1059	40.4%
DP 2020 B3XF		1047	40.2%
NG 3195 B3XF		1034	41.6%
PHY 443 W3FE		996	40.4%
PHY 400 W3FE		991	39.9%
ST 4993 B3XF		921	43.5%
NG 5150 B3XF		908	41.5%
ST 4990 B3XF		885	40.6%
ARMOR 9831 B3XF		883	40.7%
ST 5091 B3XF		825	40.8%
DP 1840 B3XF		818	42.2%
NG 4936 B3XF		811	39.3%
DP 2038 B3XF		807	45.4%
ARMOR 9608 B3XF		695	42.4%

Susceptible vs PHY Reniform resistant



70-80% of the K deficiency found in cotton is due to nematode damage and is often not soil deficient, but from root pruning.



Jefferson County, FL, non-irrigated

JEFFERSON	plot	seed cotton subsample (lb)	lint (lb.)	seed (lb.)	turnout	total seed cotton (lb/ac)	lint yield (lb/ac)
	DP 2020	2	0.791	1.131	0.3955	2647	1046.89
	DP 1646	2	0.838	1.051	0.419	2633	1103.23
	DP 2055	2	0.863	1.065	0.4315	2437	1051.57
	NG 5150	2	0.855	1.045	0.4275	2142	915.71
	Phy 400 #1	2	0.844	1.085	0.422	2536	1070.19
	Phy 400 #2	2	0.843	1.034	0.4215	2304	971.14
	Phy 545	2	0.961	1.065	0.4805	2219	1066.23
	ST 4990	2	0.8	1.098	0.4	2787	1114.80
	ST 4993	2	0.847	1.042	0.4235	2306	976.59
	ST 5091	2	0.852	1.075	0.426	2452	1044.55
	Phy 360	2	0.847	1.103	0.4235	1919	812.70
	NG 4936	2	0.813	1.129	0.4065	2697	1096.33

Washington County

JACKSON	plot	seed cotton subsample (lb)	lint (lb.)	seed (lb.)	turnout	total seed cotton (lb/ac)	lint yield (lb/ac)
	DP 2020	2.005	0.836	1.138	0.416958	1722	718.00
	DP 2038	1.466	0.731	0.729	0.498636	1576	785.85
	DP 2055	1.509	0.665	0.808	0.440689	1502	661.92
	NG 5150	1.273	0.54	0.68	0.424195	1048	444.56
	Phy 400	1.512	0.69	0.837	0.456349	1481	675.85
	Phy 443	1.26	0.537	0.703	0.42619	1321	563.00
	Phy 545	1.663	0.752	0.907	0.452195	1361	615.44
	ST 4990	2.005	0.936	1.027	0.466833	1592	743.20
	ST 4993	1.237	0.533	0.638	0.430881	1315	566.61
	ST 5091	2.004	0.867	1.099	0.432635	1677	725.53

Cotton N needs depends on:

- Soil test
- Soil type
- Yield potential
- Irrigated or non irrigated
- Crop rotation (corn, cotton, peanut)
- Grazing impacts prior to cotton
- No set rate N for all conditions-

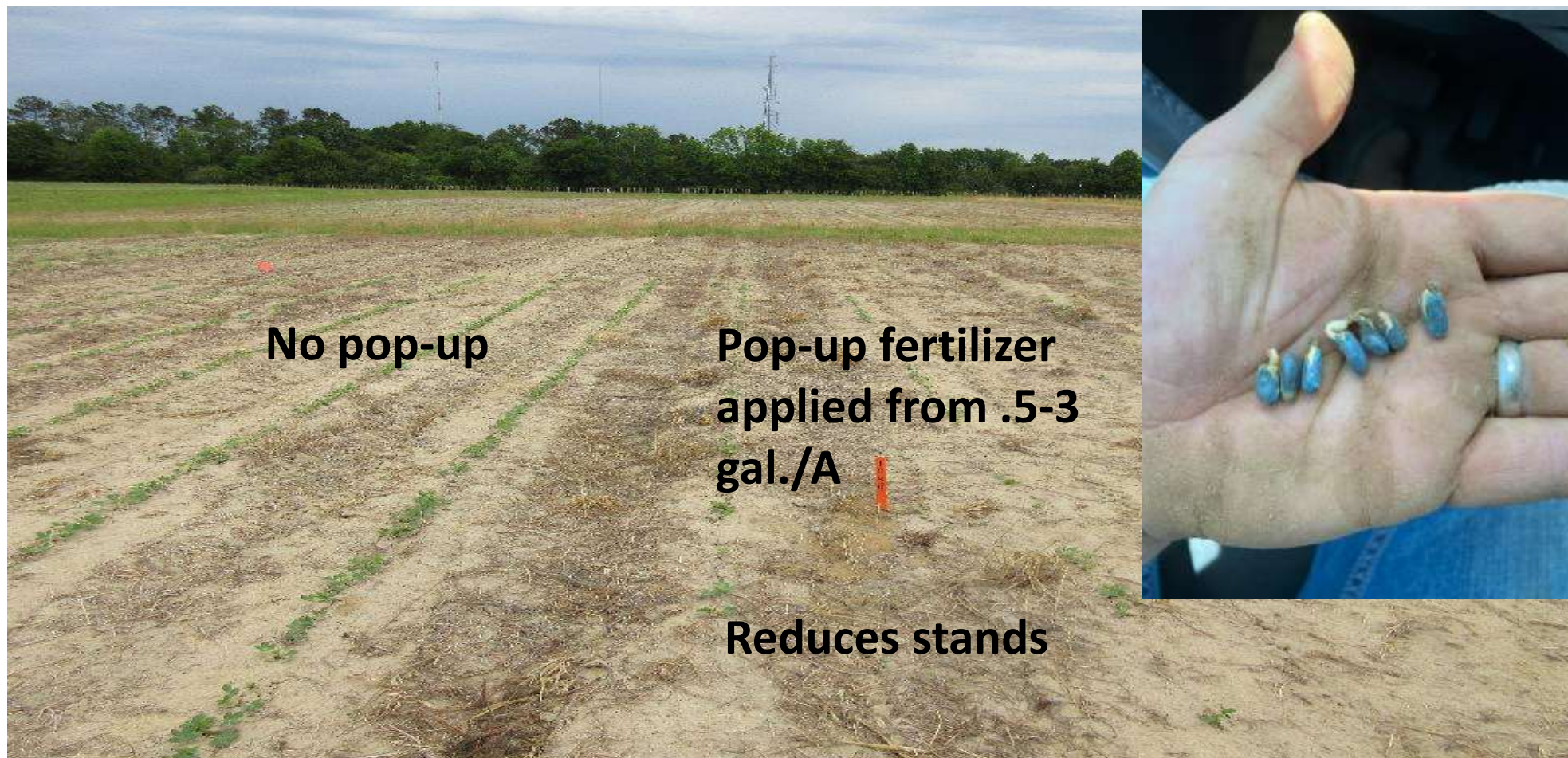
Winter grazing prior to planting cotton leads to doubling of root mass (larger and deeper) over non-grazed cover crop and 40-70% less irrigation as well as less N and K needed.



Banding fertilizer beside the row can reduce fertility needs by 20-30% vs broadcast, either dry or liquid

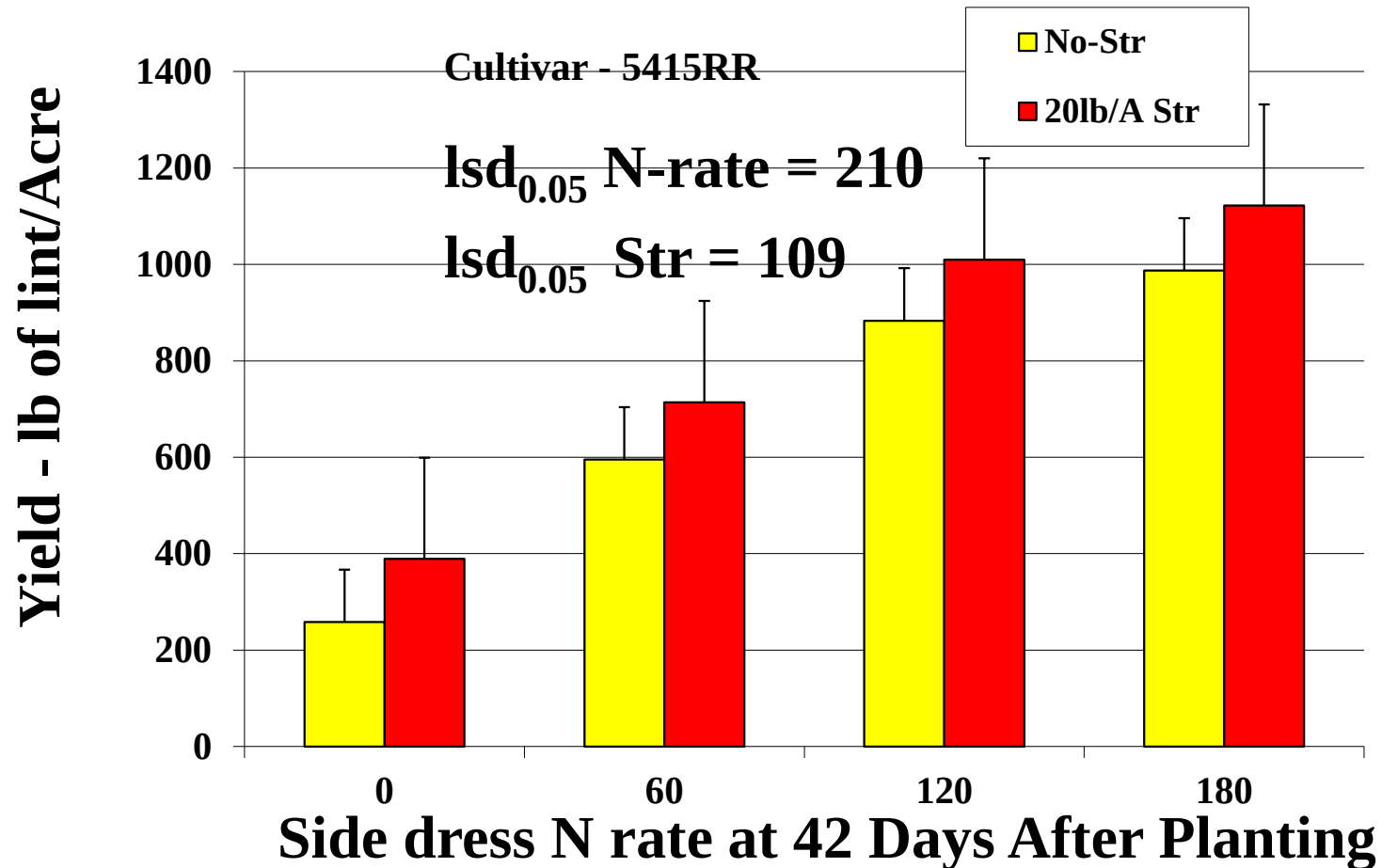


Use of pop-up fertilizer is not encouraged in furrow with seed. Starter fertilizer can be applied 2"x2"

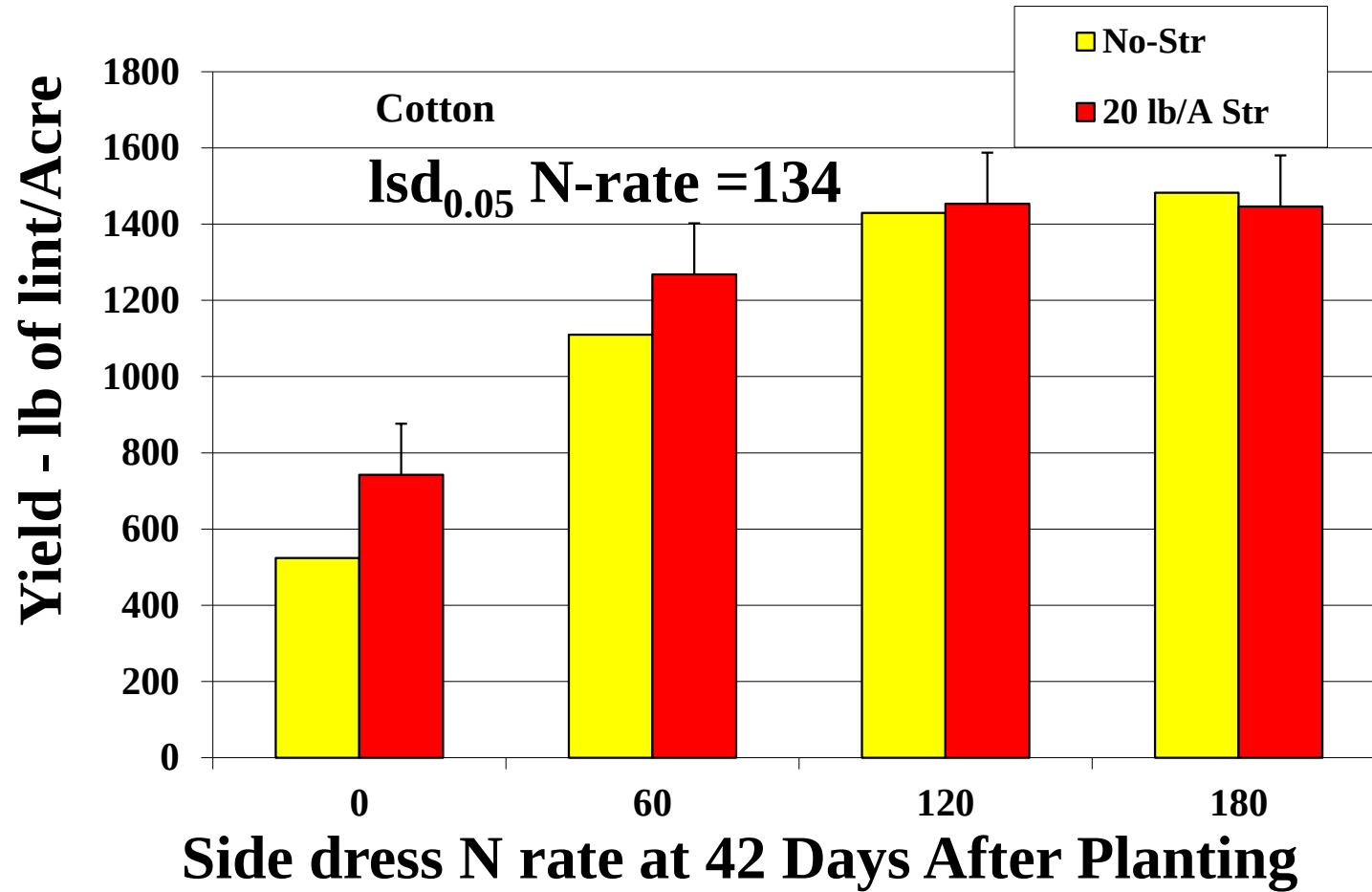


Cotton requires 50-60 lbs N/bale of lint.
In 1980 UF suggested cotton needed 60
lbs/A N total, we were averaging about
500 lbs/A of lint and is about that
double now.

Cotton Yield as Influenced by N Rate and N Starter- Sandy Soil - Cotton



Yield Vs. N Rate and N Starter- Loamy Soil - Cotton



Step 1: Capture Field Variability

Data for a nitrogen calibration strip, Electrical Conductivity (EC)

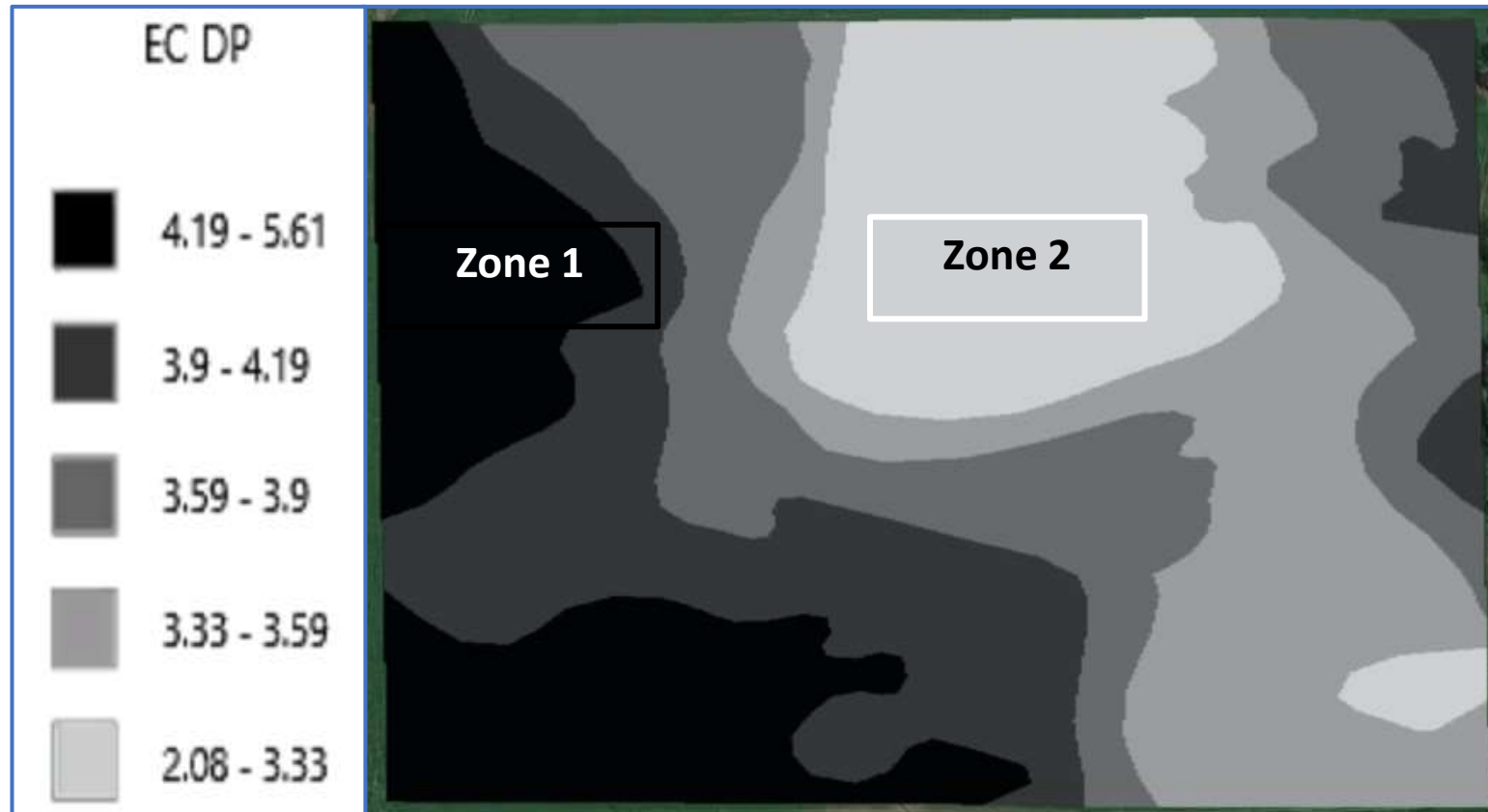
Veris MSP3: GPS enabled device



Ground-truth sampling



Field mapping based on soil electrical conductivity



Step 2: How to determine in-season nitrogen rate?

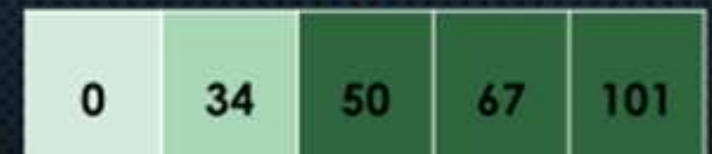
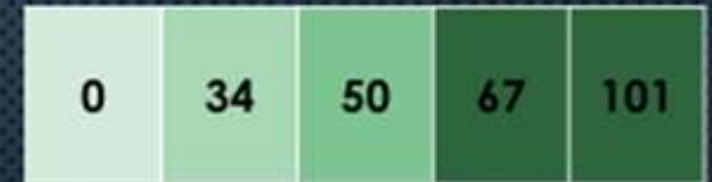
Visual ratings and NDVI

Nitrogen calibration strip

0	34	50	67	101
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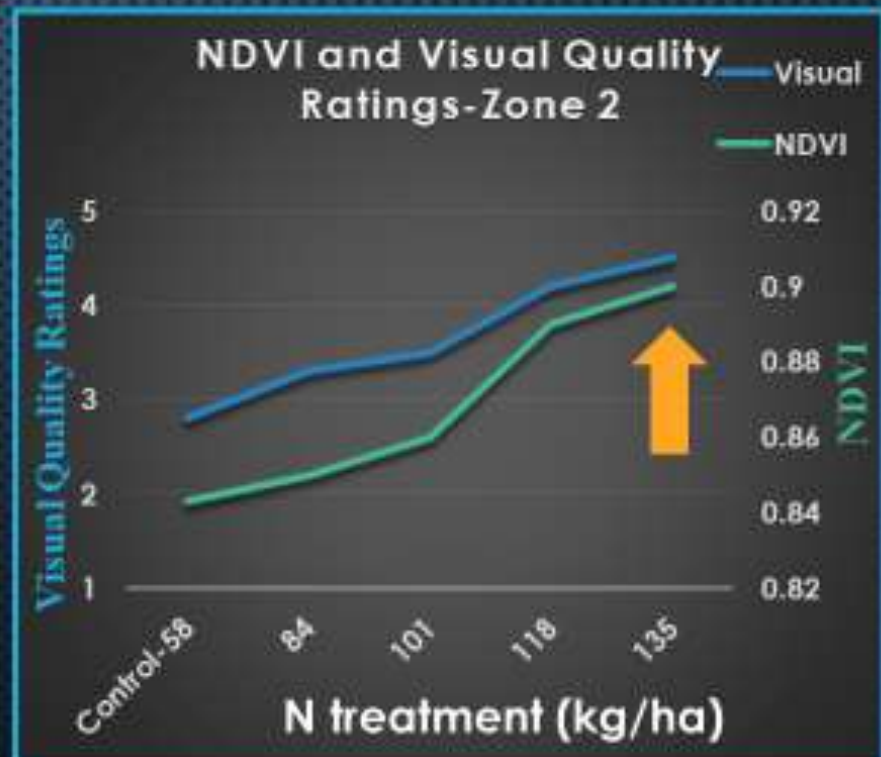
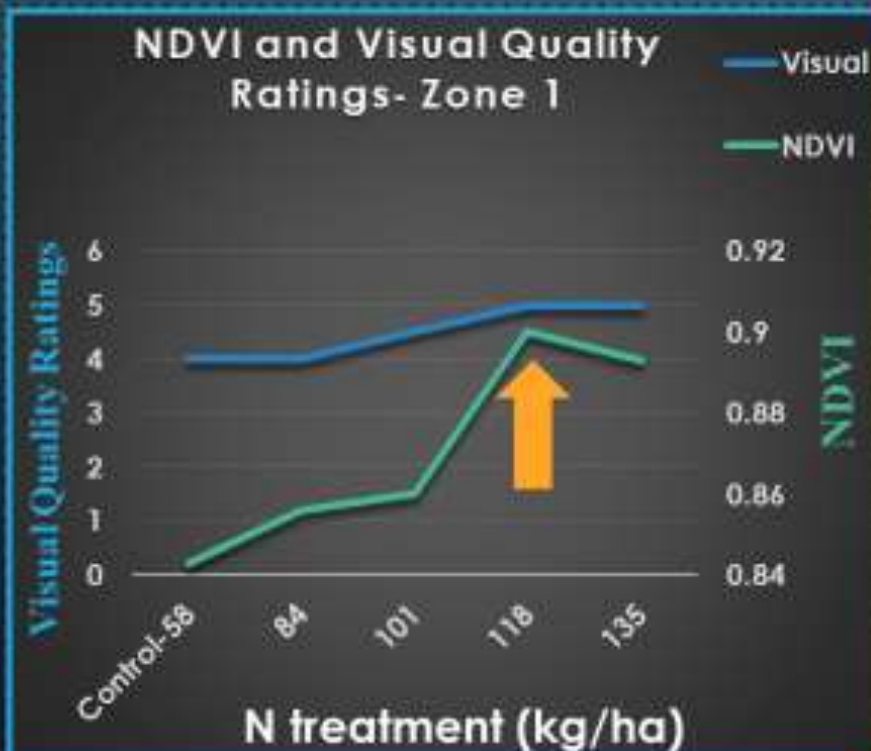
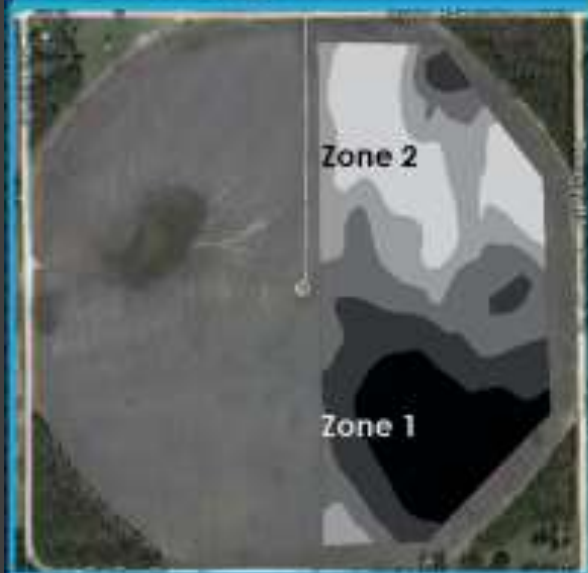
Nitrogen (kg ha^{-1})

Established on May 3, 2019

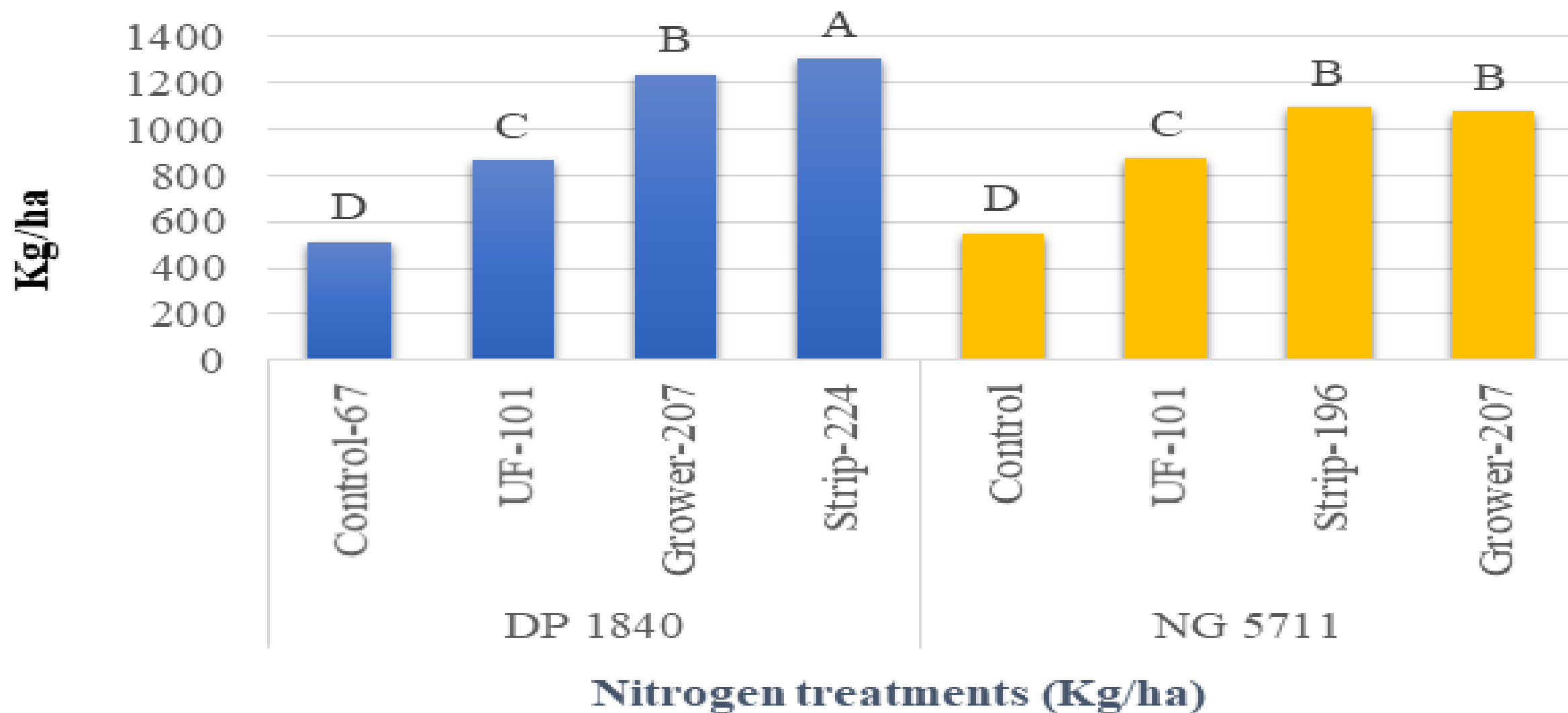


Step 2: How to determine in-season nitrogen rate?

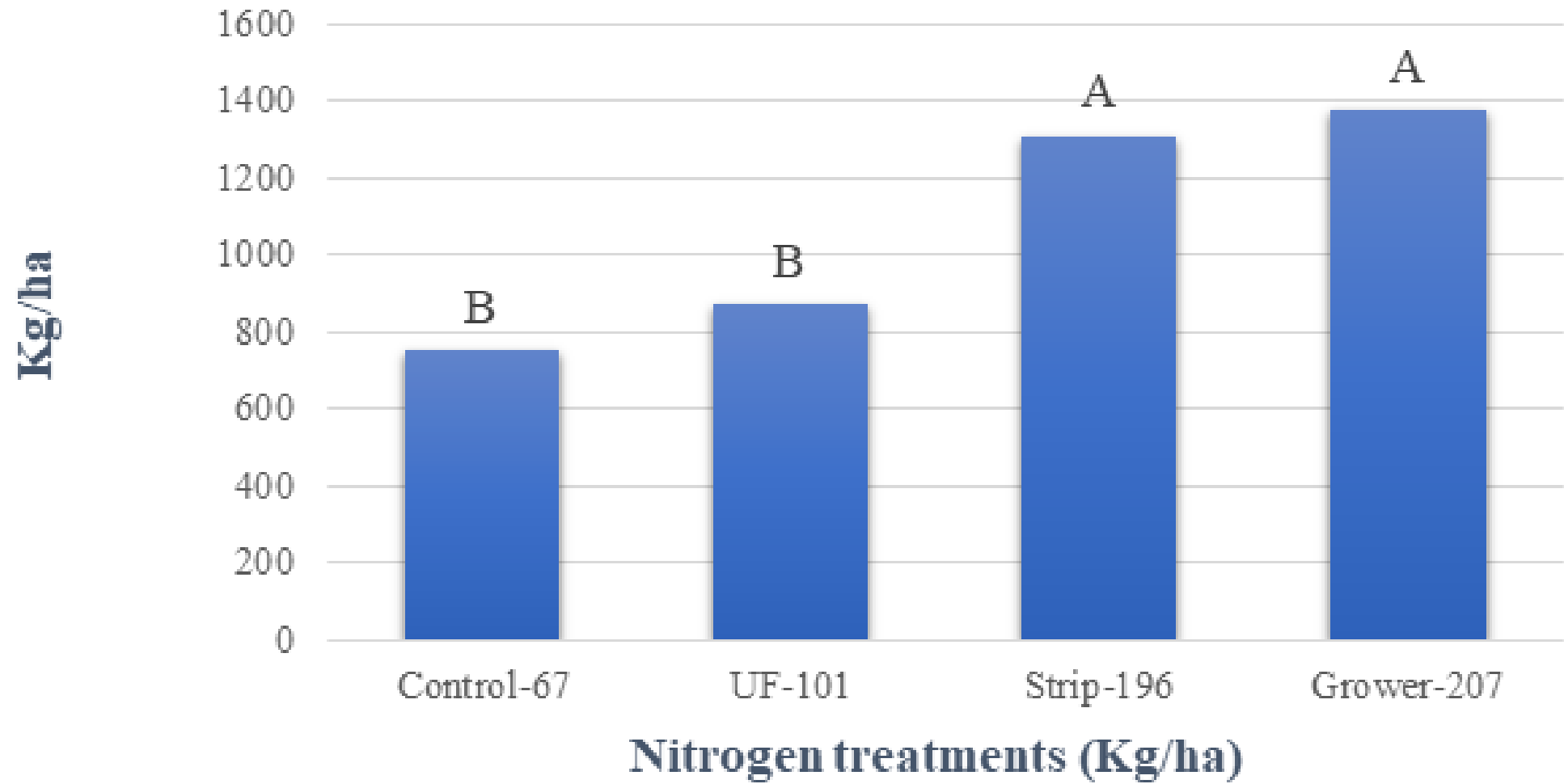
Bull Frog



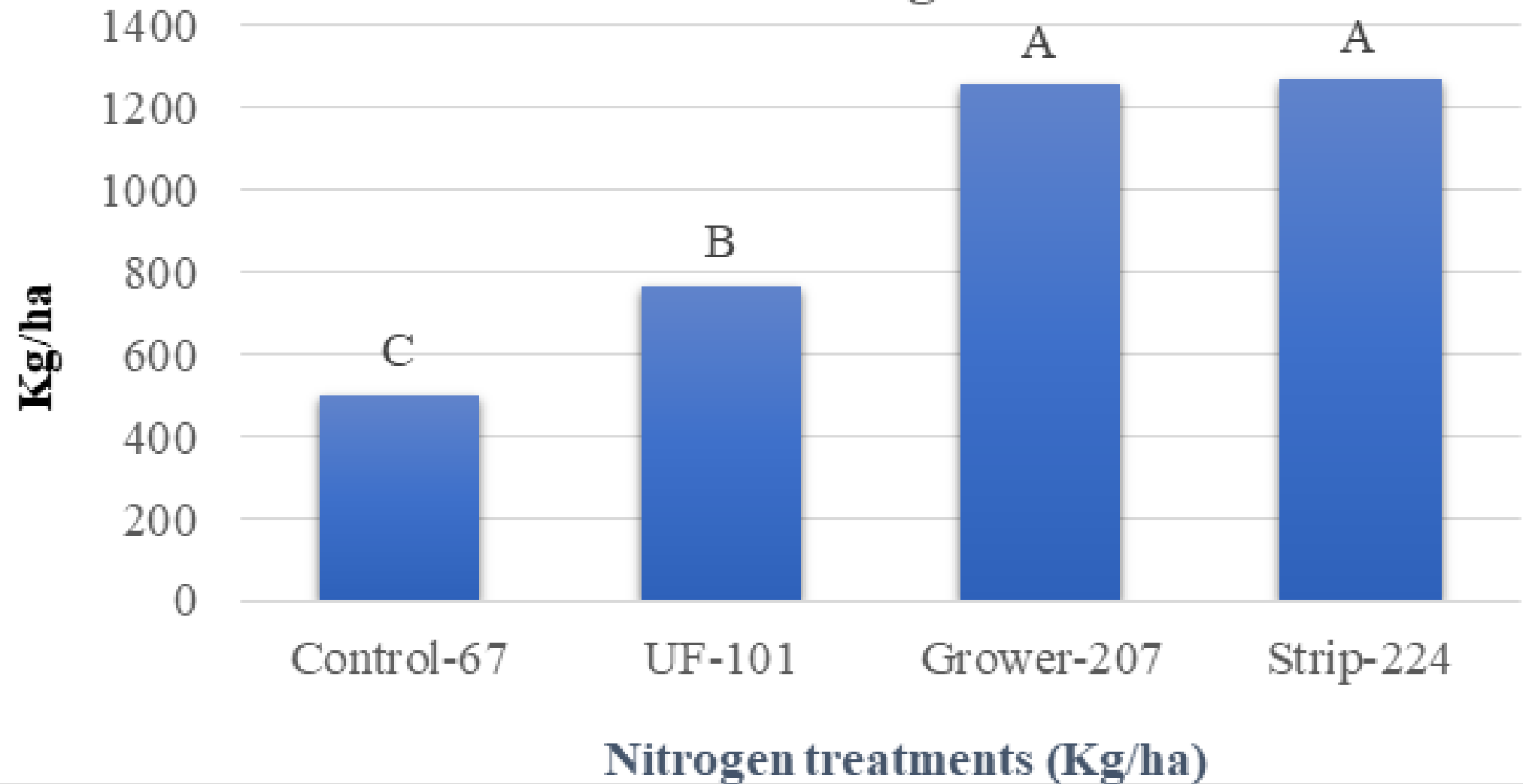
Lint Yield- Hatcher West-Light Zone



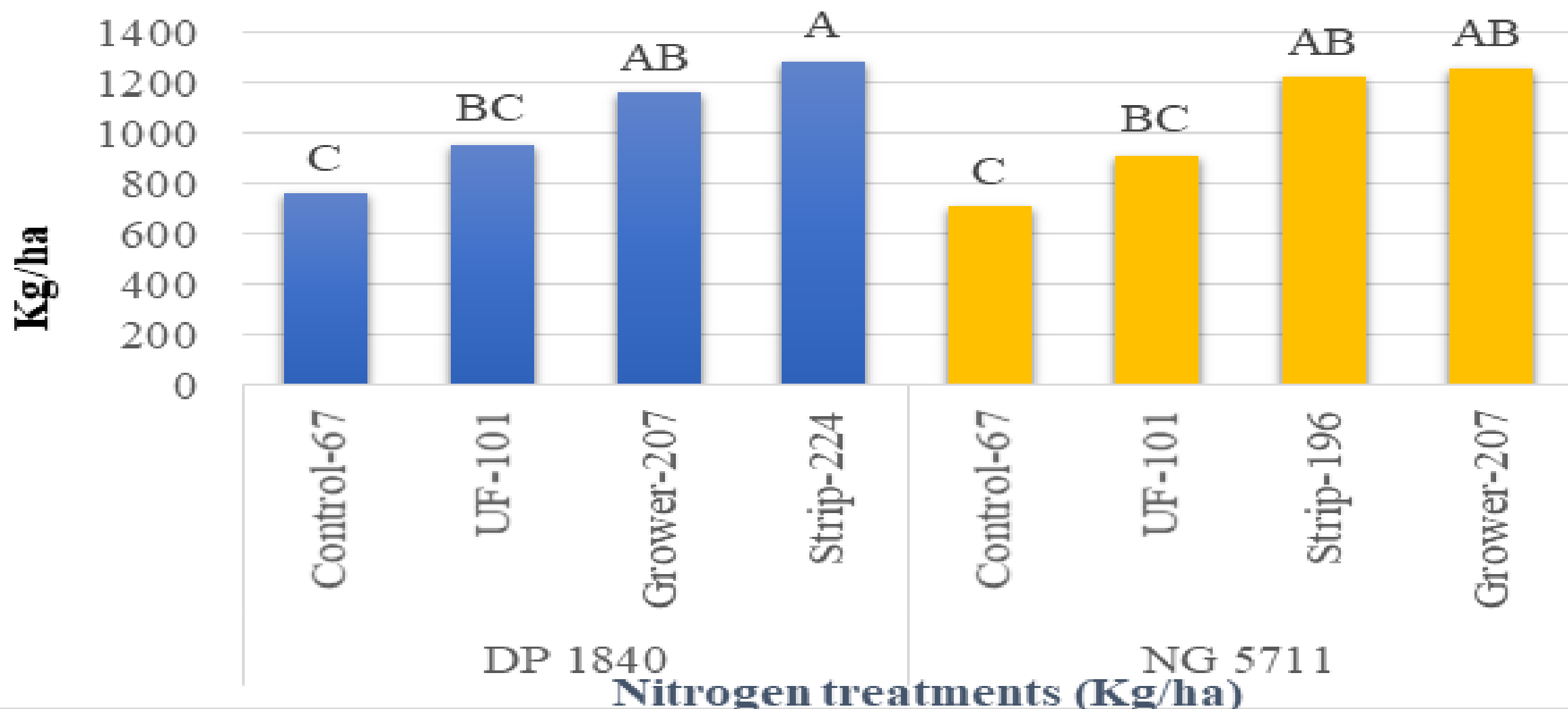
Lint Yield-Hatcher West-Dark Zone



Lint Yield-Grieble-Light Zone

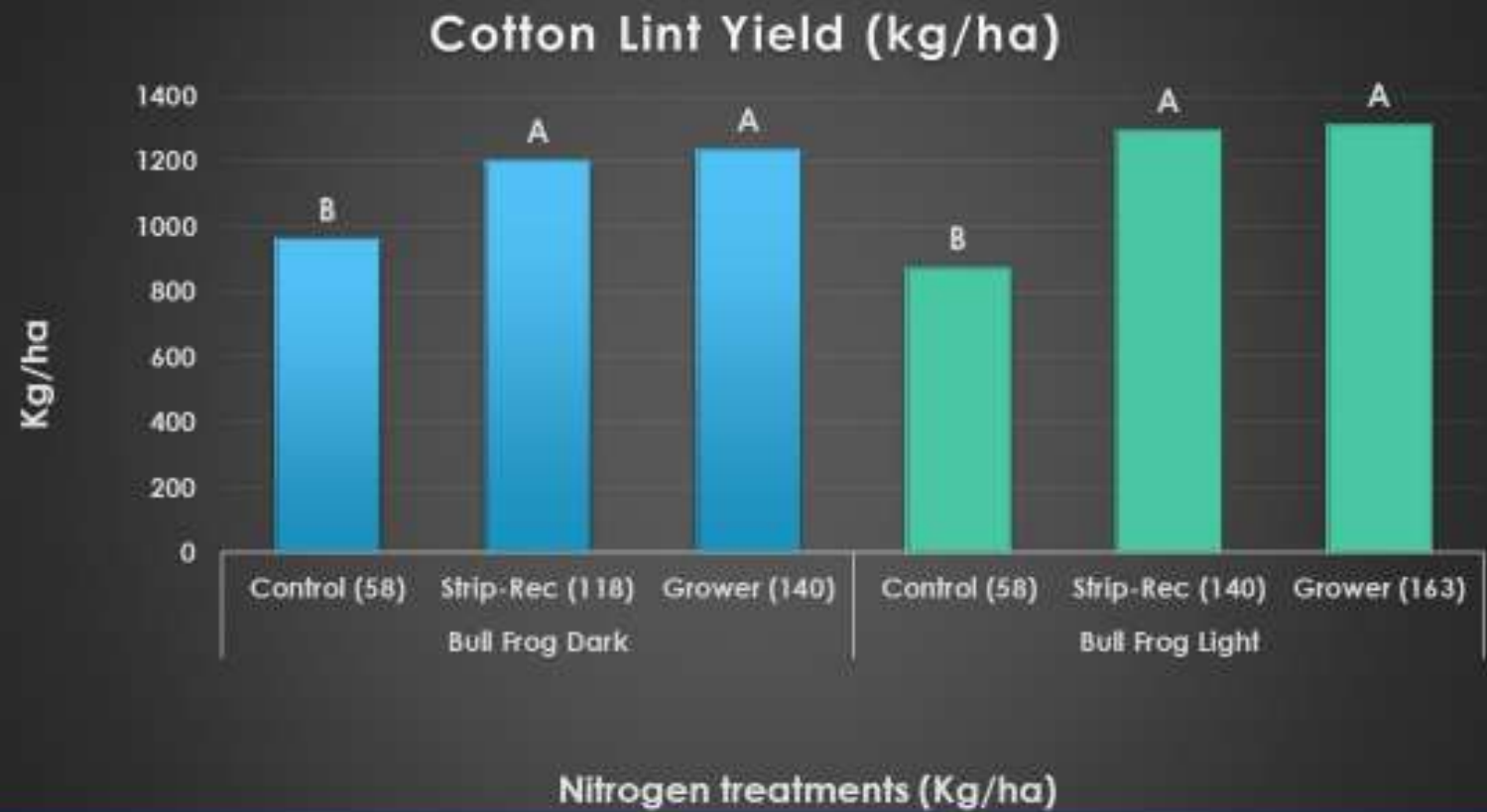


Lint Yield-Grieble-Dark Zone



Results- Bull Frog

Bull Frog

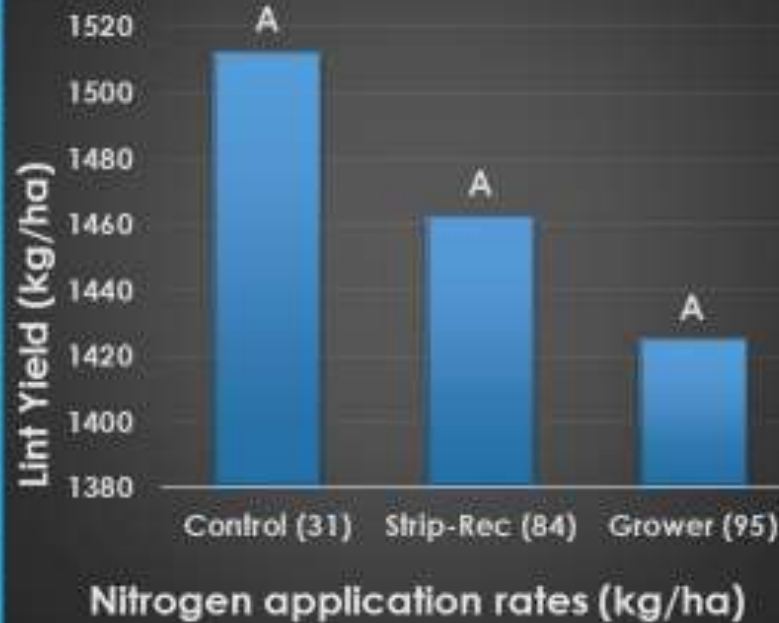


Results-After winter grazing Alford's

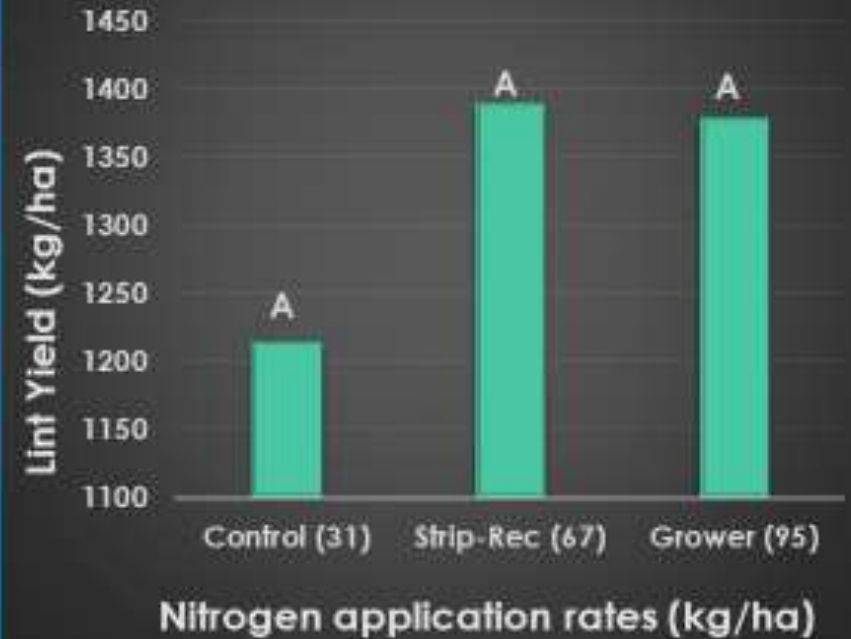
Alford's Place



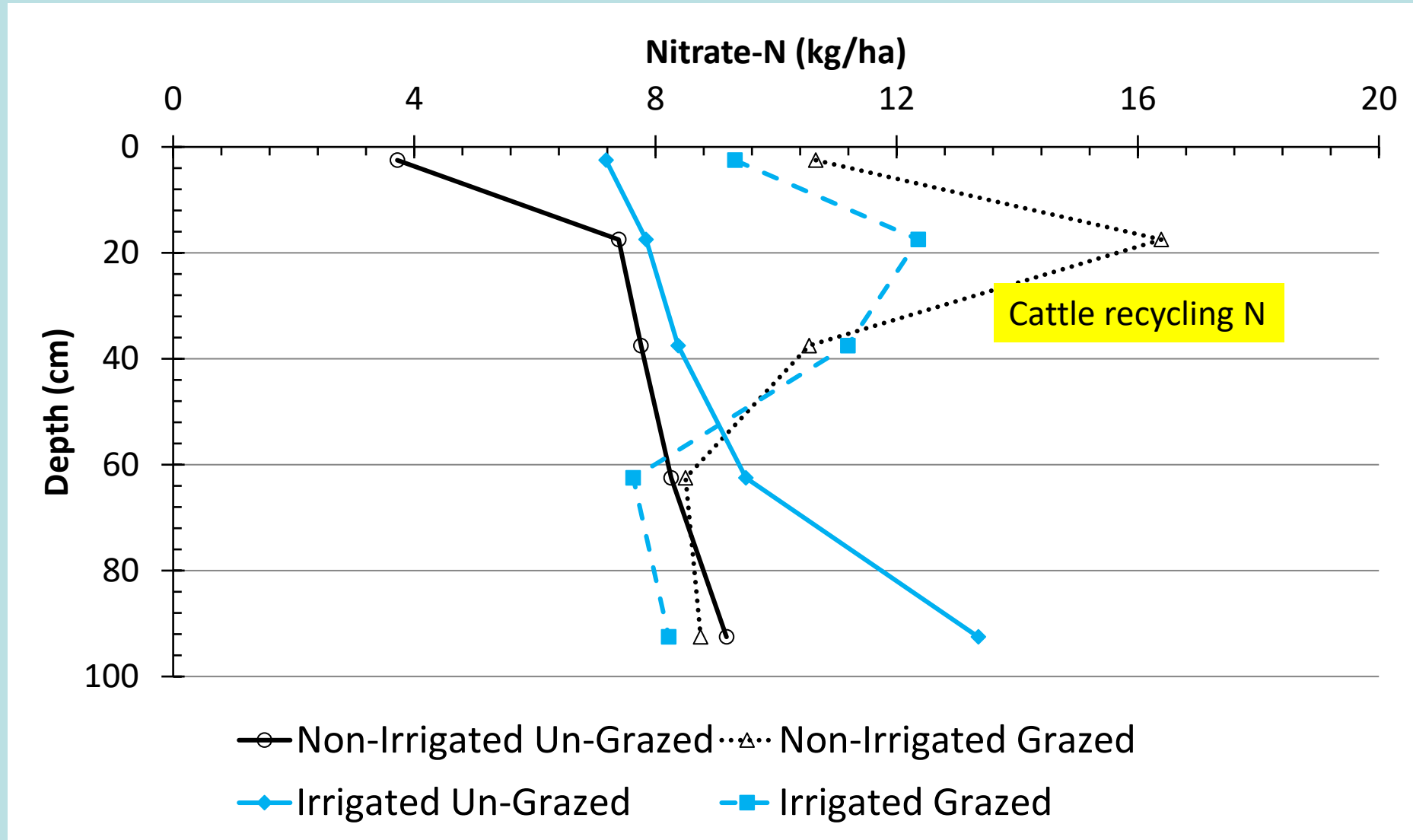
Lint Yield and Turnout
Alford's Place-Dark Zone



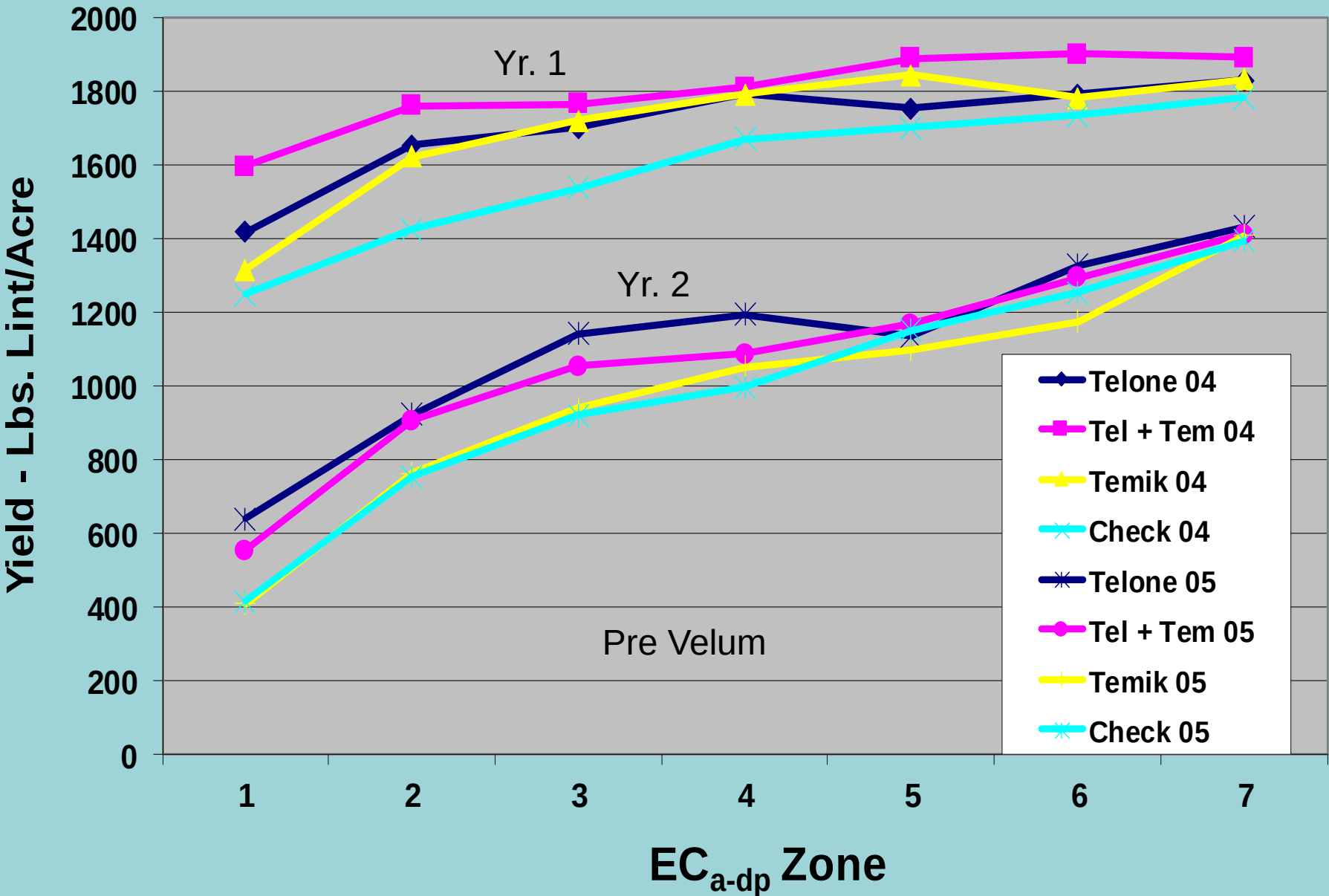
Lint Yield and Turnout
Alford's Place-Light Zone



Nitrate-N in soil profile after winter grazing before cotton, Marianna



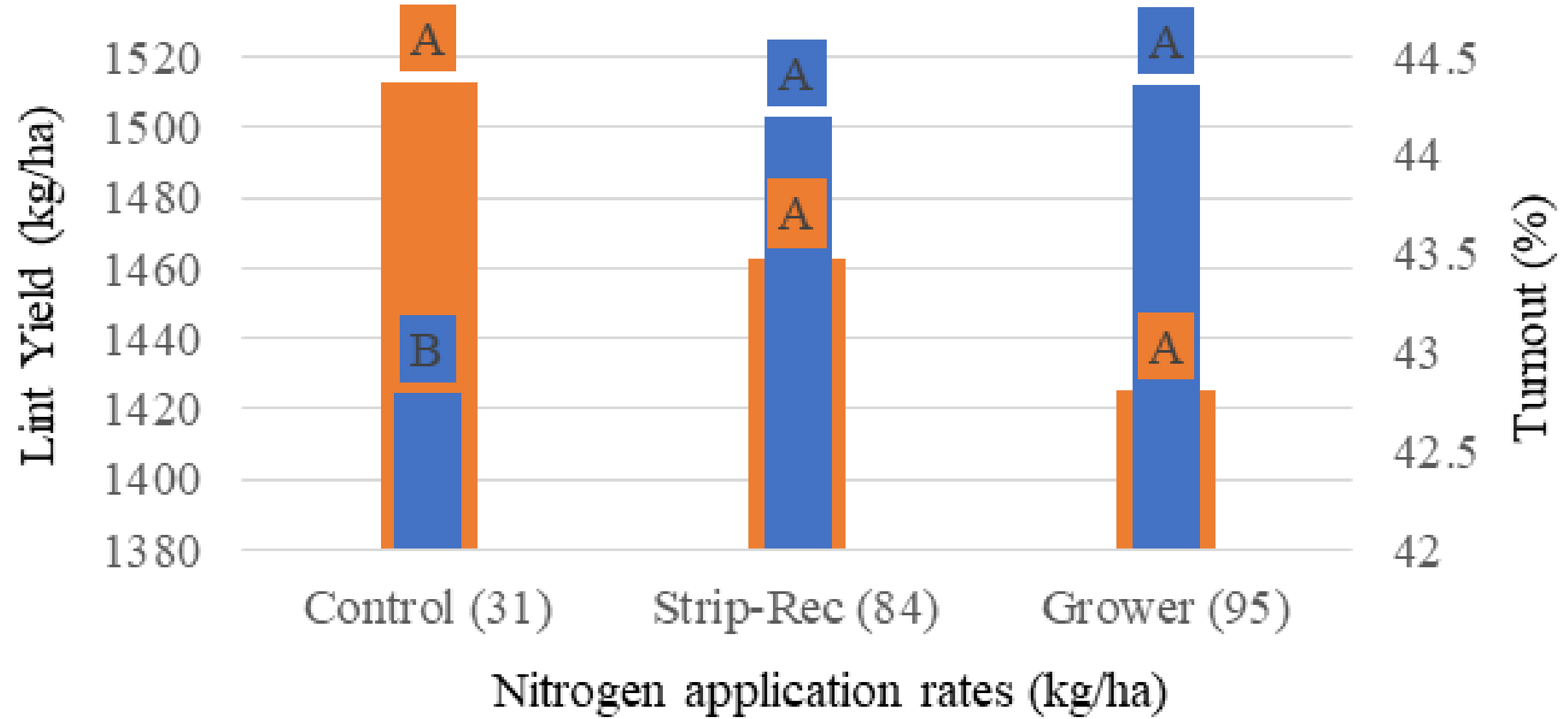
Cotton Yield Nematicide Response in year 1 and 2 on
EC Zones UArk



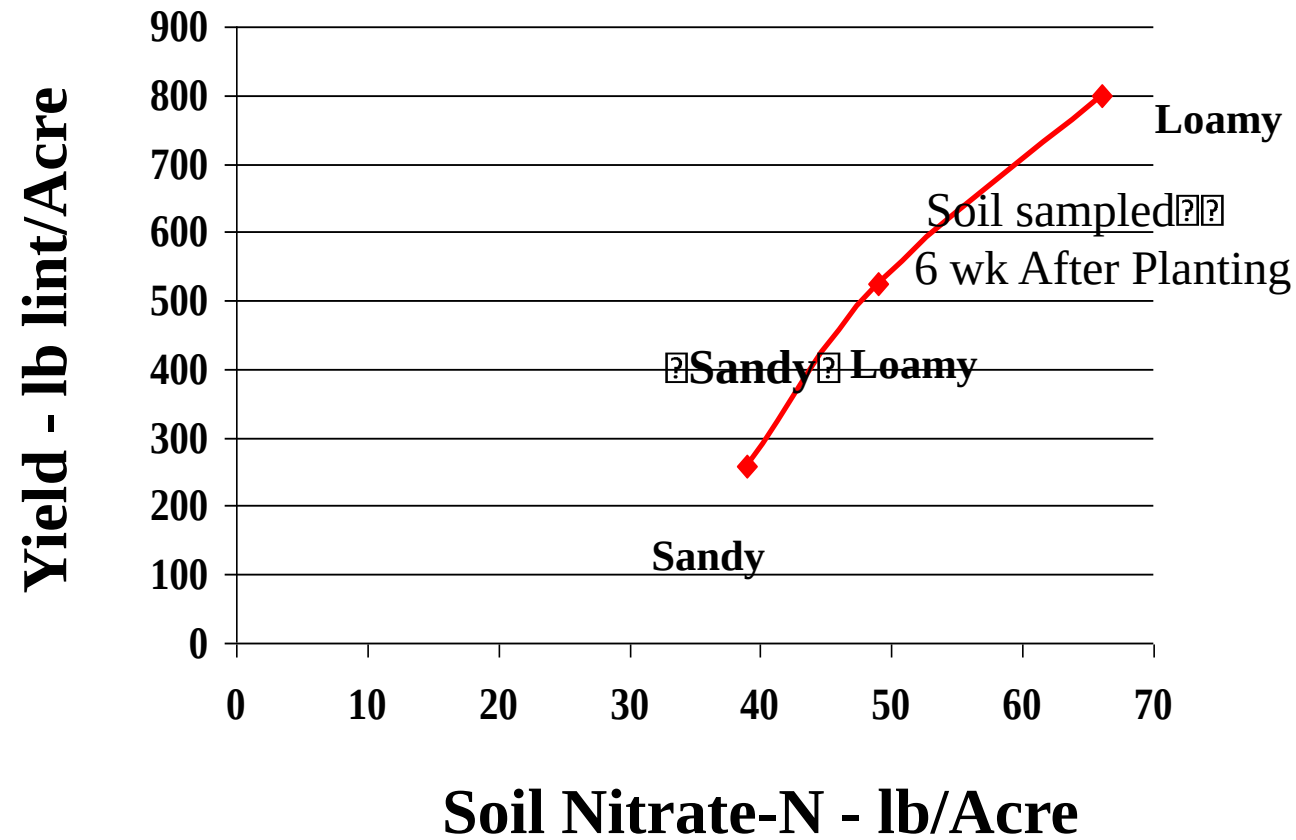
Field	EC range (dS/m) Zone 1-Dark Zone	EC range (dS/m) Zone 2-Light Zone
Hatcher West	0.42-1.25	0.2-0.34
Grieble	1.34-5.13	0.4-0.89
Bull Frog	0.62-1.82	0.39-0.55
Alford's Place	2.75-4.92	1.04-1.92

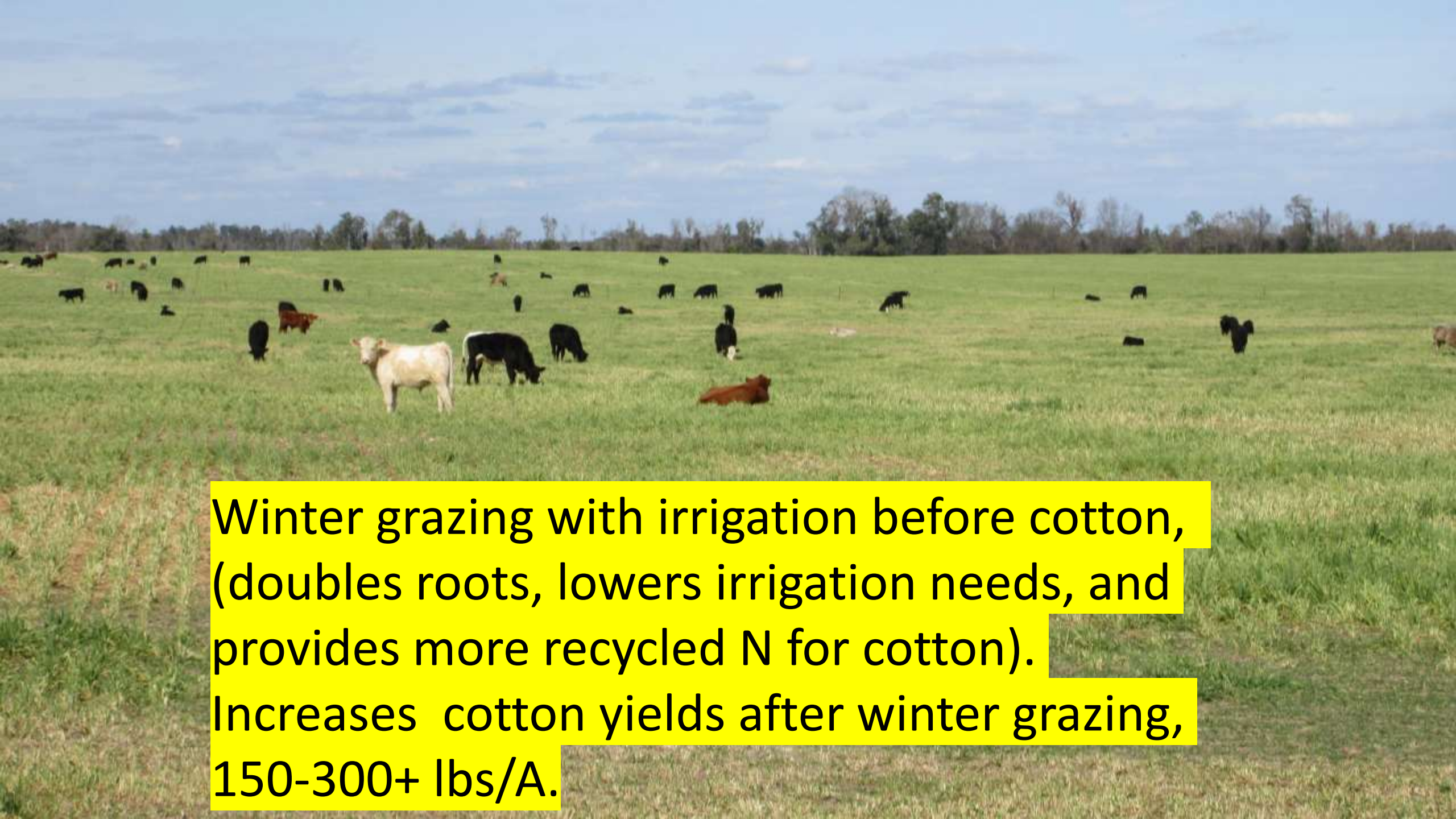
Lint Yield and Turnout
Alford's Place-Dark Zone

Yield
Turnout



Yield Vs. Soil Nitrate-N - Cotton



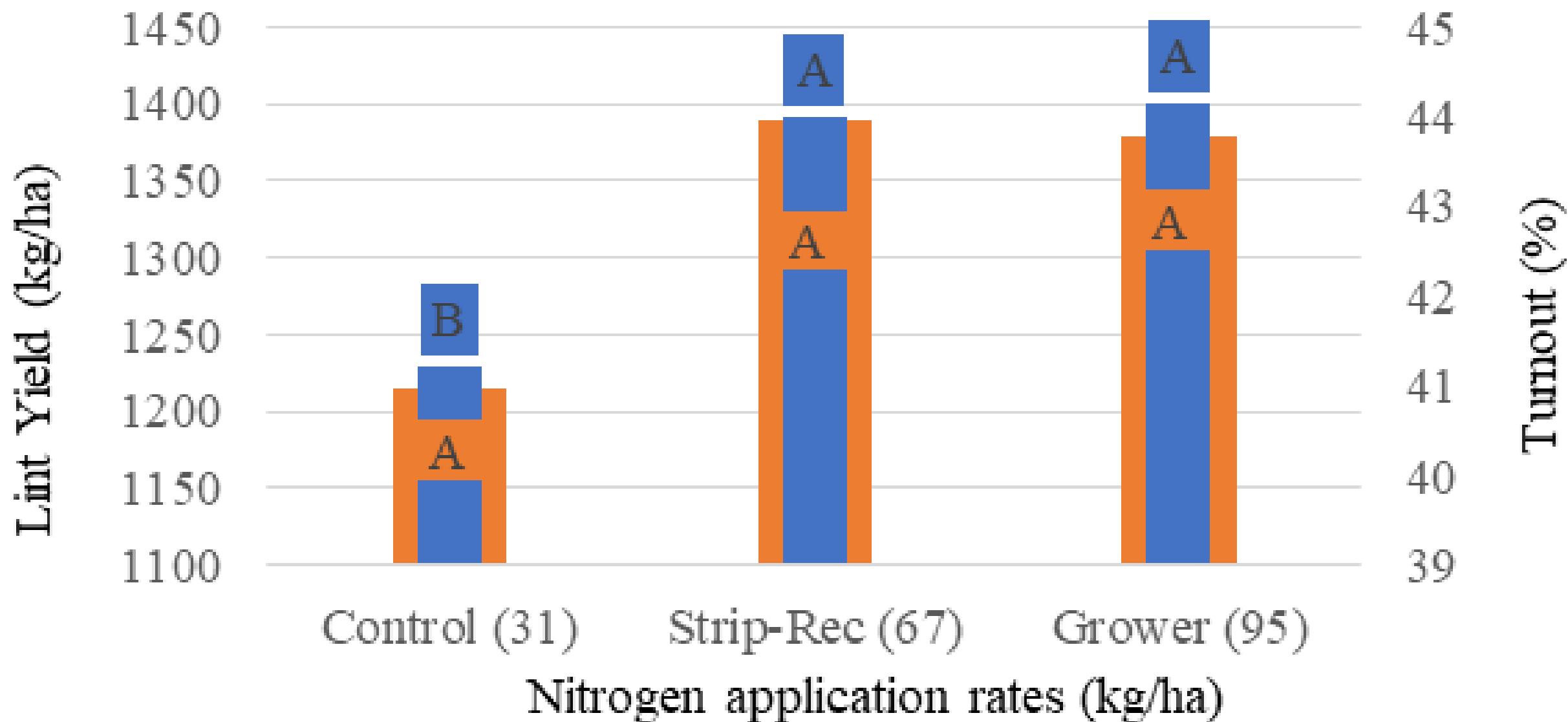


Winter grazing with irrigation before cotton,
(doubles roots, lowers irrigation needs, and
provides more recycled N for cotton).
Increases cotton yields after winter grazing,
150-300+ lbs/A.

Winter grazing

Lint Yield and Turnout Alford's Place-Light Zone

Yield
Turnout



Field	Variety	Winter Grazing	Irrigated/Non- Irrigated	Strip-Rec-N rate Zone 1 (Dark Zone) (kg/ha)	Strip-Rec-N rate Zone 2 (kg/ha)
Hatcher West	DP 1840	No	Irrigated	196	224
	NG 5711	No	Irrigated	196	196
Grieble	DP 1840	No	Irrigated	224	224
	NG 5711	No	Irrigated	196	224
Bull Frog	PHY 545	No	Irrigated	118	134
Alford's Place Grazed	PHY 400	Yes	Non-Irrigated	84	67

A green cotton harvester is shown in the middle of a large field of mature cotton plants. The cotton bolls are white and fluffy, contrasting with the dark brown stems. The harvester is a large, complex machine with a green body and a black auger system. In the background, there is a line of trees under a cloudy sky.

Thank you!

We have a lot to learn! There are many rates for N for different management!