



# 2010 UGA Uniform Cotton Variety Performance Evaluation Program

*Guy D. Collins and Jared R. Whitaker*

*UGA Extension Cotton Agronomists*

*P.O. Box 748, Tifton, GA 31793-0748 PH: 229-386-3006 FAX: 229-386-7308*

The UGA Cotton Variety Performance Evaluation Program was a huge success in 2010, with nearly 20 individual trials throughout Georgia's cotton belt, and additional trials outside of the scope of this program. The success of this program was largely attributable to the dedication of our UGA county Extension agents, our industry leaders (Bayer CropScience, Dow AgroSciences and Monsanto Company), the Georgia Cotton Commission, and cooperating growers. The implementation of this program has undoubtedly helped to address a current need of Georgia cotton growers and will make an incalculable impact in the 2011 growing season and beyond. A special thanks to all who participated in or contributed to this program, including all cooperating growers.

**Program Description:** As the 2010 season approached, it became difficult to effectively evaluate dryland variety performance due to the abnormally wet weather that was experienced throughout most of Georgia during 2009. As variety selection was drastically becoming much more important, due to the loss of DP 555 BR beyond 2010, the UGA Extension Cotton Agronomists decided to establish this variety testing program in 2010. Our industry leaders (Bayer CropScience, Dow AgroSciences and Monsanto Company) were asked to provide three of their best-adapted commercially available varieties for dryland environments in Georgia. This uniform list of CORE varieties was planted in replicated trials in growers' fields throughout Georgia's cotton belt, as arranged by the county agents. Additional non-commercially-available varieties (potential future releases) were also included in a smaller set of trials. The trials were replicated and managed/maintained by the grower with the assistance of participating county Extension agents in order to achieve realistic and statistically sound results. A seed cotton sample of each variety was collected at harvest and ginned at the UGA Microgin to provide a more realistic value for lint percentage and fiber quality. Additionally, the design of this program allowed for a much broader assessment of variety performance across a wide range of environments, ranging from 400 to more than 1,300 lbs/A yield environments in 2010 alone. This was a "first-ever" approach, in that it illustrates how variety performance can change across a range of environments, which provides information on how to place varieties in environments where they will likely perform their best. The results of the 2010 program are provided below. For better interpretation of this data, contact your local county Extension agent.

**Individual Trial Information:** On-farm replicated variety trials were planted in growers' fields in each of the counties listed in Tables 1, 2 and 3. The county agents who implemented and conducted these trials with their local cooperating growers include the following: Brent Allen, Scott Brown, R.J. Byrne, Scott Carlson, Don Clark, Jim Crawford, Brian Cresswell, Shane Curry, Mike Dollar, Phillip Edwards, Mark Frye, Wade Green, Buster Haddock, Rusty Harris, Ray Hicks, Gordon Lee, Mitchell May, Tim Moore, Wade Parker, Peyton Sapp, David Spaid, Bill Tyson, Chris Tyson and Tim Varnedore. Their participation was critical to the success of this program, and their cooperation was truly appreciated.

**Table 1.** County trials that included DP 555 BR in addition to the CORE varieties. These trials are listed by number in ascending order based on the trial average (yield environment). These trial numbers can be correlated to those described in Tables 4 and 5.

Trial Number	County	Environment	Trial Average (lbs/A)
1	Randolph	Dryland	414
2	Twiggs	Dryland	423
3	Jefferson (Godowns)	Dryland	463
4	Jefferson	Dryland	629
5	Screven	Dryland	665
6	Jeff Davis	Dryland	666
7	Candler	Dryland	826
8	Evans	Dryland	858
9	Johnson	Dryland	949
10	Wayne	Dryland	973
11	Burke	Irrigated	1178
12	Effingham	Dryland	1189
13	Jeff Davis	Irrigated	1220
14	Worth	Dryland	1338
15	Colquitt	Irrigated	1339
16	Evans	Irrigated	1385

**Table 2.** County trials that included all of the CORE varieties. These trials are listed by number in ascending order based on the trial average (yield environment). These trial numbers can be correlated to those described in Tables 6 and 7.

Trial Number	County	Environment	Trial Average (lbs/A)
1	Twiggs	Dryland	417
2	Randolph	Dryland	419
3	Jefferson (Godowns)	Dryland	465
4	Jefferson	Dryland	639
5	Screven	Dryland	655
6	Jeff Davis	Dryland	662
7	Candler	Dryland	824
8	Evans	Dryland	842
9	Johnson	Dryland	930
10	Wayne	Dryland	960
11	Burke	Dryland	1113
12	Jenkins	Dryland	1124
13	Burke	Irrigated	1181
14	Effingham	Dryland	1182
15	Jeff Davis	Irrigated	1204
16	Worth	Dryland	1320
17	Colquitt	Irrigated	1327
18	Irwin	Irrigated	1344
19	Evans	Irrigated	1378

**Table 3.** County trials that included additional non-commercial experimental varieties. These trials are listed by number in ascending order based on the trial average (yield environment). These trial numbers can be correlated to those described in Tables 8 and 9.

Trial Number	County	Environment	Trial Average(lbs/A)
1	Twiggs	Dryland	438
2	Wayne	Dryland	1006
3	Wayne	Irrigated	1389

**Table 4.** Lint yields of CORE varieties and DP 555 BR analyzed by location and with locations combined. Individual trials or locations are listed by number in ascending order based on the individual trial average. These trial numbers can be correlated to those described in Table 1. Means within a column (location) that are underlined and in bold font are not significantly different according to Fisher's Protected LSD at P<0.05. The percent of trials that a particular variety was the top yielder, or was no different than the top yielder, is listed in the far right columns.

Variety	Trial Number																Average Yield Over All Trials	Top Yielder	N.S. from Top Yielder	
	Lint Yield (lbs/A)																			% of Trials
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
DP 555 BR	369	<b>473</b>	448	537	<b>749</b>	<b>702</b>	840	<b>1001</b>	<b>1122</b>	<b>1087</b>	1148	<b>1254</b>	<b>1361</b>	<b>1502</b>	<b>1448</b>	1450	<b>968</b>	38	63	
DP 1050 B2RF	421	<b>458</b>	<b>484</b>	<b>705</b>	673	<b>716</b>	<b>924</b>	915	<b>1062</b>	<b>1045</b>	<b>1174</b>	<b>1324</b>	1209	1369	<b>1407</b>	<b>1585</b>	<b>967</b>	25	69	
ST 5458 B2RF	<b>452</b>	<b>409</b>	408	<b>658</b>	<b>689</b>	<b>769</b>	815	795	<b>1038</b>	956	<b>1188</b>	1169	<b>1323</b>	<b>1425</b>	<b>1367</b>	<b>1526</b>	<b>937</b>	6	69	
DP 1048 B2RF	383	<b>433</b>	<b>503</b>	<b>692</b>	<b>742</b>	553	<b>919</b>	857	<b>965</b>	<b>1014</b>	<b>1242</b>	1156	<b>1324</b>	1327	1352	1426	<b>931</b>	13	56	
PHY 375 WRF	<b>472</b>	<b>441</b>	<b>471</b>	<b>693</b>	626	644	836	839	<b>1064</b>	940	<b>1174</b>	1131	1147	1236	<b>1391</b>	1315	901	0	44	
ST 4288 B2F	<b>490</b>	<b>429</b>	<b>486</b>	<b>670</b>	<b>769</b>	<b>709</b>	774	847	<b>784</b>	894	<b>1211</b>	1110	1163	1387	1256	1388	898	13	50	
FM 1740 B2F	389	<b>417</b>	434	<b>619</b>	607	598	824	766	<b>964</b>	948	<b>1211</b>	1199	1197	1248	<b>1455</b>	1262	884	6	38	
DP 0949 B2RF	<b>452</b>	<b>391</b>	448	512	<b>641</b>	610	761	820	<b>878</b>	<b>1012</b>	1107	1122	1209	1390	1304	1393	878	0	31	
PHY 565 WRF	352	<b>405</b>	462	<b>636</b>	601	<b>694</b>	811	864	<b>787</b>	909	<b>1204</b>	<b>1259</b>	1158	1292	1261	1321	876	0	38	
PHY 485 WRF	357	<b>371</b>	<b>485</b>	568	552	663	751	879	<b>824</b>	924	1121	1170	1105	1203	1150	1181	832	0	19	
Trial Average	414	423	463	629	665	666	826	858	949	973	1178	1189	1220	1338	1339	1385				
P-value	0.0008	0.2483	0.0012	0.0404	<.0001	0.0036	0.0022	<.0001	0.1430	0.0020	0.0453	0.0004	<.0001	<.0001	<.0001	<.0001	<.0001			

**Table 5.** Lint yields of CORE varieties and DP 555 BR analyzed by location and with locations combined. Individual trials or locations are listed by number in ascending order based on the individual trial average. These trial numbers can be correlated to those described in Table 1. Means within a column (location) that are underlined and in bold font indicate that that variety was one of the top three performers at that location. The percent of trials that a particular variety was the top yielder, within the top two yielders, or within the top three yielders is listed in the far right columns.

Variety	Trial Number																Average Yield Over All Trials	Top Yielder	Within Top 2	Within Top 3	
	Lint Yield (lbs/A)																				% of Trials
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
DP 555 BR	369	<b>473</b>	448	537	<b>749</b>	<b>702</b>	<b>840</b>	<b>1001</b>	<b>1122</b>	<b>1087</b>	1148	<b>1254</b>	<b>1361</b>	<b>1502</b>	<b>1448</b>	<b>1450</b>	<b>968</b>	38	50	69	
DP 1050 B2RF	421	<b>458</b>	484	<b>705</b>	673	<b>716</b>	<b>924</b>	<b>915</b>	<b>1062</b>	<b>1045</b>	1174	<b>1324</b>	1209	1369	<b>1407</b>	<b>1585</b>	<b>967</b>	25	50	63	
ST 5458 B2RF	452	409	408	658	689	<b>769</b>	815	795	1038	956	1188	1169	<b>1323</b>	<b>1425</b>	1367	<b>1526</b>	<b>937</b>	6	19	25	
DP 1048 B2RF	383	433	<b>503</b>	<b>692</b>	<b>742</b>	553	<b>919</b>	857	965	<b>1014</b>	<b>1242</b>	1156	<b>1324</b>	1327	1352	1426	931	13	25	44	
PHY 375 WRF	<b>472</b>	<b>441</b>	471	<b>693</b>	626	644	836	839	<b>1064</b>	940	1174	1131	1147	1236	1391	1315	901	0	13	19	
ST 4288 B2F	<b>490</b>	429	<b>486</b>	670	<b>769</b>	<b>709</b>	774	847	784	894	<b>1211</b>	1110	1163	1387	1256	1388	898	13	19	31	
FM 1740 B2F	389	417	434	619	607	598	824	766	964	948	<b>1211</b>	1199	1197	1248	<b>1455</b>	1262	884	6	13	13	
DP 0949 B2RF	<b>452</b>	391	448	512	641	610	761	820	878	1012	1107	1122	1209	<b>1390</b>	1304	1393	878	0	0	19	
PHY 565 WRF	352	405	462	636	601	694	811	864	787	909	1204	1259	1158	1292	1261	1321	876	0	6	6	
PHY 485 WRF	357	371	<b>485</b>	568	552	663	751	879	<b>824</b>	924	1121	1170	1105	1203	1150	1181	832	0	0	13	
Trial Average	414	423	463	629	665	666	826	858	949	973	1178	1189	1220	1338	1339	1385					

**Table 6.** Lint yields of CORE varieties analyzed by location and with locations combined. Individual trials or locations are listed by number in ascending order based on the individual trial average. These trial numbers can be correlated to those described in Table 2. Means within a column (location) that are underlined and in bold font are not significantly different according to Fisher's Protected LSD at P<0.05. The percent of trials that a particular variety was the top yielder, or was no different than the top yielder, is listed in the far right columns.

Variety	Trial Number																			Average Yield Over All Trials	Top Yielder % of Trials	N.S. from Top Yielder	
	Lint Yield (lbs/A)																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
DP 1050 B2RF	<b>458</b>	421	<b>484</b>	<b>705</b>	673	<b>716</b>	<b>924</b>	<b>915</b>	<b>1062</b>	<b>1045</b>	<b>1131</b>	<b>1369</b>	<b>1174</b>	<b>1324</b>	1209	<b>1369</b>	<b>1407</b>	<b>1533</b>	<b>1585</b>	<b>1027</b>	47	84	
ST 5458 B2RF	<b>409</b>	<b>452</b>	408	<b>658</b>	689	<b>769</b>	815	795	<b>1038</b>	956	<b>1189</b>	<b>1231</b>	<b>1188</b>	1169	<b>1323</b>	<b>1425</b>	<b>1367</b>	1325	<b>1526</b>	<b>986</b>	11	63	
DP 1048 B2RF	<b>433</b>	383	<b>503</b>	<b>692</b>	<b>742</b>	553	<b>919</b>	857	<b>965</b>	<b>1014</b>	<b>1171</b>	<b>1085</b>	<b>1242</b>	1156	<b>1324</b>	1327	<b>1352</b>	<b>1482</b>	1426	980	16	68	
PHY 375 WRF	<b>441</b>	<b>472</b>	<b>471</b>	<b>693</b>	626	644	836	839	<b>1064</b>	940	<b>1094</b>	<b>1123</b>	<b>1174</b>	1131	1147	1236	<b>1391</b>	1276	1315	943	5	47	
FM 1740 B2F	<b>417</b>	389	434	<b>619</b>	607	598	824	766	<b>964</b>	948	<b>1191</b>	<b>1049</b>	<b>1211</b>	1199	1197	1248	<b>1455</b>	1350	1262	933	5	37	
PHY 565 WRF	<b>405</b>	352	462	<b>636</b>	601	<b>694</b>	811	<b>864</b>	<b>787</b>	909	<b>1202</b>	<b>1073</b>	<b>1204</b>	<b>1259</b>	1158	1292	1261	<b>1373</b>	1321	930	5	53	
DP 0949 B2RF	<b>391</b>	<b>452</b>	448	<b>512</b>	<b>641</b>	610	761	820	<b>878</b>	<b>1012</b>	<b>1069</b>	<b>1165</b>	<b>1107</b>	1122	1209	<b>1390</b>	1304	1257	1393	923	0	53	
ST 4288 B2F	<b>429</b>	<b>490</b>	<b>486</b>	<b>670</b>	<b>769</b>	<b>709</b>	774	847	<b>784</b>	894	956	<b>1000</b>	<b>1211</b>	1110	1163	<b>1387</b>	1256	1195	1388	922	11	53	
PHY 485 WRF	<b>371</b>	357	<b>485</b>	<b>568</b>	552	663	751	<b>879</b>	<b>824</b>	924	1016	<b>1018</b>	<b>1121</b>	1170	1105	1203	1150	1307	1181	876	0	37	
Trial Average	417	419	465	639	655	662	824	842	930	960	1113	1124	1181	1182	1204	1320	1327	1344	1378				
P-value	0.3505	0.0004	0.0005	0.0930	<.0001	0.0060	0.0020	0.0019	0.1601	0.0183	0.0389	0.2616	0.0566	0.0004	<.0001	0.0003	0.0004	0.0093	<.0001	<.0001			

**Table 7.** Lint yields of CORE varieties analyzed by location and with locations combined. Individual trials or locations are listed by number in ascending order based on the individual trial average. These trial numbers can be correlated to those described in Table 2. Means within a column (location) that are underlined and in bold font indicate that that variety was one of the top three performers at that location. The percent of trials that a particular variety was the top yielder, within the top two yielders, or within the top three yielders is listed in the far right columns.

Variety	Trial Number																			Average Yield Over All Trials	Top Yielder % of Trials	N.S. from Top Yielder
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
	Lint Yield (lbs/A)																					
DP 1050 B2RF	<b>458</b>	421	484	<b>705</b>	673	<b>716</b>	<b>924</b>	<b>915</b>	<b>1062</b>	<b>1045</b>	1131	<b>1369</b>	1174	<b>1324</b>	<b>1209</b>	1369	<b>1407</b>	<b>1533</b>	<b>1585</b>	<b>1027</b>	47	84
ST 5458 B2RF	409	452	408	658	<b>689</b>	<b>769</b>	815	795	<b>1038</b>	956	<b>1189</b>	<b>1231</b>	1188	1169	<b>1323</b>	<b>1425</b>	1367	1325	<b>1526</b>	<b>986</b>	11	63
DP 1048 B2RF	<b>433</b>	383	<b>503</b>	<b>692</b>	<b>742</b>	553	<b>919</b>	857	965	<b>1014</b>	1171	1085	<b>1242</b>	1156	<b>1324</b>	1327	1352	<b>1482</b>	<b>1426</b>	<b>980</b>	16	68
PHY 375 WRF	<b>441</b>	<b>472</b>	471	<b>693</b>	626	644	<b>836</b>	839	<b>1064</b>	940	1094	1123	1174	1131	1147	1236	<b>1391</b>	1276	1315	943	5	47
FM 1740 B2F	417	389	434	619	607	598	824	766	964	948	<b>1191</b>	1049	<b>1211</b>	<b>1199</b>	1197	1248	<b>1455</b>	1350	1262	933	5	37
PHY 565 WRF	405	352	462	636	601	694	811	<b>864</b>	787	909	<b>1202</b>	1073	1204	<b>1259</b>	1158	1292	1261	<b>1373</b>	1321	930	5	53
DP 0949 B2RF	391	<b>452</b>	448	512	641	610	761	820	878	<b>1012</b>	1069	<b>1165</b>	1107	1122	1209	<b>1390</b>	1304	1257	1393	923	0	53
ST 4288 B2F	429	<b>490</b>	<b>486</b>	670	<b>769</b>	<b>709</b>	774	847	784	894	956	1000	<b>1211</b>	1110	1163	<b>1387</b>	1256	1195	1388	922	11	53
PHY 485 WRF	371	357	<b>485</b>	568	552	663	751	<b>879</b>	824	924	1016	1018	1121	1170	1105	1203	1150	1307	1181	876	0	37
Trial Average	417	419	465	639	655	662	824	842	930	960	1113	1124	1181	1182	1204	1320	1327	1344	1378			
P-value	0.3505	0.0004	0.0005	0.0930	<.0001	0.0060	0.0020	0.0019	0.1601	0.0183	0.0389	0.2616	0.0566	0.0004	<.0001	0.0003	0.0004	0.0093	<.0001	<.0001		

**Table 8.** Lint yields of Experimental varieties analyzed by location and with locations combined. Individual trials or locations are listed by number in ascending order based on the individual trial average. These trial numbers can be correlated to those described in Table 3. Means within a column (location) that are underlined and in bold font are not significantly different according to Fisher's Protected LSD at P<0.05. The percent of trials that a particular variety was the top yielder, or was no different than the top yielder, is listed in the far right columns.

Variety	Trial Number			Average Yield Over All Trials	Top Yielder	N.S. from Top Yielder
	1	2	3			
	Lint Yield (lbs/A)					
DP 1252 B2RF	<b>468</b>	<b>1168</b>	<b>1607</b>	<b>1081</b>	67	100
DP 1137 B2RF	<b>470</b>	<b>1120</b>	<b>1485</b>	<b>1025</b>	0	100
DP 1050 B2RF	<b>458</b>	1045	<b>1533</b>	<b>1012</b>	0	67
DP 1133 B2RF	<b>501</b>	1058	1394	<b>984</b>	33	33
DP 1048 B2RF	<b>433</b>	1014	<b>1482</b>	977	0	67
FM 1740 B2F	<b>417</b>	948	1350	905	0	33
ST 5458 B2RF	<b>409</b>	956	1325	896	0	33
PHY 565 WRF	<b>405</b>	909	1373	895	0	33
DP 0949 B2RF	<b>391</b>	1012	1257	887	0	33
PHY 375 WRF	<b>441</b>	940	1276	886	0	33
ST 4288 B2F	<b>429</b>	894	1195	840	0	33
Trial Average	438	1006	1389			
P-value	0.0502	0.0001	0.0005	0.0009		

**Table 9.** Lint yields of Experimental varieties analyzed by location and with locations combined. Individual trials or locations are listed by number in ascending order based on the individual trial average. These trial numbers can be correlated to those described in Table 3. Means within a column (location) that are underlined and in bold font indicate that that variety was one of the top three performers at that location. The percent of trials that a particular variety was the top yielder, within the top two yielders, or within the top three yielders is listed in the far right columns.

Variety	Trial Number			Average Yield Over All Trials	Top Yielder	Within Top 2		Within Top 3
	1	2	3			% of Trials		
	Lint Yield (Lbs/A)							
DP 10RR052B2R2	<b>468</b>	<u>1168</u>	<u>1607</u>	<u>1081</u>	67	67	100	
DP 1137 B2RF	<b>470</b>	<u>1120</u>	<u>1485</u>	<b>1025</b>	0	67	100	
DP 1050 B2RF	458	1045	<u>1533</u>	<u>1012</u>	0	33	33	
DP 1133 B2RF	<b>501</b>	<b>1058</b>	1394	984	33	33	67	
DP 1048 B2RF	433	1014	1482	977	0	0	0	
FM 1740 B2F	417	948	1350	905	0	0	0	
ST 5458 B2RF	409	956	1325	896	0	0	0	
PHY 565 WRF	405	909	1373	895	0	0	0	
DP 0949 B2RF	391	1012	1257	887	0	0	0	
PHY 375 WRF	441	940	1276	886	0	0	0	
ST 4288 B2F	429	894	1195	840	0	0	0	
Trial Average	438	1006	1389					

**Interpretation of Results:** There are two methods of data analysis presented in the tables above (observing non-significance from the top yielder, or observing the top three performing varieties within a particular location). Keep in mind that it is always better to observe variety performance with as much data, and with as many years of data, as possible. It is difficult, and unwise, to make variety selections based on information derived from a single trial or only a few trials. Naturally, growers want to see which varieties performed best at the location(s) nearest to their farm. However, it is important to keep in mind that rainfall and weather variation from field-to-field and year-to-year can be quite large. An individual variety's performance can vary greatly between trials and can usually be related to rainfall or other environmental factors. Therefore, observing variety performance for consistency and stability over a range of environments will usually provide growers with better information from which to make their selections. There is a very wide range of environments illustrated in the tables above, which provides a much more robust approach when analyzing variety performance.

When observing the data illustrated in the tables above, there are several things to consider. An initial response may be to look at overall average yields across all trials. This may be an indicator of overall performance; however, there is a wide range of yield environments, even among the dryland environments in 2010. As we move away from our one-size-fits-all variety, DP 555 BR, it is time to begin considering the placement of varieties in environments that will maximize yield potential of those varieties. To begin with, look for varieties that perform well over all locations, then look for the varieties that consistently performed well (varieties that were non-significant or no different from the highest yielder, or were in the top three performers across a wide range of yield environments). This will provide some idea of consistency and stability across a range of environments.

Another consideration for variety selection is the variation in average yield potential within one's own operation. Most growers have some fields that are very productive, which are usually irrigated (with little to no constraints for timely water application) and have better soils. These same growers may also have some fields that are less productive on average (sandier soils, dryland, etc). This is where variety placement becomes more important. In this case, it is wise to observe varieties that perform well overall, but also to observe the type of yield environment where these varieties performed well (non-significant from the top yielder, or within the top three performing varieties). Some varieties may be decent performers in terms of average yield over all locations, but may only have performed well in the higher yield environments. This is an indicator that these varieties probably will perform better when placed in irrigated fields and/or on better soils, but not in marginal soils or dryland fields. The same approach applies to dryland situations. Some varieties perform better than others when placed in dryland or stressed environments, but these same varieties may not be the best ones for irrigated or higher yield environments. Your county agent is a valuable resource for variety selection, and can help you navigate this process.