PHY 310 R, PHY 410 R AND PHY 510 R: NEW UPLAND ROUNDUP READY VARIETIES FROM PHYTOGEN

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Abstract

Phytogen Seed Company will have three new Roundup Ready® cotton varieties available to growers in the Mid-South and Southeast in 2005. PHY310R, PHY410R and PHY510R were developed by traditional backcross breeding with field selection in the area of adaptation. PHY310R is an early maturity, semi-smooth leaf variety that is broadly adapted across the Mid-South and Southeast. An outstanding feature of PHY310R is a very high turnout that contributes to exceptional lint yield. PHY410R is an early-mid maturity, hairy leaf variety with improved micronaire that is broadly adapted across the Mid-South and Southeast. PHY510R is a mid-full maturity, smooth leaf variety with excellent staple, micronaire and strength that is adapted to the Deep South and lower Southeast. These new varieties cover a wide maturity range and should meet the need by growers for additional choices in Roundup Ready® varieties to plant.

Introduction

In 2000, Phytogen Seed Company entered the Southern cottonseed market with four in-licensed conventional varieties – PSC355, PSC952, HS12 and GA161. PHY410R and PHY510R were developed by introgressing the Roundup Ready® trait into PSC355 and HS12, respectively, while PHY310R was developed from a new proprietary germplasm line.

Materials and Methods

The data were summarized from a database that included available university and Phytogen small plot trials as well as strip trials conducted by Dow AgroSciences. Output from the Head-to-Head procedure of Agrobase 21 was converted to a "mean-equivalent" basis for each trait to account for the unequal number of observations for each variety. The overall average percentage that each variety was of a control variety (where ever the two occurred together) was multiplied by the overall mean of that control variety. To minimize the effect of genotype by environment interaction, the mean-equivalent for yield was independently estimated using both PHY410R and either PHY310R or PHY510R as control varieties. Either PHY410R or PHY510R was the control variety for lint percent and fiber quality data.

PHY410R was evaluated in 63 environments in 2003 and in 80 environments in 2004; however, the yield data from 41 university trials conducted in 2003 were excluded from the analysis due to inadequate plant stand from counter-season grown seed. PHY510R was evaluated in 39 environments in 2003 and in 16 environments in 2004. Limited data was available for PHY310R as it has been evaluated only during 2004 at 28 locations. Data for Roundup Ready® varieties only were analyzed for comparison with these Phytogen varieties.

Results and Discussion

PHY310R
PHY310R was the highest yielding Roundup Ready® variety across all test environments (Table 1). A factor contributing to the exceptional lint yield of PHY310R was its very high lint percent. Although lint percent from hand picked samples is higher than the gin turnout from production fields, the relative differences among varieties are comparable. Normally a small seed is associated with varieties having a high lint percent, but the seed index of

PHY310R was greater than DP432R and only slightly less than ST4793R and DP436R. The staple length of PHY310R (36.1) was greater than ST4793R and SG521R. The micronaire of PHY310R was similar to that of ST4793R in being higher than other varieties. The fiber strength of PHY310R (31.6) was second to only FM960R and the uniformity ratio was second to only PHY410R.

PHY410R

Another new, broadly adapted Roundup Ready® variety from Phytogen is PHY410R. The growth habit, yield and area of adaptation for PHY410R are most similar to ST4793R. PHY410R yielded better than the widely grown varieties ST4793, SG521R and DP436R.

The staple and micronaire of PHY410R (4.5) was equal to the average of varieties tested and better than ST4793R. The strength and uniformity ratio of PHY410R was very similar to PHY310R in being better than varieties other than FM960R.

PHY510R

There was only 80# of lint/acre difference in the mean-equivalent yield of the varieties listed in Table 2. PHY510R yielded slightly more than DP5415R, the most widely planted late maturity Roundup Ready® variety in 2004. The seed size of PHY510R was larger than DP5415R. The staple of PHY510R (36.6) was greater than DP5415R. The micronaire of PHY510R was equal to the average and lower than DP5415R. The strength of the later maturity varieties in Table 2 averaged 32.4 g/tex, while that of the early-mid varieties in Table 1 averaged 30.3 g/tex. The strength of PHY510R was greater than DP5415R and all early-mid maturity varieties except for FM960R.

Table 1. Performance of early and early-mid maturity Roundup Ready varieties.*

	Lint Yield (#/acre)	Lint %	Seed Index (g/100)	HVI			
				Staple (32's)	Mic	T1 (g/tex)	UR (%)
PHY310R	*1393*	*43.0*	*10.1*	*36.1*	*4.6*	*31.6*	*84.6*
ST4686R	1362	41.3	10.5	36.8	4.4	29.7	83.6
DP432R	1359	40.8	9.5	36.3	4.5	30.8	84.5
DP434R	1333	42.2	9.8	37.8	4.2	29.2	84.4
FM960R	1326	40.9	11.7	37.2	4.1	32.9	84.5
PHY410R	*1291*	*39.9*	*10.4*	*36.5*	*4.5*	*31.1*	*84.8*
ST4793R	1283	41.5	10.5	35.3	4.7	30.3	84.0
SG521R	1252	40.4	10.2	35.4	4.5	29.0	84.2
BCG28R	1245	41.2	9.2	36.6	4.7	29.8	83.9
DP436R	1206	36.8	10.5	37.0	4.4	28.9	84.3
Average	1305	40.8	10.2	36.5	4.5	30.3	84.3

* Percent of control from head-to-head comparisons converted to "mean equivalent"

Table 2. Performance of mid-full maturity Roundup Ready varieties.*

	Lint Yield (#/acre)	Lint %	Seed Index (g/100)	HVI			
				Staple (32's)	Mic	T1 (g/tex)	UR (%)
DP5690R	1175	39.3	na	36.2	4.4	33.4	83.9
PHY510R	*1115*	*39.9*	*9.5*	*36.8*	*4.5*	*32.8*	*83.9*
DP5415R	1103	40.7	8.8	36.2	4.6	30.9	84.2
Average	1131	40.0	9.1	36.4	4.5	32.4	84.0

* Percent of control from head-to-head comparisons converted to "mean equivalent"