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**PERFORMANCE OF PHY 410 R AND PHY 470 WR EXPRESSING THE  
 WIDESTRIKE™ INSECT PROTECTION TRAIT IN 2005 STRIP TRIALS**

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**Abstract**

Development of transgenic *Bt* cotton expressing two genes encoding different *Bt* proteins has resulted in varieties which offer season long, broad spectrum control of the major lepidopteran (lep) pests of cotton. WideStrike™ *Insect Protection*, developed by Dow AgroSciences LLC, expresses the insecticidal crystal proteins Cry1F and Cry1Ac from the bacterium *Bacillus thuringiensis* (*Bt*). Cotton genotype GC510 (Acala) was used in the transformations, which allowed for additional selections for improved fiber characteristics.

Small and large plot field trials conducted from 2000 through 2004 demonstrated that the WideStrike trait expressed in the PhytoGen™ varieties PHY 440 W and PHY 470 WR provide high levels of control of tobacco budworm (*Heliothis virescens*[F.]), soybean looper (*Pseudoplusia includens*), cabbage looper (*Trichoplusia ni*), southern armyworm (*Spodoptera eridania*) and fall armyworm (*Spodoptera frugiperda*), as well as good to excellent control of bollworm (*Helicoverpa zea* [Boddie]). These varieties showed high yield potential and very good fiber quality in larger blocks in multiple environments.

Large strip trials (5-20 acre blocks) were conducted in 15 locations from Texas to North Carolina in 2005 to further characterize the efficacy and agronomic performance of the new WideStrike variety PHY 470 WR. The variety PHY 410 R was included in all trials as a non-Bt control, and the WideStrike variety PHY 480 WR was also included in three trials. Cooperators scouted the fields on a regular basis for all insect pests, and insecticide applications were made based on local university recommendations. Data collected in the trials included larval infestations and damage of terminals, squares, flowers and bolls, as well as lint yields and fiber quality (HVI analysis).

Lepidopteran pressure did not develop in five trials. Bollworm populations were light to moderate in nine trials, and fall armyworm populations developed in three trials. Light populations of saltmarsh caterpillar, soybean looper and beet armyworm developed in a Louisiana trial. Low Southern armyworm pressure also occurred in the Fitzgerald, GA trial. The numbers of sprays applied for control of cotton bollworm or fall armyworm are provided in Table 1. Scouting reports for dates of peak lepidopteran infestations for trials with the highest lep pressure are provided in tables 2 through 10.

PHY 410 R was sprayed 1-to-8 times for control of bollworms and/or fall armyworms, while spray thresholds for PHY 470 WR and PHY 480 WR were not reached in 9 of 10 trials. The bollworm action threshold was met in the Perry, GA trial and a lep application was made. The trials demonstrated that varieties expressing the WideStrike trait provide high levels of control of tobacco budworms, fall armyworms and bollworms. The trial in Galion, LA also demonstrated very good activity against soybean loopers, saltmarsh caterpillar and beet armyworm. Low populations of Southern armyworm were reported on PHY 410 R, but not in PHY 470 WR in the Fitzgerald, GA trial.

The PhytoGen cottonseed varieties PHY 410 R, PHY 470 WR and PHY 480 WR showed high yield potential and very good fiber quality in larger blocks in multiple environments (Tables 11 and 12).

PhytoGen cottonseed varieties expressing the WideStrike trait will be offered commercially in 2006. These include PHY 370 WR, PHY 440 W, PHY 470 WR, PHY 480 WR, PHY 485 WRF and NM 1517-99 WR.

References

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Table 1. Number of insecticide applications applied to fields for control of leps based on local university thresholds for cotton bollworm and/or fall armyworm.

		CBW	FAW	PHY 410 R	PHY 470 WR
Farr, Chuck	Marion, AR		x	1	0
Jaggers, Jim	Portland, AR	x	x	3	0
Briggs, Wes	Seminole Cnty, GA	x	x	8	0
Brown, Paul	Perry, GA	x		3	1
Phillips, Brandon	Fitzerland, GA	x		2	0
Turner, Barry	Galion, LA	x		6	0
Miller, Tucker	Drew, MS	x		4	0
Price, Billy	Enid, MS		x	3	0
Nemec, Mark	Mart, TX	x		1	0
Zrubek, Randy	Palacious, TX	x		1	0

Table 2. Percent damaged plant parts and cotton bollworm larvae (L 1-2) in Mart, TX trial.

07/18/2005	Terminals		Flowers		Squares	
	% Damaged	% L 1-2	% Damaged	% L 1-2	% Damaged	% L 1-2
PHY 410 R	12	12	10	10	16	8
PHY 470 WR	5	5	2	2	0	0

Table 3. Percent damaged plant parts and small fall armyworm larvae (L 1-2) in Marion, AR trial.

08/08/2005	Flowers		Squares		Bolls	
	% Damaged	% L 1-2	% Damaged	% L 1-2	% Damaged	% L 1-2
PHY 410 R	2	2	12	26	5	9
PHY 470 WR	1	1	0	0	0	0
PHY 480 WR	1	1	0	0	0	0

Table 4. Percent damaged plant parts and cotton bollworm larvae (L 1-2) in Portland, AR trial.

07/19/2005	Terminals		Squares		Bolls	
	% Damaged	% L 1-2	% Damaged	% L 1-5	% Damaged	% L 1 - 5
PHY 410 R	8	7	6	9	3	1
PHY 470 WR	1	0	0	0	1	0
PHY 480 WR	0	0	0	0	2	0

Table 5. Percent damaged plant parts and cotton bollworm and/or tobacco budworm larvae (L 1-5) in Galion, LA trial.

08/27/05	Terminals		Squares		Bolls	
	% Damaged	% L 1-5	% Damaged	% L 1-5	% Damaged	% L 1-5
PHY 410 R	6	4	5	2	3	2
PHY 470 WR	1	1	0	0	1	1

Table 6. Infestation numbers and defoliation of secondary lep pests in Galion, LA trial.

09/20/2005	Beet Armyworm	Soybean Looper	Saltmarsh Caterpillar	Beet Armyworm	Whole Plant
	# Larvae / 6 ft. of row	# Larvae / 6 ft. of row	# Larvae / 6 ft. of row	# of Hits / 36 ft of row	Percent Defoliation
PHY 410 R	6	15	5	4	20
PHY 470 WR	0	0	0	0	0

Table 7. Percent damaged plant parts and cotton bollworm larvae (L 1-2) in Drew, MS trial.

8/26/05	Terminals		Squares		Bolls	
	% Damaged	% L 1-2	% Damaged	% L 1-5	% Damaged	% L 1-2
PHY 410 R	5	2	0	0	4	0
PHY 470 WR	1	0	0	0	0	0

Table 8. Percent damaged plant parts and fall armyworm larvae (L 1-2) in Enid, MS trial.

8/26/05	Flowers		Squares		Bolls	
	% Damaged	% L 1-2	% Damaged	% L 1-2	% Damaged	% L 1-2
PHY 410 R	0	4	2	1	5	75
PHY 470 WR	0	0	0	0	0	21

Table 9. Percent damaged plant parts and cotton bollworm and/or tobacco budworm larvae (L 1-5) in Perry, GA trial.

8/1/05	Terminals		Squares		Bolls	
	% Damaged	% L 1-5	% Damaged	% L 1-5	% Damaged	% L 1-5
PHY 410 R	10	5	19	13	5	2
PHY 470 WR	3	3	4	2	0	0

Table 10. Percent damaged plant parts and cotton bollworm larvae and/or tobacco budworm (L 1-5) in Seminole County, GA trial.

8/18/05	Terminals		Squares		Bolls	
	% Damaged	% L 1-2	% Damaged	% L 1-5	% Damaged	% L 1-5
PHY 410 R	12	6	8	2	4	0
PHY 470 WR	4	0	3	0	0	0

Table 11. Yields and lint quality of PHY 410 R and PHY 470 WR in 9 trials.

	Lint Yields	% Turnout	Micronaire	Length	Strength
PHY 410 R	1,021	40.8	4.3	1.11	29.3
PHY 470 WR	1,103	40.8	4.2	1.10	29.5

Table 12. Yield and lint quality of PHY 410 R, PHY 470 WR and PHY 480 WR in three strip trials in AR and TX.

	Lint Yields	% Turnout	Micronaire	Length	Strength
PHY 410 R	996	39.4	4.6	1.10	29.3
PHY 470 WR	1,065	39.4	4.5	1.10	29.6
PHY 480 WR	1,113	39.0	4.5	1.11	30.4