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BOLL RETENTION OF PHY 410 R AND PHY 470 WR EXPRESSING THE WIDESTRIKE™ INSECT PROTECTION TRAIT IN 2004 FIELD TRIALS

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Abstract

The WideStrike™ Insect Protection trait, which expresses 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. Plant mapping was used to evaluate, characterize and demonstrate the effectiveness of the WideStrike trait and foliar insecticide applications for protecting cotton against lepidopteran (lep) pests in 2004 field trials. Six trials were conducted from Louisiana to North Carolina to obtain data in a broad geography with different pest complexes and infestation levels. Moderate-to-heavy cotton bollworm (*Helicoverpa zea* [Boddie]) (CBW) populations developed in all trials (Table 1). In addition to a heavy cotton bollworm infestation, fall armyworm (*Spodoptera frugiperda)* (FAW) and soybean looper (*Pseudoplusia includens)*, (SBL) infestations occurred at the plot in Bainbridge, GA

PHY 470 WR, which expresses the WideStrike trait, and PHY 410 R, a non-*Bt* variety, were evaluated in all trials. These two varieties were not sprayed for lep pests at all locations. However, in the trials located in Pine Bluff, AR, Florence, SC and Bossier City, LA, additional plots of each variety were sprayed whenever local university threshold levels were met in the PHY 410 R plots. The first three fruiting positions of 10 consecutive plants in each plot of the replicated trials or four random areas in the strip trials were mapped mid and late season using the following criteria: 0 = missing, 1 = square, flower or boll, 2 = worm damaged square, 3 = worm damaged boll, 4 = other damaged or rotted boll, and 5 = open boll. Data collected late season was summarized across all six trials to demonstrate the capability of the WideStrike trait to protect fruiting structures from lep pests when compared to PHY 410 R, which was not protected from lep pests (Figures 1 and 2). In the three trials where each variety was not sprayed and sprayed with foliar lep insecticides (Florence, Pine Bluff and Bossier City), the data were summarized for each treatment (Figures 3-6).

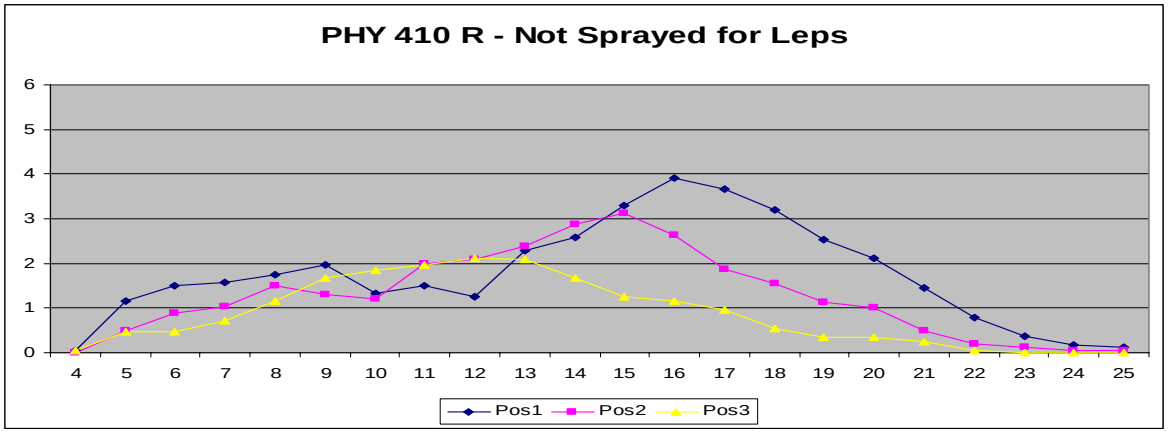
Plant mapping proved to be very useful in demonstrating the ability of the WideStrike trait to protect cotton fruiting structures when compared to the unsprayed PHY 410 R plots. Averaged over the six locations with unsprayed plots, boll set distributions of PHY 410 R and PHY 470 WR were dramatically different (Figures 1 and 2). Most noticeably, PHY 470 WR had significantly more first position bolls from nodes 6 to 15, and PHY 410 R compensated for this loss with more third position bolls.

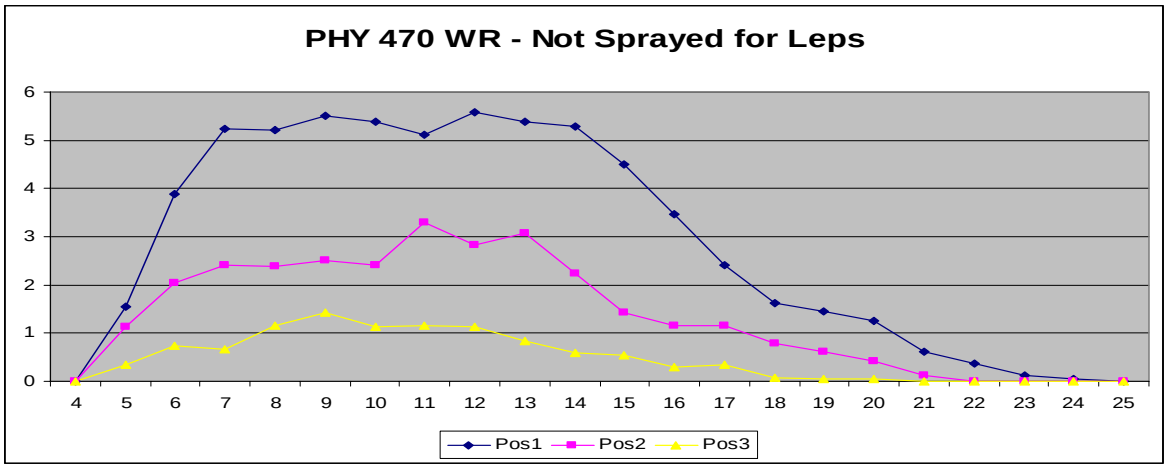
This differential effect on boll set was demonstrated more clearly in the graphs using averages over the three locations with both lep-sprayed and unsprayed plots (Figures 3 to 6). Fruit retention was greatly increased when the PHY 410 R plots were sprayed with lep insecticides at action thresholds. The greatest response to lep spray on PHY 410 R was observed at first position of nodes 6 through 14 and at second position of nodes 6 through 12. However, only minor differences in boll retention were noted for PHY 470 WR when plots were either (1) not sprayed for leps or (2) sprayed when the PHY 410 R plots were sprayed at action thresholds. In fact, the boll retention was better for PHY 470 WR in unsprayed than for PHY 410 R in plots sprayed at action thresholds.

In 2006, the WideStrike trait will be offered in PhytoGen cotton varieties either without Roundup tolerance (PHY 440 W), with the original Roundup Ready® trait (PHY 370 WR, PHY 470 WR, and PHY 480 WR), or with the new Roundup Ready Flex trait (PHY 475 WRF and PHY 485 WRF).

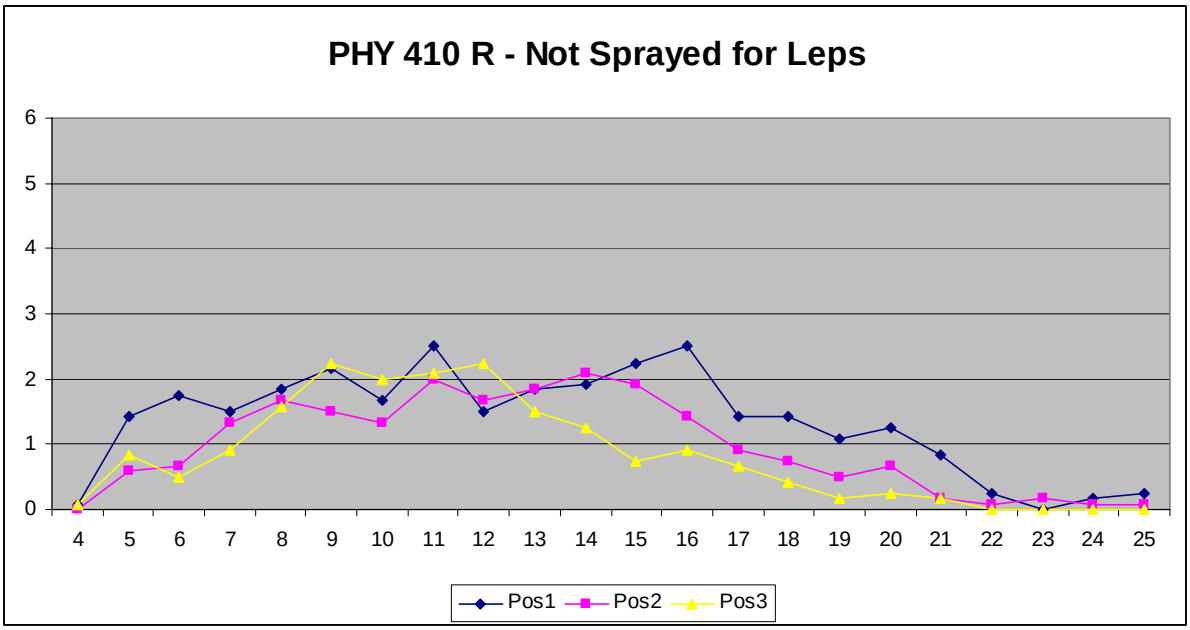
Table 1. Cooperators, locations, lep complexes and trial types of 2004 trials.

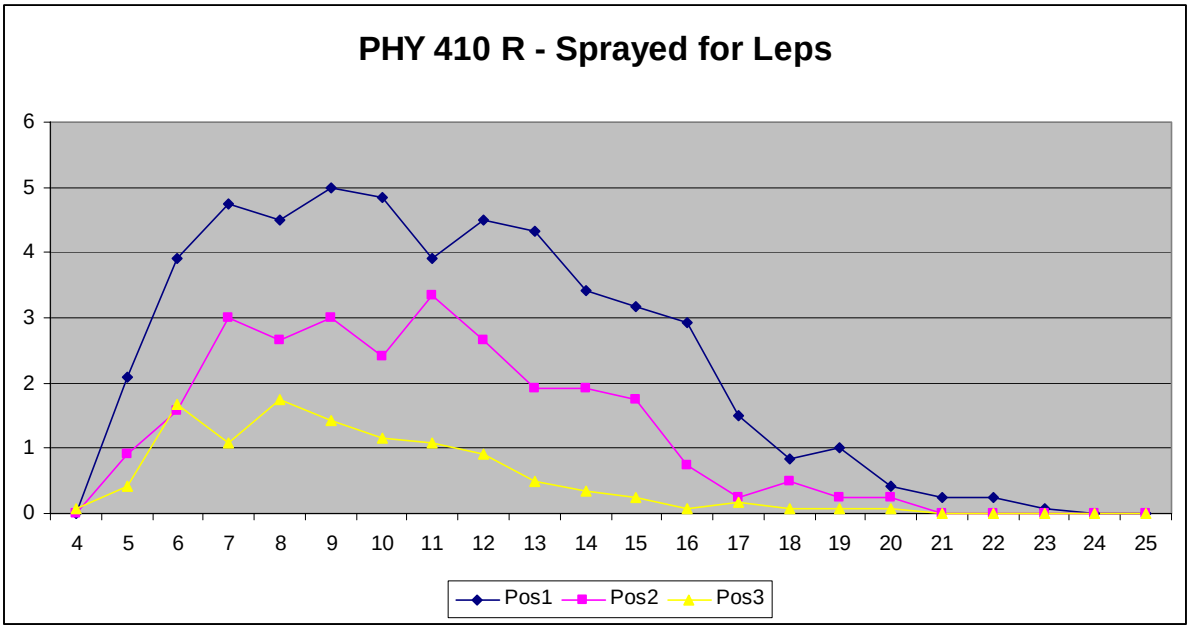
Trial Location	Cooperators	Lep Pest Complex	Trial Type
Rocky Mount, NC	Dr. J. R. Bradley, Dr. John VanDuyn	CBW - Heavy	Small plot replicated
Florence, SC	Dr. Mitchel Roof	CBW - Moderate	Small plot replicated
Bainbridge, GA	Mr. Wes Briggs	CBW, FAW and SBL – Heavy	Strip trial
Prattville, AL	Dr. Ron Smith	CBW - Moderate	Strip trial
Pine Bluff, AR	Dr. Gus Lorenz	CBW - Heavy	Strip trial
Bossier City, LA	Mr. Steve Micinski	CBW - Heavy	Strip trial

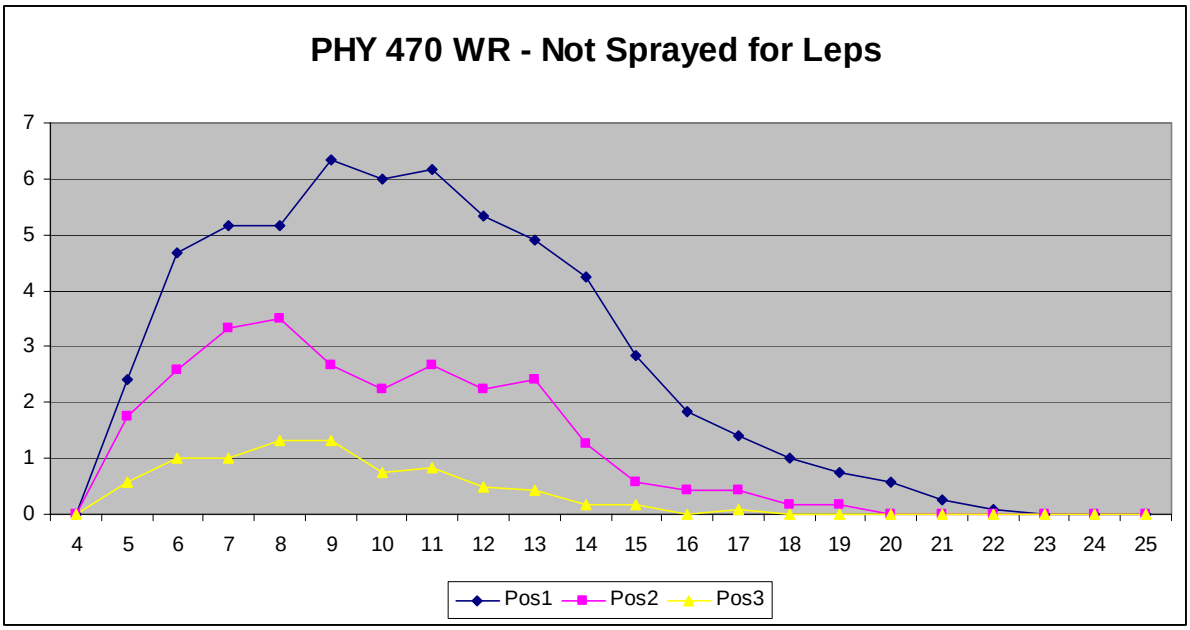


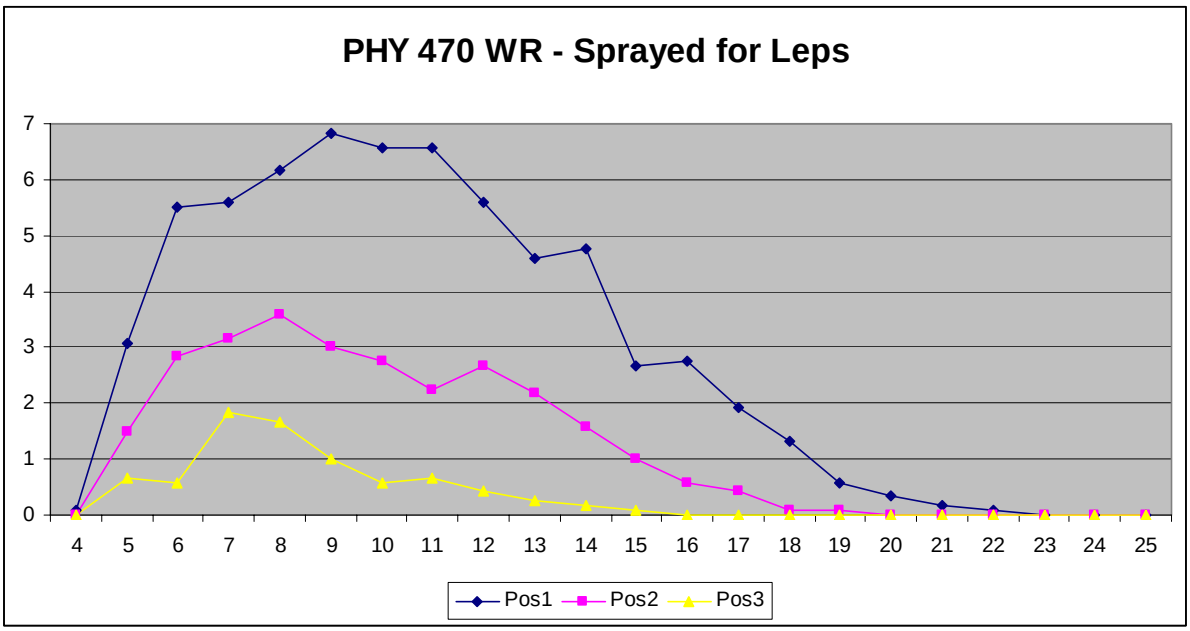


Figures 1 and 2. Boll set on ten PHY 410 R and PHY 470 WR plants averaged over six locations. No lep insecticide sprays were applied.


PHY 410 R - Not Sprayed for Leps
6
5
4
3
2
1
0
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Pos1 Pos2 Pos3


PHY 410 R - Sprayed for Leps
6
5
4
3
2
1
0
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Pos1 Pos2 Pos3





Figures 3 – 6. Boll set on ten PHY 410 R and PHY 470 WR plants averaged over three locations. Each variety was not sprayed for leps, and sprayed for leps when spray thresholds were met for PHY 410 R.