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**NATIONAL PEANUT BOARD/VIRGINIA PEANUT GROWERS ASSOCIATION—
EXECUTIVE SUMMARY, 2008**

PROJECT TITLE: Investigating Chlorpyrifos Failures in VA/NC Peanut Fields, Year 2

TERM OF PROJECT: January 1, 2008 to December 31, 2008

PROJECT INVESTIGATOR: D. Ames Herbert, Jr.

OBJECTIVES:

1. To determine the effectiveness of the soil insecticide chlorpyrifos (Lorsban) against the soil insect complex.
2. To collaborate with North Carolina faculty and field faculty (county agents) to monitor the soil insect populations in peanut fields in Southampton, Isle of Wight and Suffolk Counties in Virginia and Chowan, Gates, and Perquimans Counties to develop an understanding of why chlorpyrifos (Lorsban) has failed to protect the crop and develop appropriate management strategies for those sites.

RESULTS:

Trials 1 and 2: In 2008, two trials were conducted to evaluate a potential new insecticide, Cyazypyr™ (DuPont), for southern corn rootworm (SCR) control. Cyazypyr was applied either as a liquid into the seed furrow at planting, or as a foliar broadcast at early pegging (July 7). These treatments were compared with Lorsban® 15G (Dow AgroSciences) applied at 13 lb/acre as a band at early pegging. In Trial 1, the Lorsban treatment had significantly fewer SCR-scarified pods than the Cyazypyr treatments. There were few SCR-penetrated pods, even in the untreated control. Lorsban also provided the best protection against potato leafhopper with significantly fewer sampled and significantly less plant injury on August 19. The in-furrow Cyazypyr treatment had the highest yield, significantly greater than the early-pegging Cyazypyr treatment, but not significantly different than the Lorsban or untreated control. In Trial 2, both Cyazypyr treatments and Lorsban had a significant reduction in SCR-scarified pods relative to the untreated control, with no difference between insecticide treatments. As in Trial 1, Lorsban worked well against potato leafhopper with significantly less damage compared with Cyazypyr on August 19. Yield was numerically greater with the in-furrow Cyazypyr treatment.

Trial 3: A grower was identified in Surry County, VA with peanut fields with a history of soil SCR damage. The Advisory was applied to the largest field prior to planting with a resulting index score of 65 points (= moderate to high risk) indicating the need for remedial insect control. Three peanut varieties, all susceptible to SCR, were planted in 8 randomized strips, each 4 rows by 800 ft in size. Lorsban 15G significantly reduced the number of scarified pods vs. the untreated check from 9.3 to 4.5% for Wilson, 12.5 to 4.5% for Gregory, and 11.5 to 3.5% for CHAMPS. Pod yields ranged from 5,111 to 5,284 lb/acre. Lorsban-treated plots had average yield increases of 132 (Wilson), 243 (Gregory), and 145 (CHAMPS) lb/acre. Results indicated that the SCR Risk Advisory correctly identified the need for remedial insect control and would have increased profits for the grower by \$32/acre [173 avg. lb/acre yield increase across the 3 varieties x \$0.30/lb = \$51.90 – insecticide application cost (\$20) = \$31.90/acre].

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VIRGINIA PEANUT GROWERS ASSOCIATION
FINAL REPORT

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RESULTS:

Trials 1 and 2

In 2008, two trials were conducted to evaluate a potential new insecticide, Cyazypyr™ (DuPont), for southern corn rootworm (SCR) control. The common name for Cyazypyr is cyantraniliprole, which is a second generation ryanodine receptor insecticide. It is not currently labeled in peanut but is being evaluated by DuPont as a possible new use label. Cyazypyr represents a new insecticide class for peanut and could offer control advantages with less impact on beneficial insects and bees. 'CHAMPS' peanut was planted on May 9 (Trial 1) or May 14 (Trial 2) at two locations with different soil types at the Tidewater Agricultural Research and Extension Center-AREC (TAREC) in Suffolk, VA. Cyazypyr was applied either as a liquid into the seed furrow at planting, or as a foliar broadcast at early pegging (July 7). These treatments were compared with Lorsban® 15G (Dow AgroSciences) applied at 13 lb/acre as a band at early pegging. In each plot, 100 pods were collected after digging and evaluated for SCR-scarified and SCR-penetrated pods. Potato leafhopper counts and leafhopper plant injury were also recorded. The two center rows of each plot (70 or 80 row ft) were harvested with a modified 2-row commercial picker and yield was adjusted to 7% moisture.

In Trial 1, the Lorsban treatment had significantly fewer SCR-scarified pods than the Cyazypyr treatments (Table 1). There were few SCR-penetrated pods, even in the untreated control. Lorsban also provided the best protection against potato leafhopper with significantly fewer sampled and significantly less plant injury on August 19. The in-furrow Cyazypyr treatment had the highest yield, significantly greater than the early-pegging Cyazypyr treatment, but not significantly different than the Lorsban or untreated control.

In Trial 2, both Cyazypyr treatments and Lorsban had a significant reduction in SCR-scarified pods relative to the untreated control (Table 2), with no difference between insecticide treatments. As in Trial 1, Lorsban worked well against potato leafhopper with significantly less

damage compare with Cyazypyr on August 19. Yield was numerically greater with the in-furrow Cyazypyr treatment.

~~While these results are not clear cut (soil pests are rarely uniformly distributed throughout a test plot), there tended to be some control and yield advantage with in-furrow Cyazypyr.~~

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Trial 3

~~In 2008, an on-farm trial was conducted to evaluate three varieties, with and without Lorsban 15G, for SCR control at the Steven and Michael Pittman farm in Surry County, VA. 'Wilson', 'Gregory', and 'CHAMPS' peanut were planted on May 17 in four 34-inch rows by 800-1000 ft long. Experimental design was a split-plot with four replicates, using varieties as main plots and insecticide treatment as sub-plots. Lorsban 15G @ 13 lbs/acre was applied by the grower at early pegging (July 15) on the treated plots. All plots were irrigated with 0.75-inch water on July 28 and August 4, 17, and 24. Leafhopper counts and percent visual damage were recorded on July 25, but numbers were low and data are not included. Pod damage by SCR was evaluated for 100 full-sized pods per plot after digging. Yield was determined by harvesting plots with a 2-row commercial picker and adjusting to 7% moisture.~~

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~~Lorsban significantly reduced the number of SCR-scarified pods relative to the untreated control; averaged across all three varieties, pod damage dropped from 11.1% to 4.2% (Table 3). Lorsban also increased yield in all three varieties, although it was only significant with 'CHAMPS'.~~

Although not conclusive, these 2008 field trials show promise for this new insecticide for use in managing SCR in peanuts. More field trials are planned for 2009.

Trial 3

A grower was identified in Surry County, VA with peanut fields with a history of soil SCR damage. The Advisory was applied to the largest field prior to planting with a resulting index score of 65 points (= moderate to high risk) indicating the need for remedial insect control [Cultivar = Other (20), Texture = Loamy sand (5), Drainage = Moderately well drained (10), History of SCR damage = High (15), Planting date = May 17 (15)]. Three peanut varieties (CHAMPS, Gregory, and Wilson), all susceptible to SCR, were planted in 8 randomized strips, each 4 rows by 800 ft in size. Lorsban 15G @ 13 lb/acre or an untreated control were applied at early pegging (July 15) to 4 of the strips. Pod damage by SCR was rated after digging (Oct. 8) by inspecting 100 randomly selected full-sized pods per strip. Yield was determined based on harvesting entire plots and adjusting to 7% pod moisture.

Lorsban 15G significantly reduced the number of scarified pods vs. the untreated check from 9.3 to 4.5% for Wilson, 12.5 to 4.5% for Gregory, and 11.5 to 3.5% for CHAMPS. Pod yields ranged from 5.111 to 5.284 lb/acre (Table 3). Lorsban-treated plots had average yield increases of 132 (Wilson), 243 (Gregory), and 145 (CHAMPS) lb/acre (Table 3). Results indicated that the SCR Risk Advisory correctly identified the need for remedial insect control and would have increased profits for the grower by \$32/acre [173 avg. lb/acre yield increase across the 3 varieties

x \$0.30/lb = \$51.90 – insecticide application cost (\$20) = \$31.90/acre]. This demonstration and results were presented to peanut growers across the state at local and state-wide meetings and field tours.

We thank the Virginia Peanut Growers Association and National Peanut Board for their continued support of our peanut insect pest management research and Extension program here at TAREC.

Table 1. Potato leafhopper population and damage ratings, southern corn rootworm mean percent pod injury, and yield, PT08SCRI. Tidewater AREC, Suffolk, VA, 2008.

#	Material	Rate and application method	Leafhopper counts ¹		Leafhopper percent visual damage ²		Mean percent pod injury ³		Yield lb/acre ⁴
			Jul 25	Aug 19	Jul 25	Aug 19	Scarified	Penetrated	
1	Cyazypyr	0.134 lb ai/A (in-furrow)	9.3	19.0 a ⁵	3.5 a	4.0 a	12.3 b	0.5	5190 a
2	Cyazypyr	0.134 lb ai/A (broadcast at early pegging)	6.5	16.3 ab	1.8 bc	3.8 a	15.3 ab	0.0	4207 b
3	Lorsban 15G	13 lb/A (early pegging)	2.8	4.0 c	1.0 c	1.0 c	5.5 c	0.0	4727 ab
4	Untreated	---	8.8	12.5 b	2.5 ab	2.3 b	19.0 a	0.5	4741 ab
	LSD		NS	5.37	1.01	1.19	6.04	NS	538.3

¹Based on 15 sweeps per plot using a 15-inch diameter sweep net.

²Based on one visual sample per plot.

³A pre-harvest sample of 100 full-sized pods were randomly selected per plot after digging. Samples were taken on October 2.

⁴Yield based on weight of peanut with moisture content of 7%. Dig date = September 30 and harvest date = October 6.

⁵Means within a column, followed by the same letter(s) are not significantly different (Protected LSD, $P=0.05$ [leafhopper counts, leafhopper percent visual damage, and mean percent pod injury] or $P=0.10$ [yield]).

Table 2. Potato leafhopper population and damage ratings, southern corn rootworm mean percent pod injury, and yield, PT08SCR2, Tidewater AREC, Suffolk, VA, 2008.

#	Material	Rate and application method	Leafhopper counts ¹		Leafhopper percent visual damage ²		Mean percent pod injury ³		Yield lb/acre ⁴
			Jul 25	Aug 19	Jul 25	Aug 19	Scarified	Penetrated	
1	Cyazypyr	0.134 lb ai/A (in-furrow)	10.0	20.3	4.0 a ⁵	7.0 a	4.5 b	0.0	5907
2	Cyazypyr	0.134 lb ai/A (broadcast at early pegging)	6.3	18.3	2.0 b	5.0 b	5.0 b	0.0	5422
3	Lorsban 15G	13 lb/A (early pegging)	3.5	10.0	1.0 b	2.0 c	4.0 b	0.0	5506
4	Untreated	---	9.3	24.8	4.0 a	5.0 b	10.0 a	0.5	5208
LSD			NS	NS	1.25	1.96	4.00	NS	NS

¹Based on 15 sweeps per plot using a 15-inch diameter sweep net.

²Based on one visual sample per plot.

³A pre-harvest sample of 100 full-sized pods were randomly selected per plot after digging. Samples were taken on September 30.

⁴Yield based on weight of peanut with moisture content of 7%. Dig date = September 29 and harvest date = October 6.

⁵Means within a column followed by the same letter(s) are not significantly different (Protected LSD, P=0.05).

Table 3. Southern corn rootworm mean percent scarified pods and yield, PT08SCR3 (Steven and Michael Pittman farm, Surry Co., VA). Tidewater AREC, Suffolk, VA, 2008.

#	Variety	Material	Mean percent scarified pods ¹	Yield lb/acre ²
1	Wilson	Lorsban 15G @ 13 lb/A (early pegging)	4.5 b ³	5256
2	Wilson	Untreated	9.3 a	5124
	LSD		2.00	NS

#	Variety	Material	Mean percent scarified pods	Yield lb/acre
1	Gregory	Lorsban 15G @ 13 lb/A (early pegging)	4.5 b	5394
2	Gregory	Untreated	12.5 a	5151
	LSD		3.44	NS

#	Variety	Material	Mean percent scarified pods	Yield lb/acre
1	CHAMPS	Lorsban 15G @ 13 lb/A (early pegging)	3.5 b	5202 a
2	CHAMPS	Untreated	11.5 a	5057 b
	LSD		4.68	138.4

¹A pre-harvest sample of 100 full-sized pods were randomly selected per plot after digging. Samples were taken on October 8. There were no pods penetrated by southern corn rootworm.

²Yield based on weight of peanut with moisture content of 7%. Dig date = Oct. 7 and harvest date = Oct. 15.

³Means within a column followed by the same letter(s) are not significantly different (Protected LSD, P=0.05).

Treatment means for:	% scarified pods	Yield
1. With insecticide	4.2 b	5284
2. Without insecticide	11.1 a	5111
LSD	1.81	NS

Variety mean for:	% scarified pods	Yield
1. Wilson	6.9	5190
2. Gregory	8.5	5272
3. CHAMPS	7.5	5130
LSD	NS	NS

Split plot analysis for:	% scarified pods	Yield
Treatment	0.0012	0.0623
Variety	0.3748	0.2038
Treatment x variety	0.2849	0.7302