

# EVALUATION OF CHLORPYRIFOS TRUNK TREATMENTS ON THE RED IMPORTED FIRE ANT, APHIDS AND NATURAL ENEMIES IN PECAN TREE CANOPIES

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The red imported fire ant, *Solenopsis invicta* Buren, is suspected of aggravating aphid (yellow pecan aphid, *Monelliopsis pecanis* Bissell; blackmargined aphid, *Monellia carvella* (Fitch) outbreaks in pecans by preying on beneficial insects such as the green lacewing (*Chrysoperia* spp.), (Tedders et al. 1989). A trunk spray of chlorpyrifos has been shown to be an effective, long lasting barrier to keep ants out of tree canopies (Drees, Ree and Barr, 1990). This study was undertaken to determine whether elimination of fire ant foraging from the tree canopy using a trunk spray would have an impact on aphid population densities and/or populations of natural enemies of aphids.

## Material and Methods

On 5 July 1990, four plots were established in a non-bearing section of a pecan orchard (Royalty Pecans) in Burleson County, TX. Plots were established that were five tree rows wide and seven tree rows deep on a tree spacing of 36 feet (38,880 sq. ft. or 0.89 acre). All of the trees in two of the blocks were treated with a trunk from the ground to a height of 4 feet. The remaining blocks were left untreated.

Aphid and natural enemy population densities were monitored by selecting ten compound leaves on each of six marked trees was monitored by stapling a one-inch square olive oil-soaked index card to the trunk at eye level (above the treatment line) and estimating the number of worker ants associated with each card after approximately one hour of exposure. Post-treatment monitoring efforts were conducted on 31 July, 11 and 20 August. For each monitoring date, the number of aphids per leaf, percent leaves containing natural enemy life stages (green lacewing larvae, eggs, adults, etc.) per 10-leaf sample and the number of fire ant worker ants attracted to oil-soaked cards were analyzed for treated and untreated plots using the Student's t test (P # 0.05).

## Results and Discussion

For the two months following trunk treatments, fire ant foraging into pecan tree canopies was significantly reduced:

Mean no. ants per oil-soaked card

Date	Treated trunks	Untreated trunks	t	P#	d.f.
31 July	1.33 ± 3.37 S.D.	9.91 ± 6.96 S.D.	3.85	0.00	22
31 August	0.0	11.17 ± 10.07	3.84	0.00	22

Aphids numbers in all plots declined dramatically in August (**Table 1**). Initially, untreated plot trees contained more aphids. However, within 26 days after treatment, treated trees contained more aphids per leaf as well as significantly more percent leaves with natural enemy life stages. By 11 August, treated trees averaged fewer aphids per leaf than did untreated plot trees. No statistical differences between trunk treated and untreated plots were detected thereafter.

Additional data will be required before confidence can be raised for the use of trunk treatments to effect aphid population densities or to document a case where the treatment of tree trunks to eliminate ant foraging prevents an insecticide application for a potentially damaging population of aphids.

**Table 1.** Aphid and natural enemy density estimates in pecan orchard plots after receiving (treated) or not receiving (untreated) chlorpyrifos trunk sprays, 5 July 1990. Royalty Pecans, Burleson County, Texas.

Date	Mean no. aphids per leaf		Percent Leaves with natural enemies	
	Treated	Untreated	Treated	Untreated
5 July	16.6 ± 25.7*	27.6 ± 33.7*	11.7 ± 14.0**	26.7 ± 20.2**
31 July	26.5 ± 25.5*	11.2 ± 13.0*	40.8 ± 16.8**	24.2 ± 16.2**
11 August	0.4 ± 0.8*	2.5 ± 5.1*	7.5 ± 8.7	10.0 ± 10.4
20 August	0.4 ± 1.9	0.6 ± 1.8	9.1 ± 12.4	13.3 ± 13.7

\* Significantly different (P #0.05) according to the Student's t test (5 July, t = 2.83, d.f. = 283; 31 July, t = -5.73, d.f. = 233; 11 Aug., t = 4.57, d.f. = 238)

\*\* Significantly different (P #0.05) according to the Student's t test (5 July, t = 2.11; 31 July, t = -2.48; d.f. = 22).

### Literature Cited

- Drees, B. M., W. O. Ree and C.L. Barr. 1990. Fire ants: Do the returns justify control efforts? Pecan South 24(4):4-6.
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