



# Efficacy of Foliar and Preventive Insecticides towards Thrips in the Texas High Plains

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## Introduction

Thrips continue to be the dominant pest of seedling cotton in the Texas High Plains. In 2008, almost 2 million acres of cotton were reported infested with thrips, of which over 50% was treated preventively for thrips with a seed treatment or in-furrow application of Temik. Additionally, an additional 267,000 acres received at least one foliar insecticide application targeting thrips following preventive treatments or instead of preventive treatments. When not treated, damage to cotton by thrips will often reduce yield by as much as 20% on the Texas High Plains and depending on temperatures, as few as 1 thrips per 2 plants may result in significant damage and yield loss.

On the Texas High Plains, the western flower thrips, *Frankliniella occidentalis* (Pergande), is the dominant thrips species comprising 70-100% of the population infesting cotton, which makes West Texas somewhat unique relative to other areas of the U.S. cotton belt and may influence how insecticides perform relative to other areas. In-furrow applications of Temik is the standard by which other thrips management programs are measured in the Texas High Plains. However, because of the high toxicity of Temik, many growers have sought alternatives. Seed treatments have gained popularity for managing thrips. They are very easy to use and safer to handle than Temik. However, they tend not to last as long as Temik and are thus more likely to require follow-up foliar insecticides once they lose efficacy. The other alternative to Temik is to strictly utilize a foliar insecticide spray program. Research has demonstrated that this approach can be effective and less costly but application timing can be critical (Vandiver 2009).



Figure 1. Cotton seedling damaged by thrips feeding.

Another problem facing some High Plains cotton growers is identifying a cost effective thrips management insecticide for use on organic acreage. Currently OMRI approved thrips control products for thrips control are simply too expensive to economically justify.

## Objectives

In this study, we report the efficacy of several foliar insecticides (including an OMRI approved organic treatment), a seed treatment and in-furrow application of Temik.

## Acknowledgements

Financial support for this project was provided in part by Plains Cotton Growers, Inc.



## Materials and Methods

This study was conducted in Castro County near Dimmitt, TX in cooperation with Brian and Rex Reinert. Cotton, FiberMax 9180 B2F was planted on 40-inch rows on May 15, 2009. The test site was irrigated using a pivot irrigation system. The seeding rate was ~15-lbs seed per acre. Plots were 4-rows x 50-ft. The test was a randomized complete block design with four replicates.

**Table 1. Products, rates and application methods for insecticides evaluated**

Treatment <sup>a</sup>	Rate	Application
Temik 15G	3.5 lbs/ac	In-furrow
Avicta Complete Cotton	NA	Seed treatment
Orthene 97	3 oz/ac	Foliar
Dimethoate 4E	0.5 pt/ac	Foliar
ProNatural Micronized Sulfur	4.2 lbs/ac	Foliar
Untreated	NA	NA

<sup>a</sup>Rates for Dimethoate and Sulfur were determined by using a similar cost/ac (\$2.80) of Orthene 97 at 3 oz/ac.

Temik (aldicarb), Avicta CC (thiamethoxam + abamectin), and Orthene (acephate) were all tested at standard use rate for the geographical region (Table 1). The rates for Dimethoate 4E and the OMRI approved ProNatural Micronized Sulfur were determined by setting their use rate equivalent to the cost per acre rate of Orthene 97 which was approximately \$2.80. Foliar insecticides were applied on 27 May, and 3 and 12 June.

Treatments were evaluated by destructively sampling 10 plants per plot and visually counting the number of adult and immature thrips per plant. Evaluations were made at just prior to the first foliar application, and 2-3 and 5-8 days after treatment (DAT). In addition to counting thrips, damage ratings were taken on 11 and 17 June. Plots were subjective rated for damage on a 1-5 scale where 1 = no damage and 5 = severe damage (Figure 2).

Data were analyzed using PROC MIXED and the means were separated using an F protected LSD ( $P \leq 0.05$ ).



Figure 2. Cotton seedling severely damaged by thrips feeding; damage rating = 5.

## Results and Discussion

Prior to the first foliar spray, on 27 May, 12 days after planting (DAP), none of the plots slated for a foliar treatment regime differed from the untreated check (Figure 3).

However, both the Avicta CC and Temik treated plots had fewer thrips than the untreated and did not differ from each other. Thus indicating that both preventive treatment were effective at 12 DAP. At this time almost all of the thrips counted were adults, indicating initially colonization.

Two days following the initially foliar application, all of the foliar sprays except ProNatural Micronized Sulfur reduced the thrips population to levels equivalent to Temik and Avicta CC indicating rapid activity (Figure 4A). The sulfur treatment did not differ from the untreated. By 7 DAT with the foliar sprays the sulfur still did not differ from the untreated and Dimethoate had significantly more thrips than Orthene and Temik (Figure 4A). Thus, Dimethoate appears to be shorter lived than Orthene at the rates tested. Although Avicta CC did not differ from the Temik in total thrips, it did contain more immature thrips, indicating that it was beginning to break by 21 DAP and should have had foliar oversprays initiated.

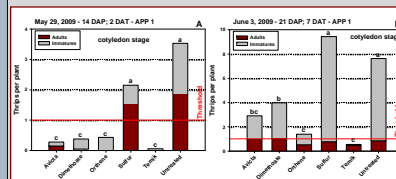


Figure 4. Mean thrips per plant at 14 DAP; 2 DAT foliar (A) and 21 DAP; 7 DAT foliar (B). Bars capped with the same letter are not significantly different in total thrips based on a F protected Mixed Procedure (LSD,  $P < 0.05$ )

On 5 June, 2 days after the second foliar application thrips counts were low due to precipitation (Figure 5A). But by 8 DAT (31 DAP), the population had increased and Sulfur was the only treatment below the threshold of 3 thrips per plant on 3 true leaf cotton but did not differ from the untreated (Figure 5B). It was obvious that by 31 DAP that both Avicta CC and Temik were no longer providing adequate control and should have had oversprays of a foliar insecticide. Numbers in the Sulfur treatment were low probably because it had already suffered heavy damage and was no longer highly attractive for thrips colonization (Figure 6).

## Results and Discussion (continued)

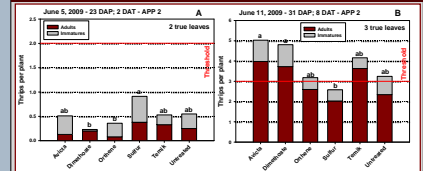


Figure 5. Mean thrips per plant at 23 DAP; 2 DAT foliar (A) and 31 DAP; 8 DAT foliar (B). Bars capped with the same letter are not significantly different in total thrips based on a F protected Mixed Procedure (LSD,  $P < 0.05$ )

At 31 DAP and 2 foliar spray treatments at a 7 day interval, all of the treatments suffered less damage than the untreated (Figure 6). Temik suffered less damage than Avicta CC suggesting that Temik provided longer residual.

At 35 and 37 DAP neither Temik nor Avicta CC differed from the untreated in total thrips and Dimethoate and Orthene were the only treatments providing control (Figure 7).

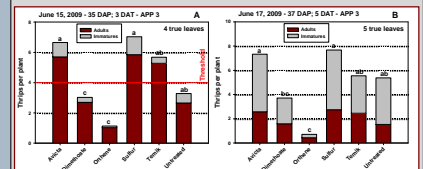


Figure 7. A) Mean thrips per plant at 35 DAP; 3 DAT foliar (A) and 37 DAP; 5 DAT foliar (B). Bars capped with the same letter are not significantly different in total thrips based on a F protected Mixed Procedure (LSD,  $P < 0.05$ )

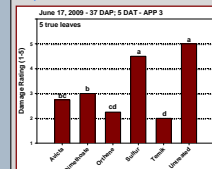


Figure 8. Mean thrips damage rating (1-5 scale with 1 = no damage and 5 = severe damage) at 37 DAP. Bars capped with the same letter are not significantly different in total thrips based on a F protected Mixed Procedure (LSD,  $P < 0.05$ )

Based on the final damage rating taken at 37 DAP, Temik suffered the least damage but did not statistically differ from Orthene (Figure 8). The damage Temik suffered indicates that at least one foliar overspray would have been justified. Avicta CC suffered more damage than Temik suggesting that it would have required oversprays earlier than Temik. ProNatural Micronized Sulfur did not provide adequate control, and Dimethoate did not appear to offer as long of residual control as Orthene.