

## **CRUISER® (THIAMETHOXAM) SEED TREATMENT FOR CONTROL OF EARLY SEASON INSECTS IN COTTON IN THE MID-SOUTH AND TEXAS**

**B.W. Minton**

**Syngenta Crop Protection  
Cypress, TX**

**B.D. Black**

**Syngenta Crop Protection  
Searcy, AR**

**J.E. Driver**

**Syngenta Crop Protection  
Hewitt, TX**

**C.F. Grymes**

**Syngenta Crop Protection  
Idalou, TX**

**J.C. Holloway, Jr.**

**Syngenta Crop Protection  
Greenville, MS**

**D. Long**

**Syngenta Crop Protection  
Greensboro, NC**

**S.H. Martin**

**Syngenta Crop Protection  
Ruston, LA**

**N.D. Ngo**

**Syngenta Crop Protection  
Leland, MS**

### **Abstract**

Cruiser 5FS is an insecticide seed treatment for control of early season sucking and chewing insect pests in cotton. The active ingredient - thiamethoxam is a neonicotinoid insecticide with unique chemical and physical characteristics. Application to seed provides systemic distribution throughout the seedling following germination. Cruiser 5FS at 7.65 fl oz/cwt (300 g ai/100 kg) cottonseed provides protection against tobacco thrips, western flower thrips and cotton aphids. Field trials conducted in 2000 and 2001 confirmed the activity against these pests as well as against cotton fleahoppers. Average yield increases with Cruiser were 228 lbs. lint/acre and 81 lbs. lint/acre for 2000 and 2001, respectively.

### **Introduction**

Thiamethoxam is a second generation neonicotinoid insecticide labeled as a seed treatment on cotton, grain sorghum and wheat. U.S. registration was received in December 2000, and the seed treatment product was initially sold under the trade name of Adage®. The name was changed in the U.S. in August 2001 to the global trade name of Cruiser. Registrations on other crops including corn are pending approval.

Thiamethoxam affects the insect nervous system by blocking nicotinic acetylcholine receptors. The insecticide has both contact and stomach activity. Insect feeding ceases within hours of exposure, followed by death in 24-48 hours. There is no evidence of cross resistance with other insecticide classes. Thiamethoxam has a water solubility of 4,100 ppm and has a low partition coefficient which facilitates rapid plant uptake. Thiamethoxam applied to the seed is absorbed by the plant roots following germination and is translocated throughout the plant, traveling acropetally in the xylem. This distribution property provides early season protection of seedlings from sucking and chewing insect pests.

In addition to seed treatment application, insect control can be achieved with thiamethoxam through foliar, infurrow, transplant drench, tray drench, and drip irrigation applications. Thiamethoxam is registered as Actara® 25WG and Centric® 25WG for foliar applications, and Platinum® 2SC for soil and drip irrigation applications. Registration has been obtained in 70 countries for control of more than 160 insect pests in 115 crops.

## Materials and Methods

The efficacy of Cruiser was examined in Texas and in the mid-south by Syngenta and University Researchers during 2000 and 2001. Plot sizes ranged from 4-8 rows by 25-50 feet in length with four replications. Adult and immature thrips per 10 plants, cotton aphids per 10 leaves, cotton fleahopper nymphs per 20 terminals, and plot yields were measured. Cotton fleahoppers were collected with an Insect Vac (BioQuip) to dislodge nymphs from plant terminals. Data were combined for all like comparisons of Cruiser 5FS at 7.6 oz/cwt seed, Gaucho® 4FS at 8 oz/cwt seed, Temik® 15G at 3.5 lbs/acre in furrow, and untreated control.

## Results and Discussion

### Thrips

Cruiser, Gaucho and Temik provided excellent control of immature thrips 35 days after planting in trials with 100% tobacco thrips (Table 1) and in trials containing a mixture of 36% flower thrips and 64% tobacco thrips (Table 2). Less control was observed for tobacco and flower thrips adults (Tables 3 and 4) with all three treatments. This may be due to the migration of adult thrips between plots and the attraction to healthier plants normally found in the treated plots.

Data for adult and immature thrips were not collected separately for western flower thrips trials. Temik provided slightly greater control than either Cruiser or Gaucho seed treatment at evaluations taken 18 and 24 days after planting. However, none of the treatments provided adequate control 32 DAP. These data were an average of three locations. (Tables 5)

### Aphids

Cruiser, Gaucho and Temik provided early season control of cotton aphids in several mid-south and Texas trials. Cruiser and Gaucho appeared to have longer residual activity, providing greater control than Temik for evaluations made 24 days after planting or later. Moderate aphid control was observed with Cruiser and Gaucho 49-54 days after planting. (Tables 6 and 7)

### Cotton Fleahoppers

In two Texas trials, Cruiser provided good to excellent control of cotton fleahopper nymphs 40 and 47 days after planting (Table 8). Cotton fleahopper counts were higher in the Gaucho and Temik treatments than those observed in the Cruiser treatment. Additional studies are needed to confirm the efficacy of Cruiser on cotton fleahoppers and to establish the length of control/suppression.

### Yield

Cotton yield increase over the untreated control was 201-228 lbs. lint/acre in 2000 and 47-81 lbs. lint/acre in 2001 with the three chemical treatments. When averaged over both years (13 locations), cotton yield increase over the untreated control was 13.3%, 14.1%, and 17.4% with Temik, Gaucho, and Cruiser, respectively. (Table 9)

## Conclusion

Cruiser, Gaucho, and Temik provided a reduction in western flower thrips through 24 days after planting and a reduction in tobacco and flower thrips for 32-35 days after planting. Cruiser and Gaucho provided longer control of cotton aphids than Temik with control lasting for 49-54 days in some trials. The greatest reduction in cotton fleahopper nymphs 40 and 47 days after planting occurred with Cruiser then Gaucho. Cotton yield increase over the untreated averaged across all locations was 106, 112, and 138 lbs. lint/acre with Temik, Gaucho, and Cruiser, respectively. Cruiser consistently provided control of early season pests and increased cotton yield comparable to the standards. It will be a useful tool for early season cotton insect control.

Table 1. Mean Number of Immature Tobacco Thrips per 10 Plants (Mid-South and Texas Trials).

Treatment	Rate	Mean No. Immatures/10 plants		
		21 DAP	28 DAP	35 DAP
Untreated Control		63.0	47.8	39.2
Cruiser 5FS	7.6 fl oz/cwt	6.4	16.8	13.6
Gaucho 4FS	8.0 fl oz/cwt	11.8	21.2	21.0
Temik 15G	3.5 lbs/acre	7.6	17.0	20.8
Number of Locations		8	7	6

Table 2. Mean Number of Immature Flower (36%) & Tobacco (64%) Thrips per 10 Plants (Texas Trials).

<b>Treatment</b>	<b>Rate</b>	<b>Mean No. Immatures/10 plants</b>	
		<b>23 DAP</b>	<b>32 DAP</b>
Untreated Control		4.8	7.8
Cruiser 5FS	7.6 fl oz/cwt	0.9	2.3
Gaucho 4FS	8.0 fl oz/cwt	2.6	3.0
Temik 15G	3.5 lbs/acre	0.4	2.4
Number of Locations		2	2

Table 3. Mean Number of Adult Tobacco Thrips per 10 Plants (Mid-South and Texas Trials).

<b>Treatment</b>	<b>Rate</b>	<b>Mean No. Adults /10 plants</b>		
		<b>21 DAP</b>	<b>28 DAP</b>	<b>35 DAP</b>
Untreated Control		16.2	20.2	17.0
Cruiser 5FS	7.6 fl oz/cwt	9.8	13.6	9.8
Gaucho 4FS	8.0 fl oz/cwt	13.6	16.2	11.8
Temik 15G	3.5 lbs/acre	8.4	7.0	8.8
Number of Locations		8	7	6

Table 4. Mean Number of Adult Flower (36%) & Tobacco (64%) Thrips per 10 Plants (Texas Trials).

<b>Treatment</b>	<b>Rate</b>	<b>Mean No. Adults/10 plants</b>	
		<b>23 DAP</b>	<b>32 DAP</b>
Untreated Control		4.4	2.4
Cruiser 5FS	7.6 fl oz/cwt	2.1	1.7
Gaucho 4FS	8.0 fl oz/cwt	2.3	1.7
Temik 15G	3.5 lbs/acre	1.1	1.4
Number of Locations		2	2

Table 5. Mean Number of Adult and Immature Western Flower Thrips per 10 Plants (Texas Trials).

<b>Treatment</b>	<b>Rate</b>	<b>Mean No. Adults and Immatures/10 plants</b>		
		<b>18 DAP</b>	<b>24 DAP</b>	<b>32 DAP</b>
Untreated Control		15.5	19.3	6.8
Cruiser 5FS	7.6 fl oz/cwt	7.4	7.2	7.8
Gaucho 4FS	8.0 fl oz/cwt	10.2	8.8	5.1
Temik 15G	3.5 lbs/acre	4.9	4.4	5.1
Number of Locations		3	3	

Table 6. Mean Number of Cotton Aphids per 10 Leaves (Mid-South Trials).

<b>Treatment</b>	<b>Rate</b>	<b>Mean No. Aphids/10 plants</b>		
		<b>14-17 DAP</b>	<b>24-28 DAP</b>	<b>37-43 DAP</b>
Untreated Control		18.7	158.1	100.5
Cruiser 5FS	7.6 fl oz/cwt	3.6	24.8	19.1
Gaucho 4FS	8.0 fl oz/cwt	2.7	26.2	16.8
Temik 15G	3.5 lbs/acre	8.4	57.1	69.4
Number of Locations		5	12	5

Table 7. Mean Number of Cotton Aphids per 10 Leaves (Texas Trials).

<b>Treatment</b>	<b>Rate</b>	<b>Mean No. Aphids/10 plants</b>		
		<b>21-25 DAP</b>	<b>28-40 DAP</b>	<b>49-54 DAP</b>
Untreated Control		48.8	40.6	36.9
Cruiser 5FS	7.6 fl oz/cwt	5.4	7.5	13.2
Gaucho 4FS	8.0 fl oz/cwt	5.9	13.4	13.1
Temik 15G	3.5 lbs/acre	18.2	17.0	42.3
Number of Locations		6	5	4

Table 8. Mean Number of Cotton Fleahopper Nymphs per 20 Terminals (Texas Trials).

<b>Treatment</b>	<b>Rate</b>	<b>Mean No. Nymphs/20 terminals</b>	
		<b>40 DAP</b>	<b>47 DAP</b>
Untreated Control		7.2	6.2
Cruiser 5FS	7.6 fl oz/cwt	1.1	1.7
Gaucho 4FS	8.0 fl oz/cwt	3.5	3.2
Temik 15G	3.5 lbs/acre	4.9	5.6
Number of Locations		2	2

Table 9. Average Cotton Yield (Mid-South and Texas Trials).

<b>Treatment &amp; Formulation</b>	<b>Rate</b>	<b>Lbs. Lint/Acre</b>		
		<b>2000</b>	<b>2001</b>	<b>2 Year Average</b>
Untreated Control		620	902	793
Cruiser 5FS	7.6 fl oz/cwt	848	983	931
Gaucho 4FS	8.0 fl oz/cwt	836	940	905
Temik 15G	3.5 lbs/acre	821	948	899
Number of Locations		5	8	13