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EVALUATION OF SEVERAL EARLY SEASON THRIPS MANAGEMENT APPROACHES FOR TEXAS HIGH PLAINS COTTON

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Abstract

Thrips are a reoccurring problem in seedling cotton in the Texas High Plains. Temik, a granular systemic insecticide, is the standard thrips control practice when preventative treatments are used. Declining use has occurred in response to more recent poor economics of cotton production. The recent release of the new Cruiser seed treatment and the increased interest of producers to economize thrips control led to the following study where various foliar treatments, Gaucho and Cruiser seed treatments were compared to Temik and an untreated check. The Gaucho seed treatment was not effective due to the presence of western flower thrips. The Cruiser seed treatment was as cost effective as the Temik treatment. Foliar treatments, when timed properly did provide control and yield benefits similar to the preventative treatments. Effective thrips control practices needed to last 4 weeks to maximize benefits. Foliar treatment thresholds should include not only thrips numbers but also percent immatures as criteria. COTMAN was able to graphically represent the delay that thrips damage causes to seedling cotton; resulting in up to 2 weeks harvest delays and substantial yield losses.

Introduction

Thrips are a reoccurring problem to seedling cotton in the Texas High Plains (Fig. 1). Yield losses where thrips were not controlled average 21% across infested irrigated acreage (Photo 1-3). This represents approximately 1.5 million acres. In spite of considerable research over the last 20 years clearly demonstrating the economic benefits of thrips control, many producers continue to ignore thrips as a serious pest (Leser 1986). High front-end cost is a big factor for producers not willing to adopt preventative thrips control practices on over half of the affected acres. Inconvenience in using granular systemic insecticides is another reason for lower adoption rates. Toxicity of these insecticides even with the added safety provided by "lock-and load" application systems is still a concern. Producers would really rather use a seed treatment if at all possible.

Until recently, available seed treatments have not been competitive with the standard systemic insecticide, Temik. Orthene, either as a seed treatment from the delinters or a planter-box treatment, has provided erratic results and usually does not provide adequate residual; control. The newer Gaucho seed treatment, while effective in some cotton growing regions of the U. S., has never performed well in the Texas High Plains.

Current management approaches need to be reevaluated, especially with the introduction of the new Cruiser seed treatment by Syngenta. This study continues earlier thrips management evaluation tests including the addition of the Cruiser seed treatment and a late foliar treatment applied at the end of the Roundup Ready application window.

Materials and Methods

The test was planted on May 9, 2002 using the cotton cultivar, PM 2326RR. A sprinkler-irrigated commercial field near Farwell, Texas was utilized. A randomized complete block design with 4 replications was utilized with treatments applied to plots measuring 100 feet by two rows. Treatments included: 1) Temik 15G @ 3.5 lbs/acre, 2) Cruiser seed treatment (ST), 3) Gaucho 600 ST, 4) Cruiser ST + 2 foliar treatments based on the economic threshold (ET), 5) Gaucho St + 2 foliar treatments based on the ET, 6) three foliar treatments based on the ET, 7) one foliar treatment applied at the 5th true leaf (end of Roundup Ready spray window), and 8) the untreated check. Foliar treatments were with Orthene 90S applied at the 2.0 ounces/acre broadcast rate adjusted for a 10-inch application band. The economic threshold currently used for the Texas High Plains is one thrips per true leaf present (adult or immature) with applications usually ceasing after the 5th true leaf.

Thrips were counted on ten whole plants in each plot on 5/22 (13 days after planting-DAP), 5/28 (19 DAP), 6/5 (26 DAP), and 6/12 (33 DAP). Adults were separated from immatures and species determinations made. COTMAN was utilized to monitor the progress of the crop, using the SQUAREMAN component to monitor 1st position square retention, growth curves, height-to-node ratios, etc. Dates of monitoring were 6/28, 7/3, 7/12, and 7/18. Once flowering occurred, BOLLMAN was utilized to graphically interpret Nodes above white flower (NAWF) on 7/24 and 7/31, when cutout was achieved at NAWF=5. Heat units were calculated form the temperatures obtained from the Muleshoe, Texas weather station.

Leaf area of the first 5 expanded true leaves on each plant collected was measured using a LI-COR L 3100 laboratory area meter. Ten plants per plot were obtained on 6/21 for this purpose. Lint yields were obtained through hand harvesting 1/1000 acre per plot. These samples were ginned at the Lubbock Experiment Station and fiber analysis obtained through the International Textile Center. Data was analyzed using SAS. Mean separation was determined using ANOVA and either LSD or DMRT (SAS 1985).

Results and Discussion

Thrips infestations were heavy and persisted past five weeks following planting. The dominant thrips species was the western flower thrips, *Franklinella occidentalis* (Pergande). This species is typically associated with wheat and moves into cotton once the wheat matures. The test field was in an area with abundant wheat fields. Based on total thrips numbers, the foliar ET treatment required three sprays through the five true leaf protection stage, beginning 5/22 (Fig. 2). Both the Gaucho and the Cruiser seed treatments with foliar treatments as a part of the package were treated two times beginning 5/28. The foliar treatment delayed until the end of the Roundup Ready application window (5 true leaves) was applied on 6/12. No other sprays were applied since the protocol called for foliar treatments to be terminated once 6 true leaves were present. This is the standard practice for growers as recommended by the Texas Cooperative Extension. Using percent immatures as a basis for determining if treatments had failed to provide protection from reproductive recruitment, the foliar Et treatment should have needed one fewer treatments (Fig. 3). The foliar spray- augmented Gaucho seed treatment still needed two sprays but the Cruiser seed treatment probably did not need a treatment.

Measurements of leaf area for the first five true leaves indicated that neither the Gaucho seed treatment nor the Roundup Ready window delayed foliar treatment were effective (Fig. 4). All other treatments provided some measure of damage control as evidenced by significant increases over the untreated check. Leaf area measurements are often used as an indicator of the severity of thrips feeding damage. There have been previous studies that have shown a direct relationship between leaf area increases over the untreated check in the treated plots and final lint yields (unpublished data). No studies have shown that the leaf area reduction is directly related to yield declines. It is suspected that when thrips are feeding on leaf buds in the plant terminal, they are also feeding on squares too small to see with the unaided eye. This feeding results in square loss and subsequent yield reductions.

COTMAN analysis provided useful information on the effects of the various thrips treatments on the progress of the affected crop. Target development curves indicated that the untreated check, the Gaucho seed treatment and the delayed foliar spray in the Roundup Ready treatment resulted in significant delays in maturity as evidenced by later cutout dates (Fig. 5). The other treatments tracked closely to the optimal target development curve after first flower. There was a 1-5 day increase in earliness at cutout, a 1-6 day decrease in time to achieve the 450 heat units needed for a boll to be safe from bollworm feeding damage and a 3-11 day earlier attainment of the 850 heat units need to have the crop ready for a harvest aid treatment, depending upon the particular treatment, when compared to the untreated check (Table 1). These results indicated that COTMAN could provide a means of measuring delays and earliness of various thrips management practices.

Yields were significantly increased by all treatments over the untreated check with the exception of the delayed foliar Roundup Ready Window application and the Gaucho seed treatment alone (Fig. 6). The results of this study reaffirmed that effective thrips control practices can provide good returns on dollars invested. The Cruiser seed treatment was shown to be as effective as the 3.5 lb./acre rate of Temik in providing cost effective thrips control. Foliar sprays were also effective when applied in a timely manner. This test confirmed what we had long suspected; that the foliar economic threshold should include percent immatures with total thrips counts in the economic threshold. No treatment is justified until percent immatures reaches about 30%.

Acknowledgments

The authors would like to thank Tyrri Vandiver for providing the test field and maintaining good cropping practices during the conduct of the test. Don Wanjura with the USDA ARS Stress Lab in Lubbock provided the LI-COR L 3100 laboratory area meter used in measuring leaf area. Funding was provided by Charles Grymes of Syngenta and Russ Perkins with Bayer CropSciences (formally Aventis).

References

Leser, J. F. 1986. Thrips management: problems and progress. Proc. Beltwide Cotton Conf. Nat. Cotton Council. pp. 175-178.

SAS Institute. 2000. SAS user's guide: statistics. SAS Institute. Cary, NC.

Table 1. Date each thrips control treatment reached cutout (NAWF = 5), caterpillar safety (450 HU's) and time of harvest aid application (850 HU's). Farwell, TX. 2002.

Treatment	NAWF = 5 July	450 HU's August	850 HU's September
UTC	28	17	18
Temik 3.5	25	13	10
Cruiser ST	24	12	9
Cruiser ST + Foliar ET	24	12	9
Gaucho ST	26	15	12
Gaucho ST + Foliar ET	23	11	7
Foliar ET	24	12	9
Foliar RR	27	16	15

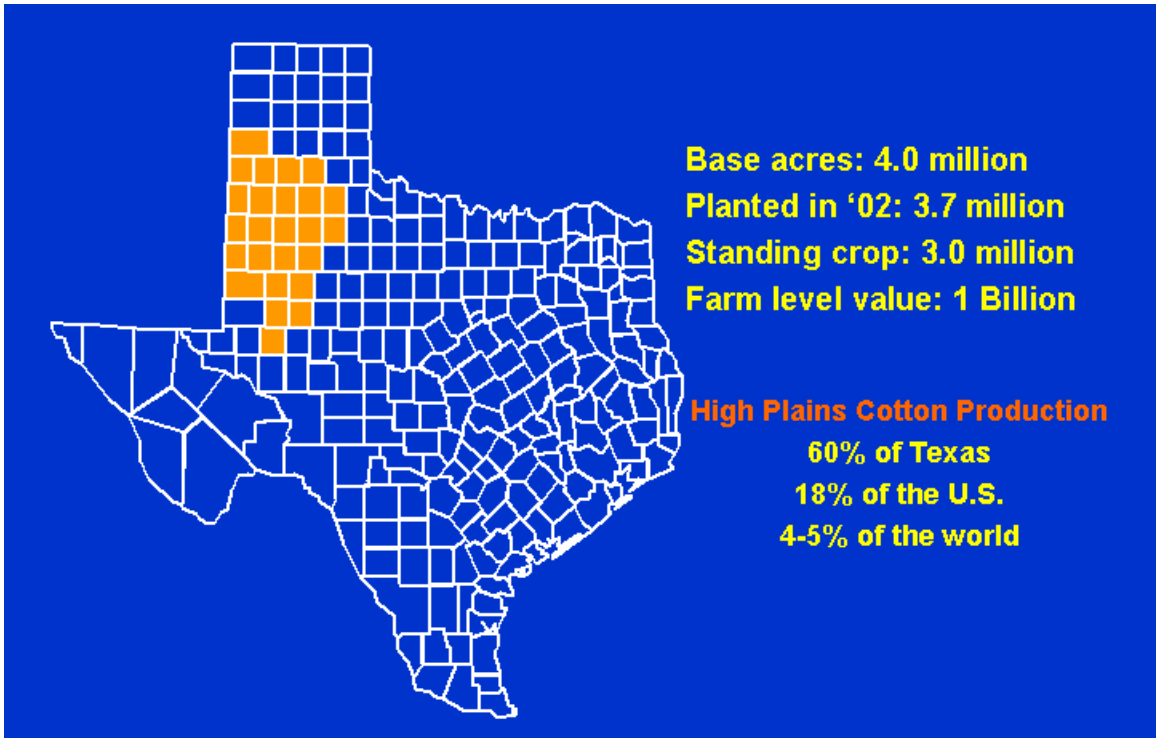

Figure 1. 25-county Texas High Plains cotton production region.

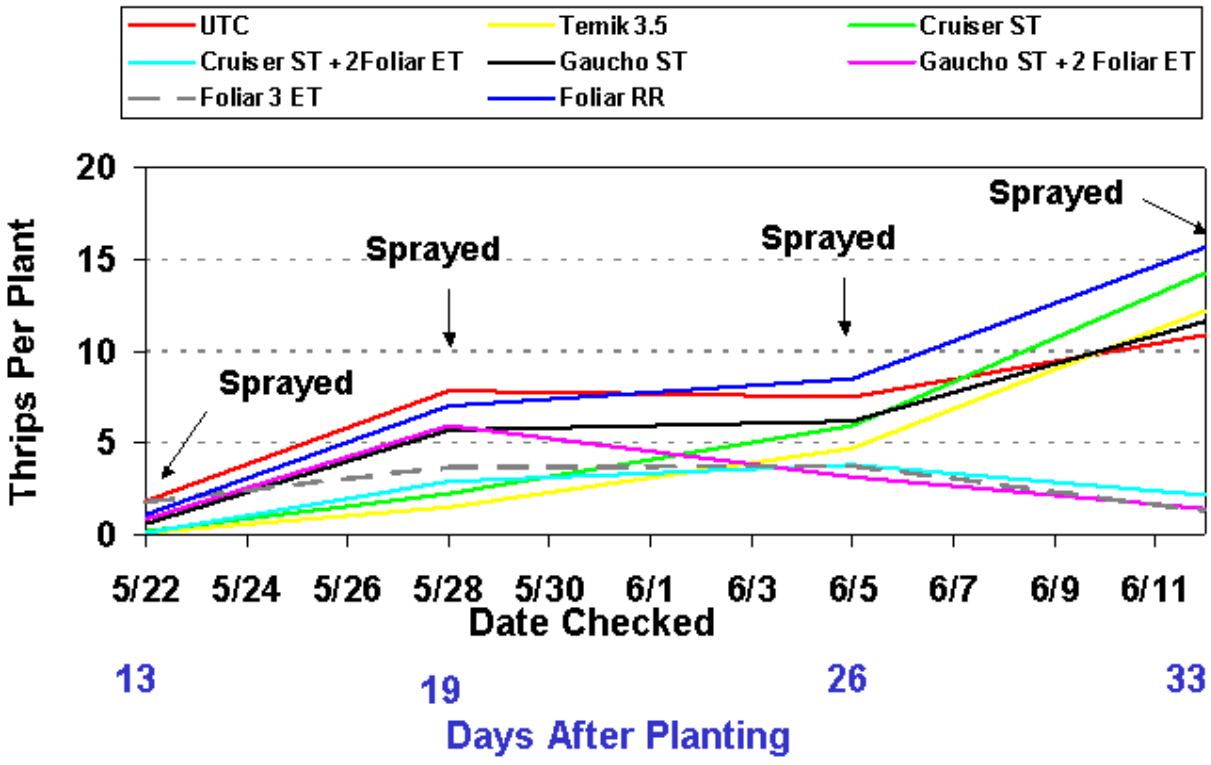

Figure 2. Number of thrips per plant in various treatments. Farwell, TX 2002.

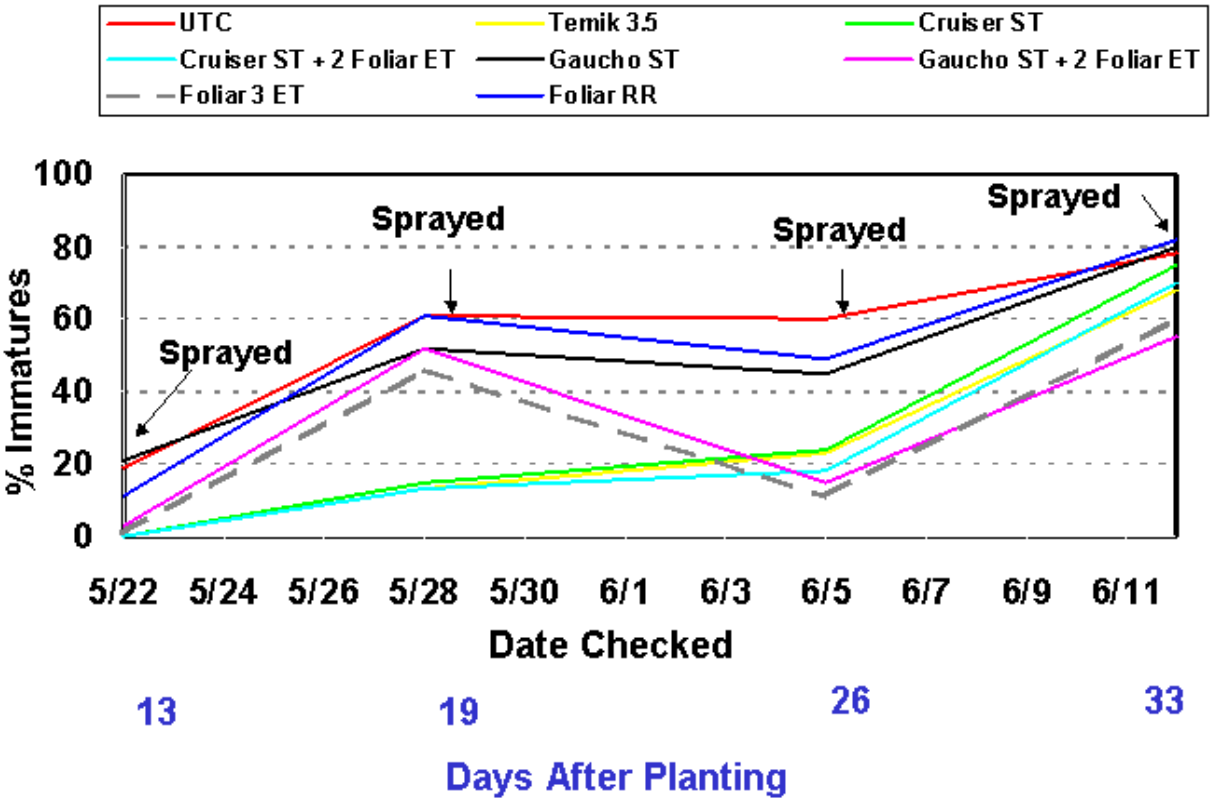

Figure 3. Percent immature thrips in various treatments. Farwell, TX 2002.

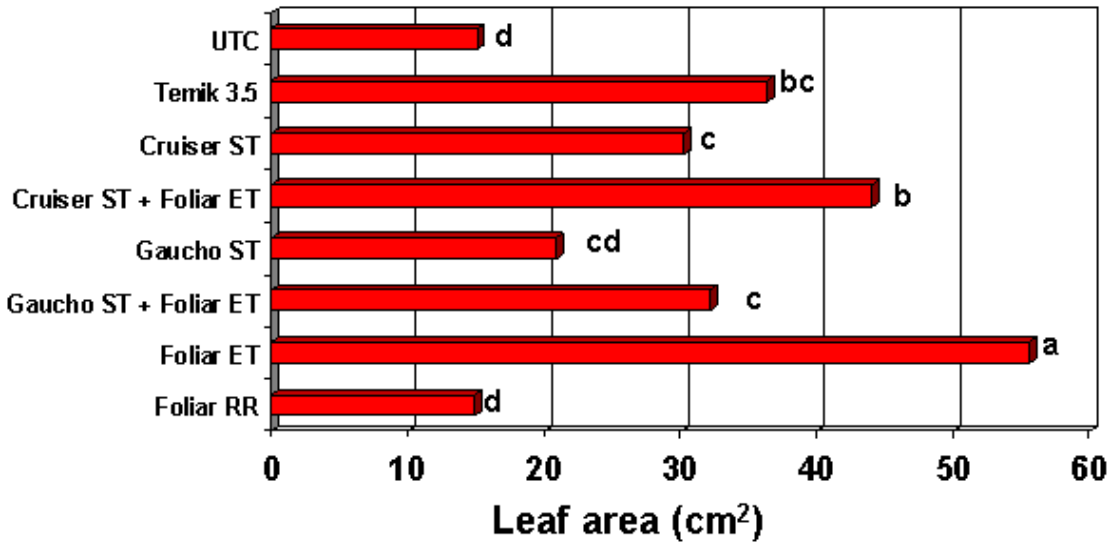

Figure 4. Leaf area in response to thrips feeding damage in various treatments. Farwell, TX 2002. Means followed by the same letter are not significantly different (P>0.10).

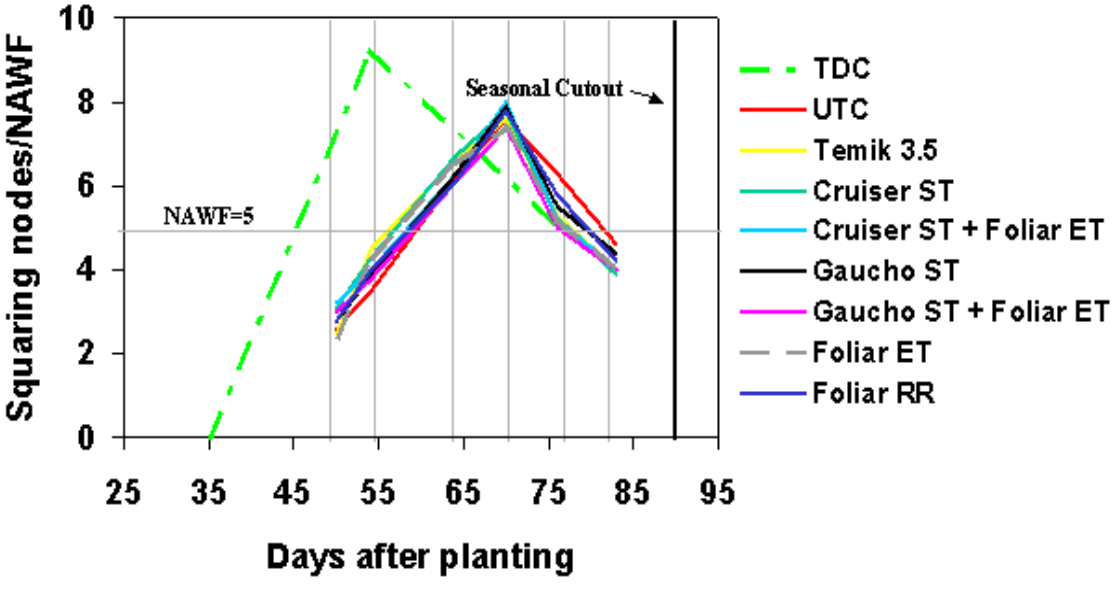

Figure 5. COTMAN Target Development Curves (TDC) for various thrips control treatments. Farwell, TX 2002.

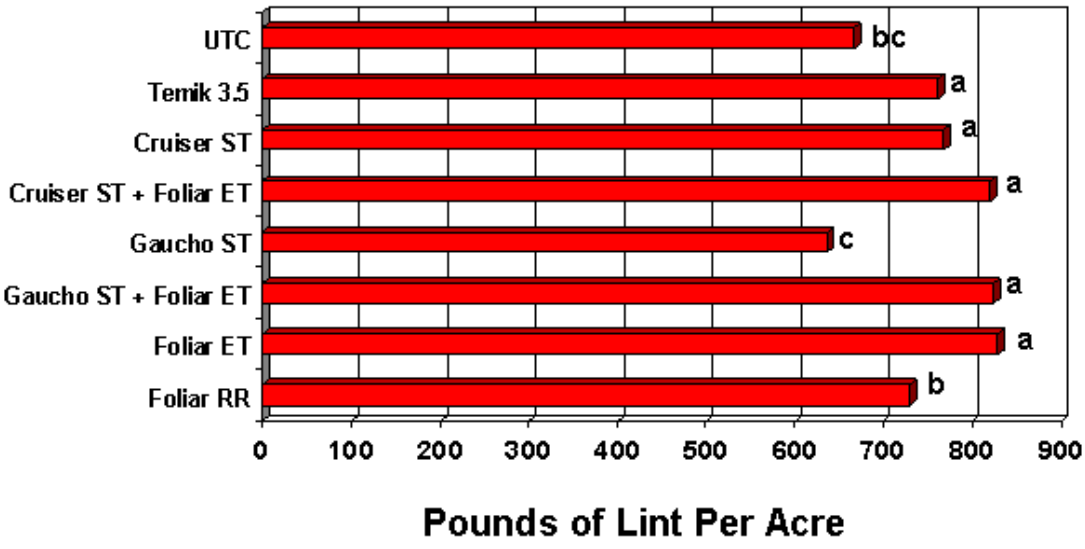

Figure 6. Tields in response to various thrips control practices. Farwell, TX 2002. Means followed by the same letter are not significantly different (P>0.10).

Photo 1. Close-up of western flower thrips.

Photo 2. Severe thrips feeding damage to seeding cotton plants in the untreated check.

Photo 3. Comparison of untreated check to Temik treatment, 2-row plots.