Plains Pest Management Association

Integrated Pest Management Program

Hale, Swisher, and Floyd Counties

<u>2015 Annual Report</u>

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Extension Agent-IPM

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2015 Plains Pest Management Newsletters available at: http://hale.agrilife.org/

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A successful Extension IPM program hinges upon strong support, active participation, and a desire to advance and improve IPM practices from area producers, agribusiness, gardeners, and homeowners.

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Jerik Reed	Plains Pest Management, Lab Assistant
Denise Reed	Plains Pest Management, Lab Assistant

Plains Pest Management 2015 Advisory Committee

Ronald Groves	Kent Springer	Jerry Rieff
Jimie Reed	Jimmy Sagaser	Joe McFerrin

2015 Plains Pest Management AG IPM

Blayne Reed, Extension Agent – IPM, Hale, Swisher, & Floyd Counties

Relevance

Production agriculture is the foundation of the economies of Hale, Swisher, & Floyd Counties. Pests continually threaten production agriculture and persistently develop to overcome existing control measures. Integrated Pest Management (IPM) is an affective and environmentally sound approach to pest management that uses a combination of evolving control practices to maintain economic and environmental stability in production agriculture. The Plains Pest Management IPM Program is an educational program that strives to educate the producers of Hale, Swisher, & Floyd Counties about the latest IPM principles and to help implement sound IPM control strategies into producer's operations in Hale & Swisher Counties.

Response

The Plains Pest Management Association, made up of 16 participating grower members and steered by a chairing committee and the IPM agent, made informing the producers in Hale, Swisher, & Floyd Counties about the latest IPM principles, control methods and options a priority in 2015. During the year the activities included:

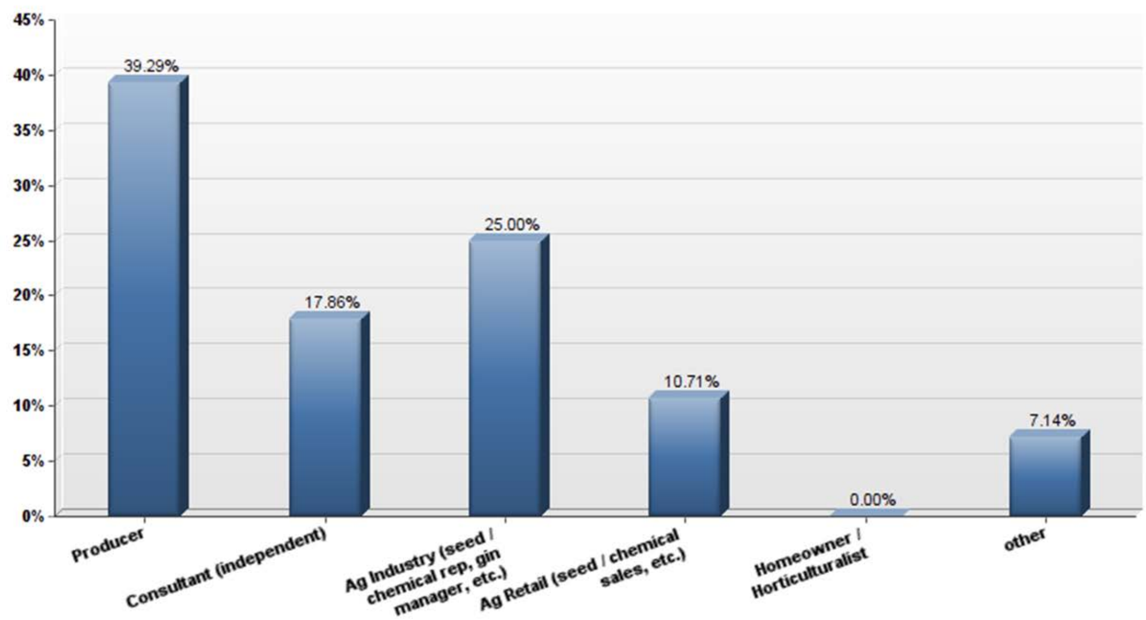
- Weekly field scouting for insect, weed, and disease problems of the 16 participating grower member's fields (7,201 acres of all crops) were conducted over the 2015 growing season.
- Information from this field scouting was shared, interpreted, and IPM solution recommendations given to the participating growers via scouting report and direct interaction.
- Data generated from the field scouting, along with pertinent IPM research and successful recommendations were shared through the Plains Pest Management Newsletter weekly throughout the growing season and monthly during the offseason. (18 issues, 294 subscribers).
- Locally conducted16 independent agriculture IPM related research trials and shared results rapidly through newsletters, blogs, radio programs, and direct interaction.
- Made 4 Pest Patrol Hotline submissions summing a current pest situation nearing problem status area wide and gave IPM recommendations.
- IPM and its implementation, current pest pressure, emerging pests, and control recommendations were major topics for all weekly Ag radio programs conducted. Two weekly on the 1090 AgriPlex Report and one weekly on Fox Talk 950's IPM report. Gave 1 IPM related television interview.
- Gave IPM presentations at 8 grower meetings, 2 professional meetings, 3 producer turn-row meetings, 5 Progressive Grower Meetings, and 1 Field Scout Schools where IPM was a topic (where 48 CEUs were offered total).

- Assisted with district IPM research trials and gave resulting data rapid dissemination of results through newsletters, blogs, radio programs, and direct interaction.

Results

A retrospective post evaluation instrument was distributed to the subscribers of the Plains Pest Management Newsletter and was posted for all viewers of the Plains Pest Bugoshere (blog) to interact with and respond to.

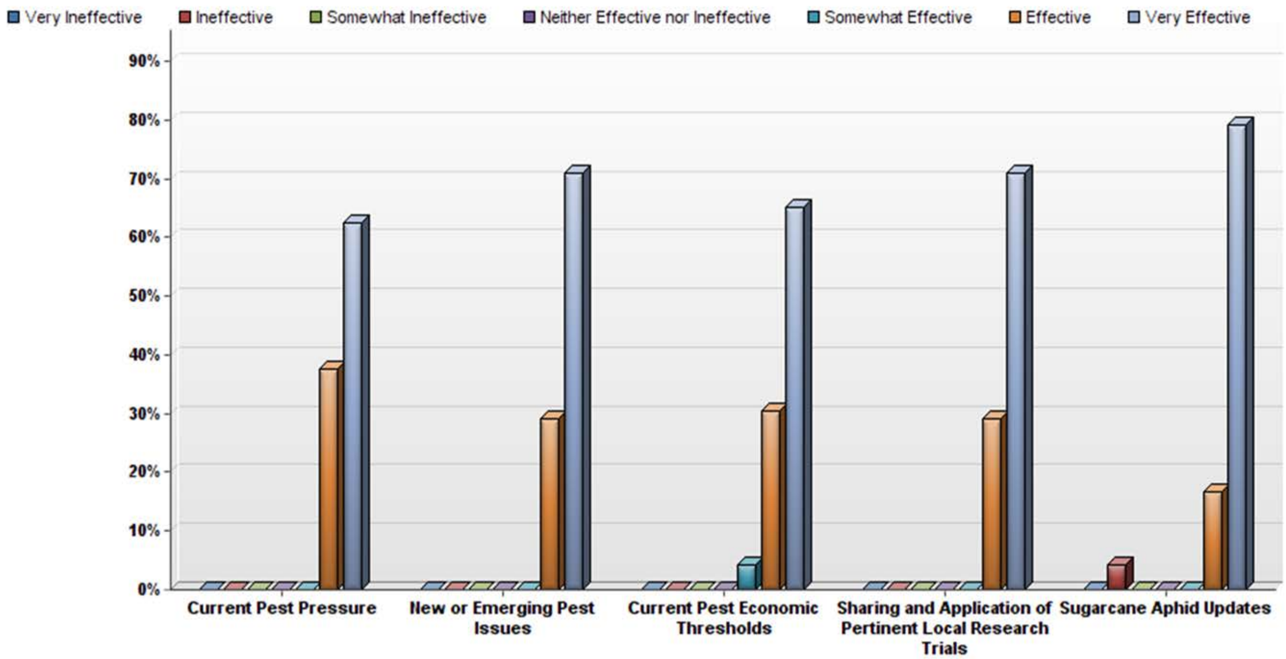
The survey responders were made up of:



Survey responders were asked, “In general, do you feel that applying Integrated Pest Management principles and strategies reduces risk associated with production?” and “Has the Texas IPM program consultations, demonstrations, newsletters, meetings, radio programs, blogs, and other educational activities resulted in reduced pesticide use in your production operation, home, or business in recent years?”

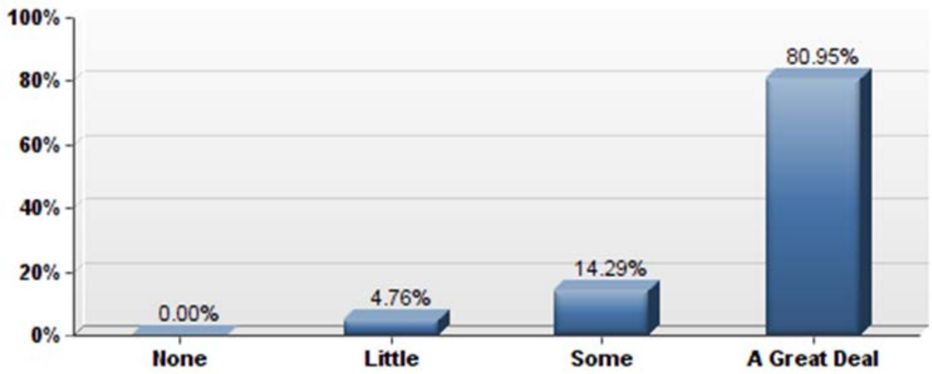
- <u>96% of the responders believed that IPM reduced risk</u> associated with production while **<u>77% indicated that Texas IPM Programs had reduced pesticide use</u>** during recent years.

Survey responders were asked to, “Please select the column that best reflects how helpful the Plains Pest Management IPM program was during the 2015 growing season in improving your awareness of the following issues.”

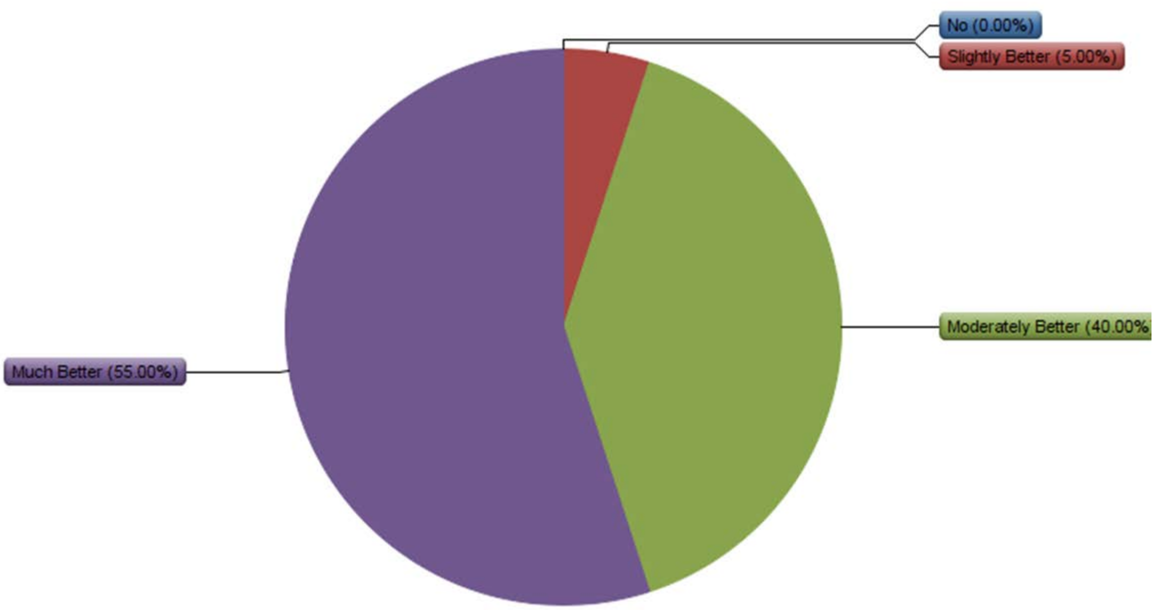


The sugarcane aphid made its unwelcome appearance on the High Plains during a critical time for the 2015 sorghum crop’s development. The Hale, Swisher, & Floyd IPM Unit spent quite a bit of time and effort toward understanding and controlling this new, invasive, and little understood aphid pest species.

Survey responders were asked “How much impact did the Plains Pest Management’s 2015 locally conducted research efforts have on your sugarcane aphid control decision making during the 2015 sorghum growing season?”

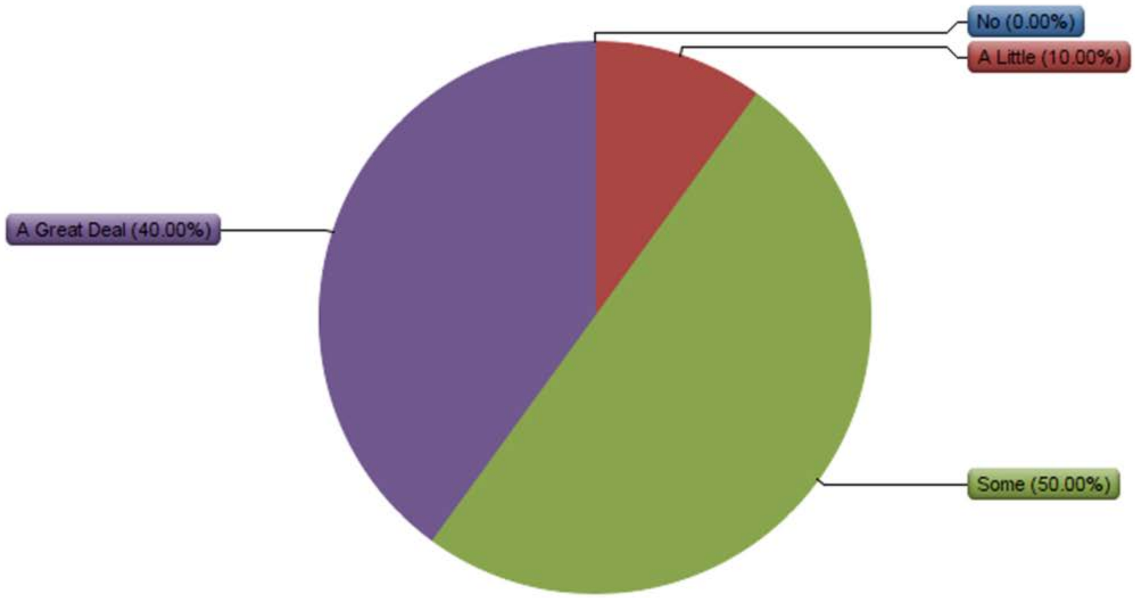


Survey responders were also asked, “Due to the 2015 efforts of the IPM Program in weed management, do you feel you will be better prepared to meet the weed challenges on your production or influenced crop acres in the future?”



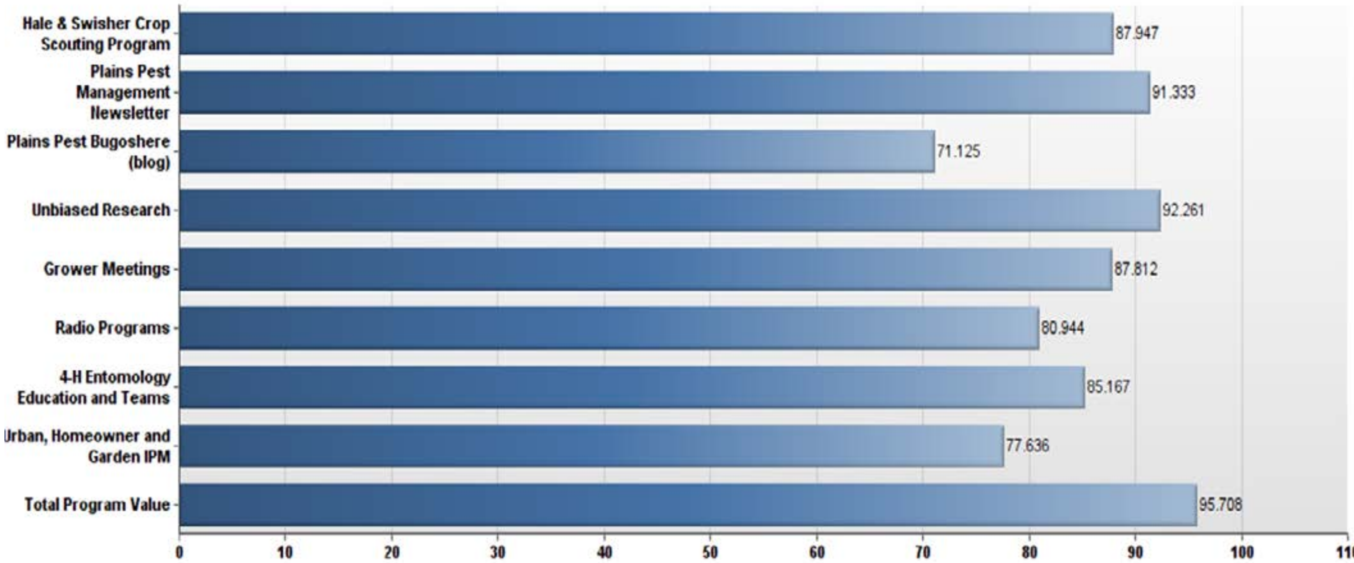
Texas A&M AgriLife strives to provide education about spray drift management at many producer, grower, and customer meetings. The IPM Program also highlights this effort in most of its educational outreach projects.

Survey responders were asked, “Do you feel this effort has reduced off site chemical drift to homeowners, horticultural sites, and other unintended targets?”



Survey responders were asked what they felt the per acre monetary value of the Plains Pest Management Association was in 2015. The average value for all responders was **$54.11 per production acre**.

Survey responders were also asked, “If you could assign a 0 to 100 value to each component of the Plains Pest Management Association's efforts and the information generated by those efforts, what would that value be?



The IPM Program in Hale & Swisher Counties is proving to have real value and impact in the Hale, Swisher, & Floyd production agriculture economy. If the survey responder estimated **$54.11 per production acre estimate** of the value of the IPM Program is multiplied by **half of the irrigated cotton, corn, and sorghum production acres in Hale, Swisher, & Floyd Counties, a <u>$14,555,590.00 potential impact figure</u>** emerges. Even if this purposely conservative survey based estimate proved to be high, the Plains Pest Management Association is still not only important to the production agriculture economy in the Hale, Swisher, &Floyd area, but is a significant part of that economy's maintenance and function.

2015 Plains Pest Management "In-Depth" Weed IPM

Blayne Reed, Extension Agent – IPM, Hale, Swisher, & Floyd Counties

Relevance

Production agriculture is the foundation of the economies of Hale, Swisher, & Floyd Counties. Following the 2011 growing season, palmer amaranth, often referred to as pig-weed or careless-weed, was confirmed to have resistance to glyphosate in Hale, Swisher, & Floyd County. The region's heavy reliance upon this herbicide for weed control, particularly over the top in glyphosate tolerant cotton, fundamentally threatened and impacted the sustainability of the agricultural economy of these counties and the region. It is imperative that this threat be met with sound IPM principles that offer environmentally sound solutions that maintain profitability.

Response

The Plains Pest Management Association, made up of 16 participating grower members and steered by a chairing committee and the IPM agent, made informing the producers in Hale and Swisher Counties about weed IPM principles, control methods and options a priority in 2015. During the year the activities included:

- Weekly field scouting, which included weed evaluations, of the participating grower member's fields (7,201 acres of all crops) were conducted over the 2015 growing season.

- Information from this field scouting was shared, interpreted, and IPM solution recommendations given to the participating growers via scouting report and direct interaction.

- Data generated from the field scouting, along with pertinent weed IPM research and successful recommendations were shared through the Plains Pest Management Newsletter weekly throughout the growing season and monthly during the offseason. (18 issues, 294 subscribers).

- Weed IPM and its implementation was a major topic of interest for all of the weekly Ag radio programs conducted. Two weekly on the 1090 AgriPlex Report and one weekly on Fox Talk 950's IPM report.

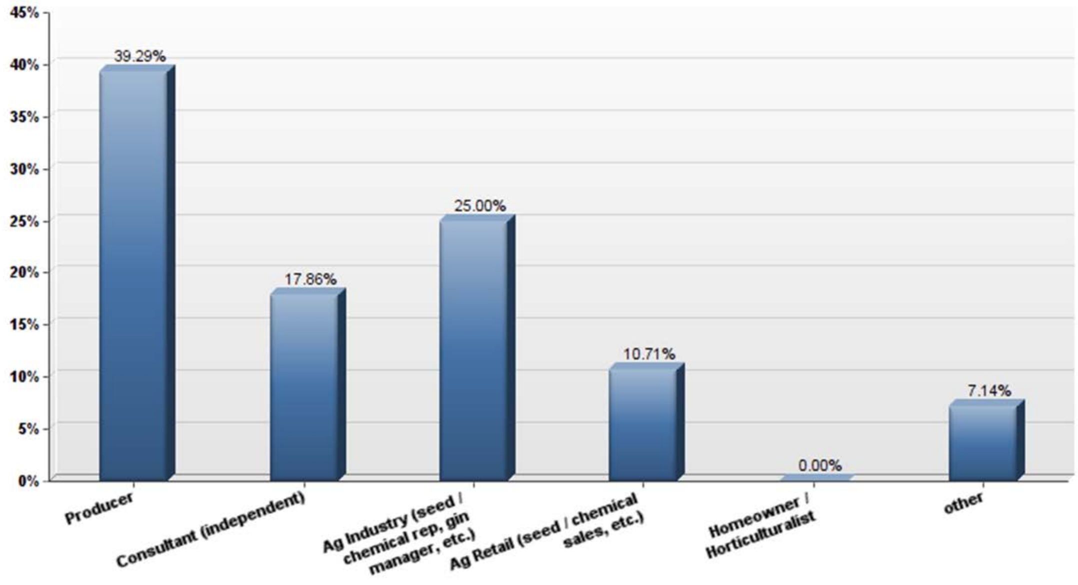
- Gave weed IPM presentations at 7 grower meetings, 1 professional meeting, 2 turn-row meetings, and held 6 Progressive Grower Meetings where weed IPM was a topic (where 36 CEUs were offered total).

- Locally conducted 3 independent Weed IPM related research trials over 2014-2015 and shared results rapidly through newsletters, blogs, radio programs, and direct interaction.

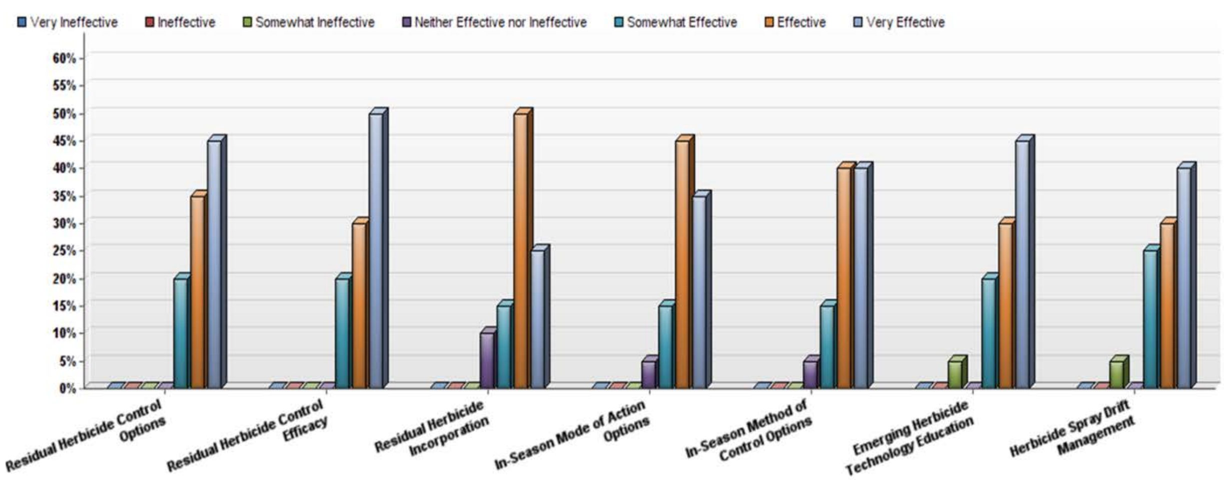
Results

A retrospective post evaluation instrument was distributed to the subscribers of the Plains Pest Management Newsletter and was posted for all viewers of the Plains Pest Bugoshere (blog) to interact with and respond to.

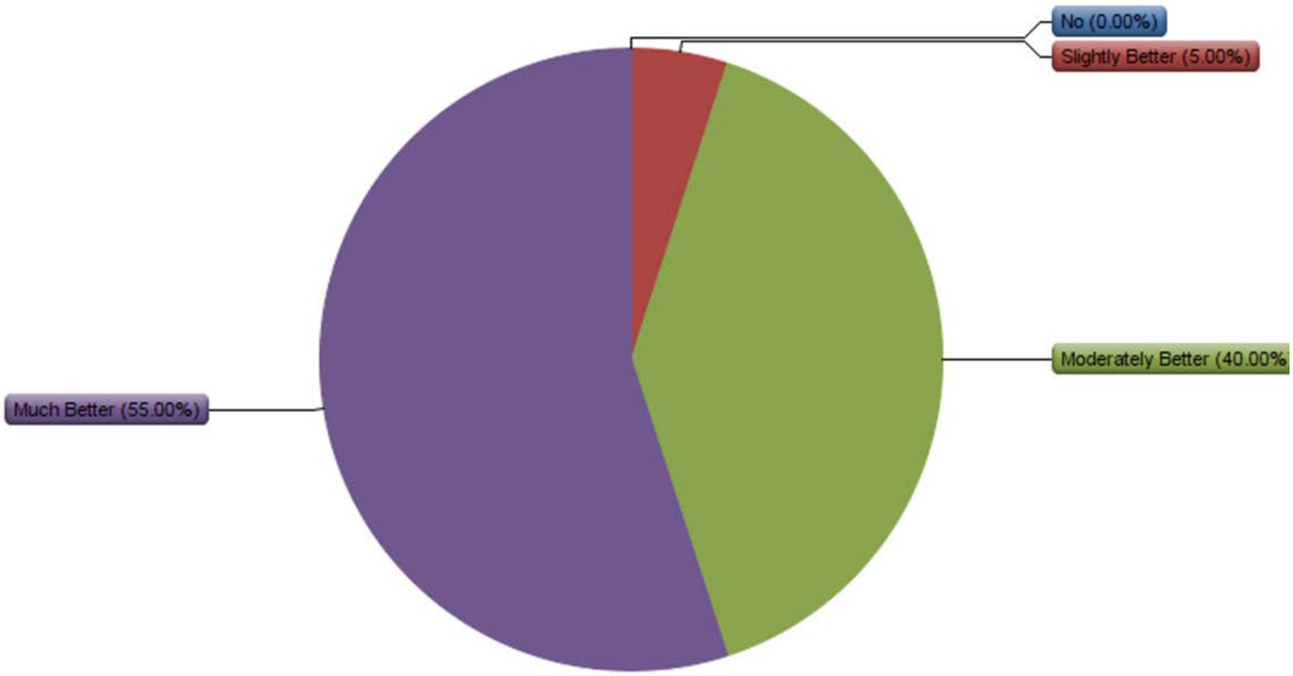
The survey responders were made up of:



Responders were asked, “Please select the column that best reflects the impact of the 2015 IPM Program's weed management educational efforts in resistant weed control for your situation as your prepare for the 2015 growing season.”



Responders were also asked, “Due to the 2015 efforts of the IPM Program in weed management (local independent research trials, direct contact, grower meetings, field days, radio programs, newsletters, blogs, and turn row meetings, etc.), do you feel you will be better prepared to meet the weed challenges on your production or influenced crop acres in the future?”



Following the annual Hale, Swisher Ag Conference held on April 14, 2015 in Plainview, Texas, a retrospective post evaluation was given to the participants. Participants were asked to rate their understanding both before and after the conference on two specific weed IPM topics:

Management strategies to control herbicide resistant weeds.

Factors involved in weed management systems and herbicide selection.

The responses were:

(Understanding Before) - Management strategies to control herbicide resistant weeds.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	5	11.6	12.2	12.2
	Good	25	58.1	61.0	73.2
	Fair	8	18.6	19.5	92.7
	Poor	3	7.0	7.3	100.0
	Total	41	95.3	100.0	
Missing	System	2	4.7		
Total		43	100.0		

(Understanding After) - Management strategies to control herbicide resistant weeds.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	31	72.1	75.6	75.6
	Good	9	20.9	22.0	97.6
	Fair	1	2.3	2.4	100.0
	Total	41	95.3	100.0	
Missing	System	2	4.7		
Total		43	100.0		

(Understanding Before) - Factors involved in weed management systems and herbicide selection.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	4	9.3	9.8	9.8
	Good	23	53.5	56.1	65.9
	Fair	13	30.2	31.7	97.6
	Poor	1	2.3	2.4	100.0
	Total	41	95.3	100.0	
Missing	System	2	4.7		
Total		43	100.0		

(Understanding After) - Factors involved in weed management systems and herbicide selection.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	28	65.1	68.3	68.3
	Good	12	27.9	29.3	97.6
	Fair	1	2.3	2.4	100.0
	Total	41	95.3	100.0	
Missing	System	2	4.7		
Total		43	100.0		

Summary

The battle to control weeds in our crops will likely never be over, and for Hale, Swisher, & Floyd Counties the battle with glyphosate resistant palmer amaranth has just begun. Nor will the Plains Pest Management cease in weed IPM educational and research efforts. Nonetheless, the efforts in 2015 Plains Pest Management Weed IPM seem to have had a direct impact upon producers, consultants, Ag industry, and Ag retail in this area.

2015 General Horticulture, Homeowner, & Gardening IPM Education

Blayne Reed, Extension Agent – IPM, Hale, Swisher, & Floyd Counties

Relevance

Pests affect all aspects of human life. Pests continually threaten production agriculture, stored grain, human health, households, and even the stored foods in our pantries. Meanwhile, these same pests persistently develop to overcome existing pest control measures. Integrated Pest Management (IPM) has a thirty plus year history of proven environmentally sound and affective approaches to pest management by utilizing a combination of established principles and evolving specific control practices to maintain pest control. The Plains Pest Management IPM Program is an educational program that strives to educate the producers and citizens of Hale & Swisher County about the IPM principles and the latest IPM control methods to help implement IPM into our daily pest control strategies.

Response

The Plains Pest Management Association, made up of 16 participating grower members and steered by a chairing committee and the IPM agent, made informing the general populace of Hale, Swisher, & Floyd County about IPM principles and implementation into our daily pest control habits one of the IPM Program's focus in 2014. During the year activities included:

- Devoted 1 mosquito IPM article to the Plains Pest Bugoshere (blog) and 1 article to the weekly Plains Pest Management Newsletter.

- Gave 3 mosquito IPM presentations and 1 bed bug presentation to local civic groups. Gave 2 general IPM education and 1 spray drift management presentations given at North Region Right of Way Conference and Amarillo Ornamental & Turf Conference. And 1 IPM and garden pest control presentations to Plainview Area Farmer's Market Meetings.

- Direct interaction with customer base through site inspections, phone calls, office visits, and customer questions. All interactions included IPM recommendations.

- IPM principles and its implementation for home, office, horticulture, agriculture, and gardening were common topics for all of the weekly Ag radio programs conducted.

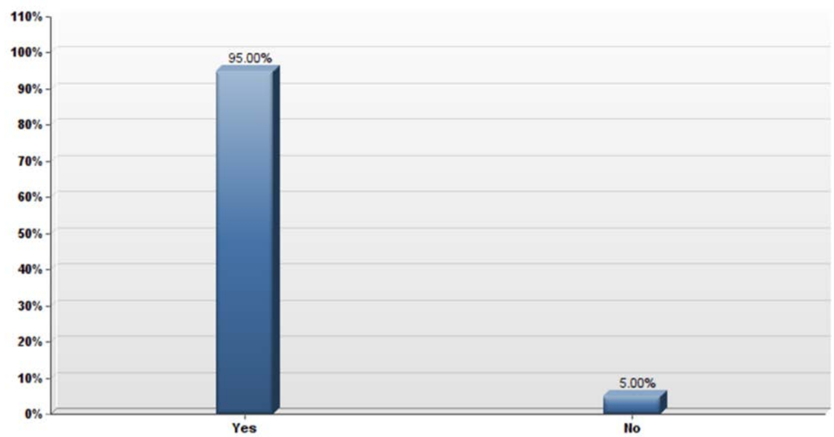
- Participation in the Hale County Ag Fair in presenting IPM presentation to 510 area youth, participation in and coaching of the Hale & Swisher 4-H Entomology ID Teams, led Hale & Swisher new 4-H insect collection projects, and held one insect collection workshop.

Results

A retrospective post evaluation instrument was distributed to the subscribers of the Plains Pest Management Newsletter and was posted for all viewers of the Plains Pest Bugoshere (blog) to interact with and respond to.

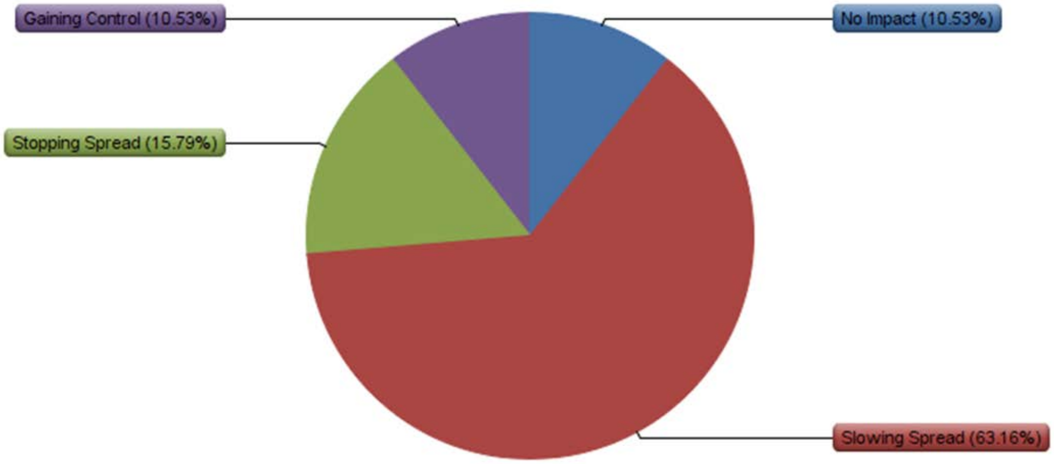
Responders were asked, “During the summer of 2015 the mosquito population flourished following frequent rain events threatening public health and sanity. The Hale, Swisher, & Floyd IPM Unit made educating about the mosquito threat and mosquito IPM a focal point by addressing the topic 8 times on the weekly local and regional IPM radio programs, covering Integrated Mosquito Management (IMM) at 3 local civic club meetings, releasing 1 blog noting IMM, 1 newspaper alert about IMM, and 1 newsletter article on IMM.

Do you feel these efforts had a positive impact on mosquito control and public health in the area?



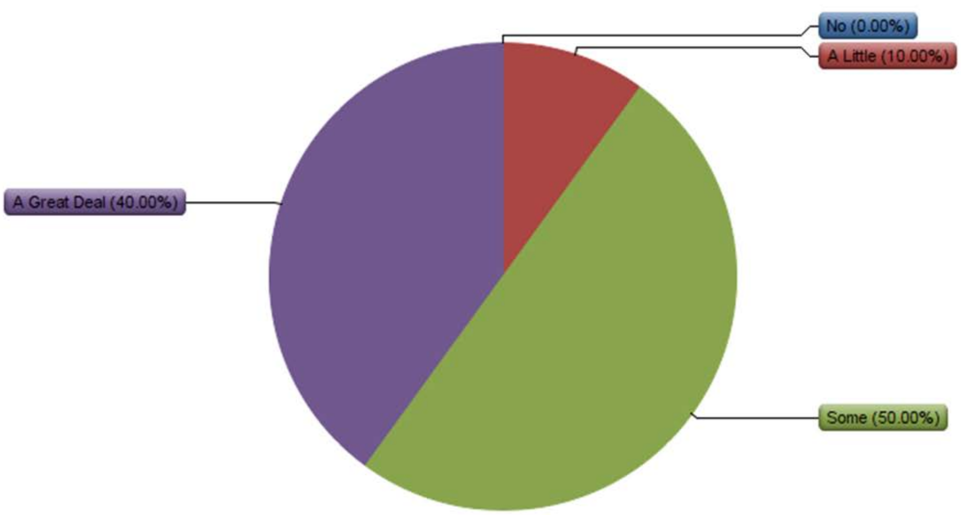
Responders were then asked, “Many health and IPM officials now view the bed bug situation as potentially epidemic across North America and at a very critical stage. During 2015, the Hale, Swisher, & Floyd IPM Unit offered education about bed bugs and bed bug IPM on 2 of the weekly local radio programs, presented bed bug IPM at 1 civic group meeting, and made 6 site visits for bed bug scouting and IPM control consultations.

Do you feel these 2015 efforts of the IPM Program in bed bug IPM are aiding in slowing the spread of bed bugs, stopping the spread of bed bugs, or controlling bed bugs?”



On a related topic, responders were asked, "Texas A&M AgriLife strives to provide education about spray drift management at many producer, grower, and customer meetings. The IPM Program also highlights this effort in most of its educational outreach projects.

Do you feel this effort has reduced off site chemical drift to homeowners, horticultural sites, and other unintended targets?"



Summary

The vast majority of responders to the retrospective post survey represented the various agricultural production sectors in Hale, Swisher, & Floyd Counties more than the general citizenry. Still the IPM Program's efforts in horticulture, homeowner, and gardening IPM education received high marks for value from these agricultural sectors, proving an importance placed for general IPM education in the area. Meanwhile, bed bugs and mosquitoes are tough pests to control, but our educational efforts seem to have offered solid results. . .

2015 Educational Activities

Farm Visits	5262
Number of Newsletters Released	19
Newsletter Recipients	7255
Direct Contacts	6319
Radio Programs	97
Blog Releases	30
Television Spots	1
Ag Consultants and Field Scouts Trained	141
Newspaper / Magazine / online Magazine articles written or interviewed for	18
Research Trials Initiated	19
Research Trials Supported	10
Presentations / Programs / Field Days Made for Adults	43
Presentations Made to Youth	14
Pest Patrol Hotline Alerts	4
Articles for other blogs	3
Educational Videos Released	3

Activity Highlights

Plains Pest Management Scouting Program (7,201 acres)
Applied Research Projects
Weekly Radio Programs
Hale County Summer Crop Field Day
Swisher Fall Ag Conference
Hale & Swisher 4-H youth Entomology Projects
Horticulture IPM Spot Checks
District 2 4-H Youth Leader Conference
High Plains Association of Crop Consultants
CEU training
Texas Pest Management Association
SET
FOCUS on South Plains Agriculture

Plains Pest Management Newsletter
Plains Pest Management Bugoshere (blog)
Hale & Swisher Ag Day
Hale County Wheat Field Day
Swisher Spring Ag Day
Amarillo Farm & Ranch Show
Hale County BLT Program Support
Progressive Growers Breakfasts
Entomological Society of America
Field Scout School
Site Scouting and IPM Recommendations
Pest Patrol Hotline
Hale / Swisher Mobile Field Tour
Texas Sugarcane Aphid News

2015 at a Glance

The following is a brief overview of the 2015 growing season in Hale & Swisher Counties. Copies of the Plains Pest Management Newsletters published in 2015 are available at http://hale.agrilife.org/ for a more in-depth look at specific pest pressure, weed situations, crop conditions, and environmental conditions at any given week.

Each growing season is unique and the weather and pest of 2015 were no exception. A dry winter and early spring led to way to rain filled mid-spring and planting season that continued through to mid to late-summer. The rainfall then seemed to shut down and return to a very dry and warm weather pattered that included some timely but very spotty rains in late-summer through fall and early-winter and late season heat unit accumulation.

While all four of the majorly produced commodity prices for cotton, corn wheat, and sorghum fell below the average cost of production, the heavy spring rains brought relief to a long standing drought situation. The lack of moisture during key stages of the 2015 wheat crop's development, yields were capped but heavy moisture helped grain development but severely hampered harvest, eventually causing several wheat fields to be lost. These rains also interfered with plantings and caused many area producers to change their planting intentions. The area's cotton crop was delayed in planting and large quantities of acres eventually shifted to corn and sorghum to take advantage of the moisture and avoid the potential damage of a short-season cotton crop. This included a notable amount of dry-land that shifted into corn production. The early rains gave all three crops a very good start despite any lateness. During late July, as the rain pattern became spotty, most of these crops were midway through their respective development. Areas that receive little or no additional rain for the summer had difficulty keeping up with irrigation needs and dry-land corn was lost. Areas that received the spotty rains did so in a very timely manner and made even dry-land corn successful. While PGR use in cotton was high early in the growing season, a decent boll load and reduction of rain kept the crop in check. Areas missing the July and August summer rains still harvested a light dry-land cotton and sorghum crop while area catching the July and August rains set producer dry-land record highs for those crops. As the drying summer led to a dry fall, heat unit accumulation continued that developed the late cotton crop and there were very few instances of low quality cotton due to a short season crop, some minor leaf grade issues aside. Eventually, spotty fall rains and snow returned across the majority of the area and the 2016 wheat crop was able to successfully begin after a successful summer crop harvest.

Pests during 2015 were considered severe and proved very costly to the area. The arrival of the sugarcane aphid as a new and invasive pest in sorghum caused both widespread treatment and damages. Many area fields if left untreated, failed to obtain good aphid control, or were not sprayed in a timely manner were hit hardest. New economic thresholds for the sugarcane aphid on Texas High Plains sorghum were developed locally as quickly as research could be finalized. For several producers the answers came too late. Producers how responded to the new research and monitored their sorghum fields closely had good yields and profitable sorghum.

While the sugarcane aphid made most of the news highlights as a severely damaging invasive, the dry and warm conditions during mid and late summer caused a spider mite outbreak in area corn that reached the highest mite population and pest level levels the area had seen in 20 years. Over 90% of the area's corn was treated at least once for economic populations of spider mites. Also attacking the 2015 corn crop was an abnormally high amount of Southern Rust. Well over half the area's corn also had to be treated for economically this and a few other damaging corn diseases. Together with the mites, the cost of controlling corn pests was significantly higher than the area had witnessed in many years, easily robing what economic benefit the early rains had for what turned out to be average grain yield and then some.

The more traditional pests were much less notable in 2015. While populations of bollworms and fall armyworms were high, most of these pests opted for their more preferred host of corn or sorghum with so much of those crops getting a late start rather than attacking the available cotton. In the late corn, bollworms are of no economic concern while the fall armyworms made little impact in 2015. If sorghum became the host plant of these two pests, the tremendous populations of beneficial predators that had built on the tremendous sugarcane aphid population quickly made short work of any building problem. Lygus and fleahoppers in cotton were a larger concern with approximately 15% of the area's cotton requiring treatment for these two pests. Finding those fields at economic risk was of extreme importance early in the growing season, but this level of pest pressure is lighter than what most would consider an average Lygus or fleahopper population pressure season. The early rains had a significant impact on area thrips, keeping economic populations down on seedling cotton. Most fields were treated at least once for thrips, but subsequent applications were not needed to reach cotton's reproductive stages. Higher than usual aphid pests, of multiple species, and predators, due mostly to the sugarcane aphid populations have eventually moved into the 2016 wheat at high levels. Thus far, this high population of predators has prevented many of the usual wheat pests treatments.

2015 Applied Research and Demonstration Projects

Sugarcane Aphid (Melanaphis sacchari) Field Abundance on Resistant and Susceptible Sorghum Hybrids in the Southern High Plains of Texas

2015 Chemigation for Control of Economic Sugarcane Aphids in Grain Sorghum

2015 Sorghum Partners Grain Sorghum Variety Trial

2015 Population Monitoring of Adult Bollworms in Hale & Swisher Counties

2015 Spider Mite Product Efficacy Evaluation in Corn

2015 Cotton Harvest Aid Demonstration Trial, Swisher County

2015 Cotton Seed Treatment Product Efficacy Evaluation for Thrips Control

2015 Floyd County Phytogen Cotton Variety Trail

2015 Swisher County Phytogen Cotton Variety Trail

TWO YEARS OF PRE-PLANT RESIDUAL HERBICIDE EFFICACY TRIALS ON TEXAS HIGH PLAINS COTTON

2015 Velum Total in Swisher/Hale County Cotton for Nematode & Thrips Control

2015 Hale County Sugarcane Aphid Product Efficacy in Grain Sorghum

Sugarcane Aphid (Melanaphis sacchari) Field Abundance on Resistant and Susceptible Sorghum Hybrids in the Southern High Plains of Texas

Blayne Reed (1), Dr. Patrick Porter (2) and Dr. Ed Bynum (3)

(1) Texas A&M AgriLife Extension, Plainview, TX, (2) Texas A&M AgriLife Extension, Lubbock, (3) Texas A&M AgriLife Extension, Amarillo

Texas A&M AgriLife - Halfway Experiment Station, Halfway, Texas

Summary

One commercially available sorghum line (NK 7633) and two experimental sorghum lines (SPX 17514, and SPX 17414) that had in previous greenhouse and field studies shown to exhibit a sugarcane aphid resistant trait or traits and a known susceptible line, (KS 585) were utilized to evaluate the economics and strength of the resistant trait(s) in a production field situation. The four lines were planted under a pivot irrigation system in a limited irrigation scenario into a large plot trial with three replications. Weekly checks for sugarcane aphid presence began shortly after emergence and continued until 10 August when the aphid population was high enough to begin data collection for the trial. The sugarcane aphid population increased rapidly and only two data collection weeks were collected before the aphid population far surpassed the South Texas established economic threshold. On 21 the field was indecently oversprayed with 1.2 oz. Transform along with neighboring sorghum trials. While the ability to gage the absolute efficacy of any potential sugarcane aphid resistance was lost due to the overspray, the trial did hold true value to evaluate the trait under real world situations. Following the overspray, the aphid population crashed with the aid of beneficial predation and no more aphid counting dates were relevant. A 0-10 sugarcane aphid damage rating scale was utilized to rate sugarcane aphid damage in the trial. Two damage rating dates were utilized, the first was 24 August shortly after the overspray, and the second at the end of the growing season on 29 September. The trial was combine harvested on 29 October.

The three resistant sorghum genotypes had significantly fewer total sugarcane aphids per leaf on 17 August when compared to the susceptible genotype proving that the suspected resistant trait is effective in field situations (*P*=0.0267, LSD=46.67). The three resistant lines exhibited significantly less sugarcane aphid damage on the 0-10 damage scale on both rating dates (in-season damage rating (*P*=0.0010, LSD=0.927)), (end of season damage rating (*P*=0.0001, LSD=0.763)). The three resistant lines also significantly out yielded the susceptible line by an average of 1,169 lb. grain (*P*=0.0122, LSD=704.7125).

It should be noted that all lines were well over any established sugarcane aphid economic threshold. This confirmed and currently available form of sugarcane aphid resistance should be viewed as applicable and valuable but very weak compared to the level of resistance needed. It is not known if any line would have been harvestable without the support of the incidental overspray treatment.

Objective

The sugarcane aphid, *Melanaphis sacchari* (Zehntner), first appeared as a pest of South Texas grain sorghum during the 2013 growing season and quickly spread to several sorghum producing regions. Sugarcane aphid did not reach the key Texas High Plains sorghum production region until late August of 2014. By October of 2014 the pest was heavily ensconced on the High Plains sorghum crop but, due to the pest's late arrival and the advanced developmental stage of the sorghum crop at first colonization, the sugarcane aphid had limited economic impact during the 2014 growing season. However, the sugarcane aphid caused major yield and harvest losses throughout most of the southeastern United States in 2014. Because the sugarcane aphid greatly expanded its range to new areas in 2014 it was expected to arrive much earlier on the Texas High Plains during the 2015 growing season. In 2015 the sugarcane aphid was detected on the High Plains on 27 June, a full two months earlier than in 2014. Earlier infestations of the sugarcane aphid would pose a serious threat to the grain sorghum hybrids that are grown on the Texas High Plains. These hybrids have been selected to provide maximum yields for the semi-arid growing conditions of the Texas High Plains, but only a few sorghum hybrids may contain any type of resistance to the sugarcane aphid.

Initial greenhouse trials and field notes from earlier impacted regions suggested that at least a form of host plant resistance to the sugarcane aphid might be commercially available for 2015. It quickly became imperative that this host plant resistance be evaluated for economic benefit and use on the unique and key sorghum producing areas of the Texas High Plains.

Materials and Methods

One commercially available sorghum line (NK 7633) and two experimental sorghum lines (SPX 17514, and SPX 17414) that had in previous greenhouse and field studies shown to exhibit a sugarcane aphid resistant trait or traits were chosen for the trial. A known susceptible line, (KS 585) was added for reference to evaluate the economics and strength of the resistant traits found in the three resistant lines.

The four sorghum varieties were planted on 10 June 2015 at the Texas A&M AgriLife Halfway Experiment Station into a simulated commercial sorghum production environment under pivot irrigation in a limited irrigation scenario. All seed from all varieties included in the trial were treated with a commercial standard rate of thiamethoxam (Cruiser® 5 FS) seed treatment. Each plot consisted of 4 1.016 m (40 inch) rows with the plot length reaching the full allotted wedge of the pivot. The longest plot occupied 0.12897331 ha (0.3187 ac) on the outside of the allotted wedge and the shortest plot occupied 0.10610858 ha (0.2622 ac) on the inside of the allotted wedge. Plots were arranged in a Completely Random Design and there were 3 replications.

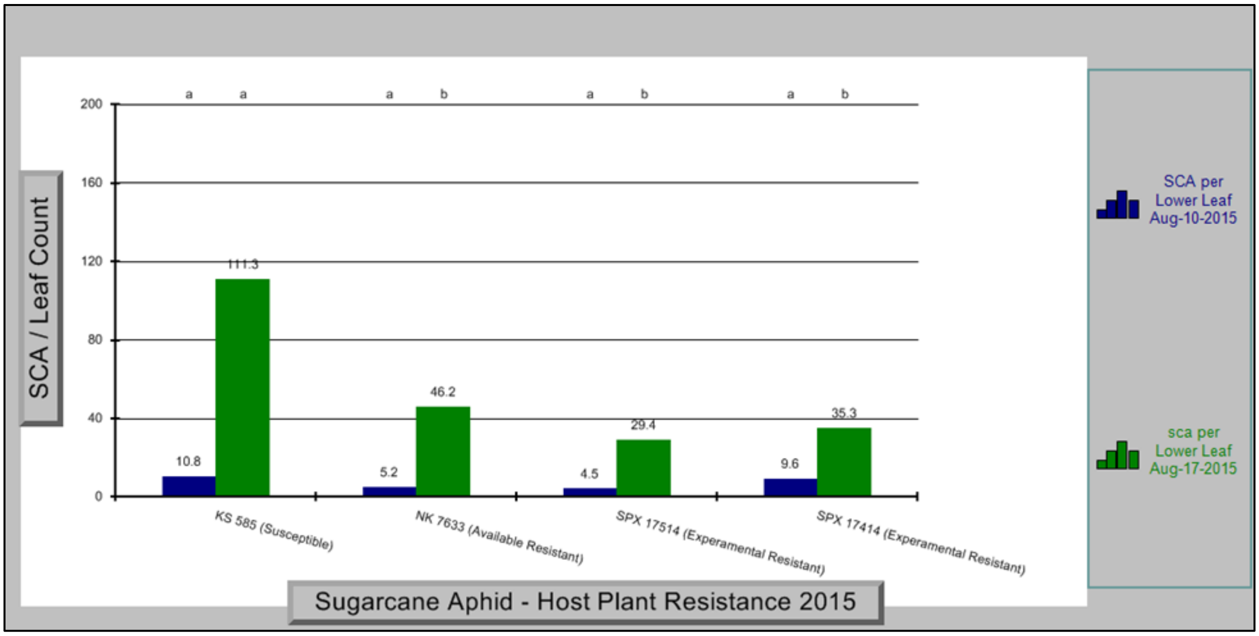
The trial was checked weekly for sugarcane aphid presence. The field was scouted and managed for all other crop pests, irrigation and fertilization needs and standard weed control options were employed. Small populations of sugarcane aphids were observed on 13 and 20 July sampling dates, and these became more widely distributed on 27 July and 3 August. Weekly experimental data counts began on 10 August. The plant growth stage on 10 August ranged fairly narrowly from 70 - 95% bloom. Experimental counts consisted of ten randomly selected lower and upper leaves per plot. The lower leaf selection for all plants consisted of the lowest fully green leaf, while the upper leaf selection for all plants was the second leaf below the flag leaf. The field was accidentally oversprayed on 21 August with 1.2 oz. /ac (29.57 ml/ha) of sulfoxaflor (Transform® WG), 4 days after the 17 August data were taken.

Following the 21 August insecticide application, a 0-10 sugarcane aphid damage rating with 0 representing no damage and 10 representing 100% damaged or dead plant, was taken for each plot on 24 August. On 29 September a second, end of season sugarcane aphid damage rating from each plot was taken. All plots were machine harvested on 29 October and data were collected on per acre yield, bushel weight and percent moisture on a per plot basis. All collected leaf count, damage rating, and harvest data were statistically compared using ARM and ANOVA or JMP 12.0 (SAS Institute) and means were separated at the 0.05 level of probability.

Results and Discussion

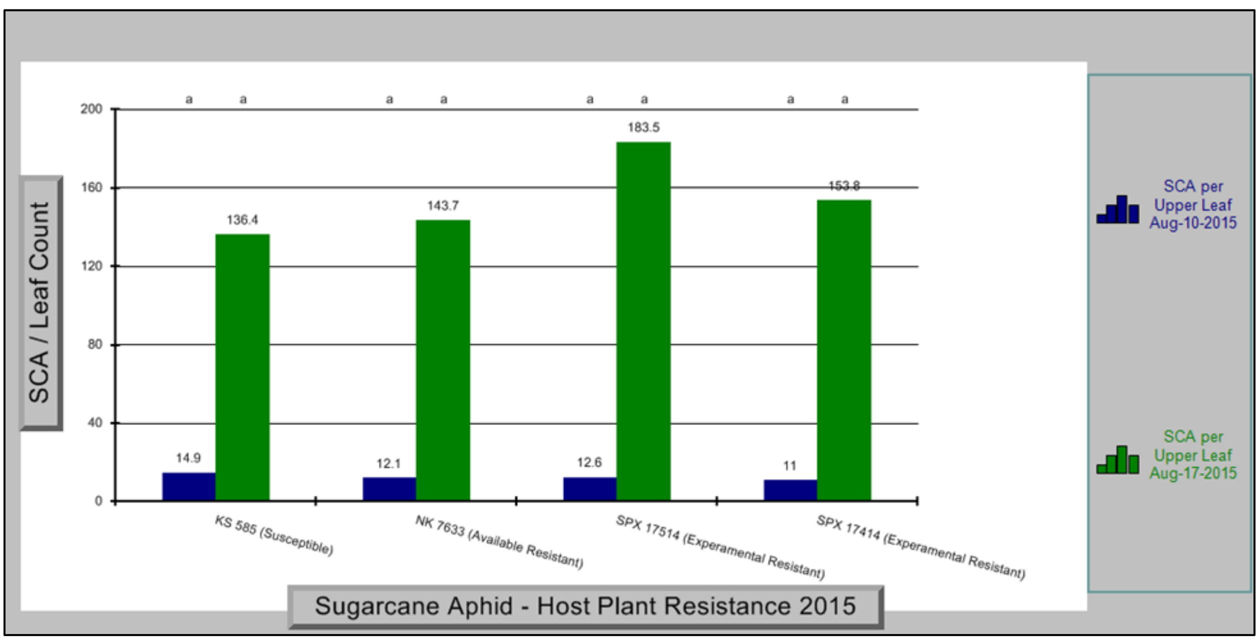
The NK 7633 hybrid was chosen to represent what was commercially available to Texas High Plains sorghum producers in 2015. The two experimental lines may be released in the next few seasons and would represent what resistance producers could expect in the next few seasons. The source(s) of resistance in these lines are unknown, and it is also not known whether they all have the same or different sources of resistance. However, the important task was to determine whether these sorghums could provide field level protection against sugarcane aphid.

10 and 17 August lower leaf counts. There were no significant differences in sugarcane aphids per lower leaf on 10 August, the first leaf count date (*P*=0.3891). By 17 August, the second leaf count date, significant differences were found in number of sugarcane aphids per lower leaf (*P*=0.0055, LSD=025t).



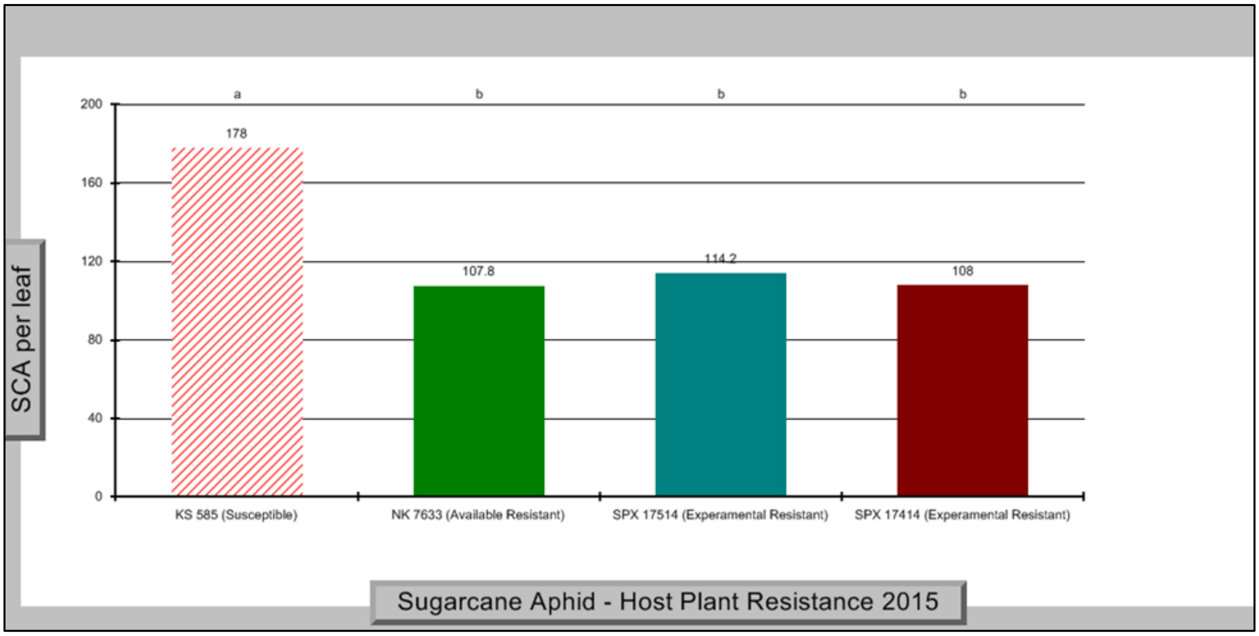
Graph 1. 10 and 17 August sugarcane aphids per lower leaf.

10 and 17 August upper leaf counts. There were no significant differences in per leaf sugarcane aphid numbers on upper leaves for either of the sample dates (*P*=0.7377 and *P*= 0.5852 respectively).



Graph 2. 10 and 17 August sugarcane aphids per upper leaf.

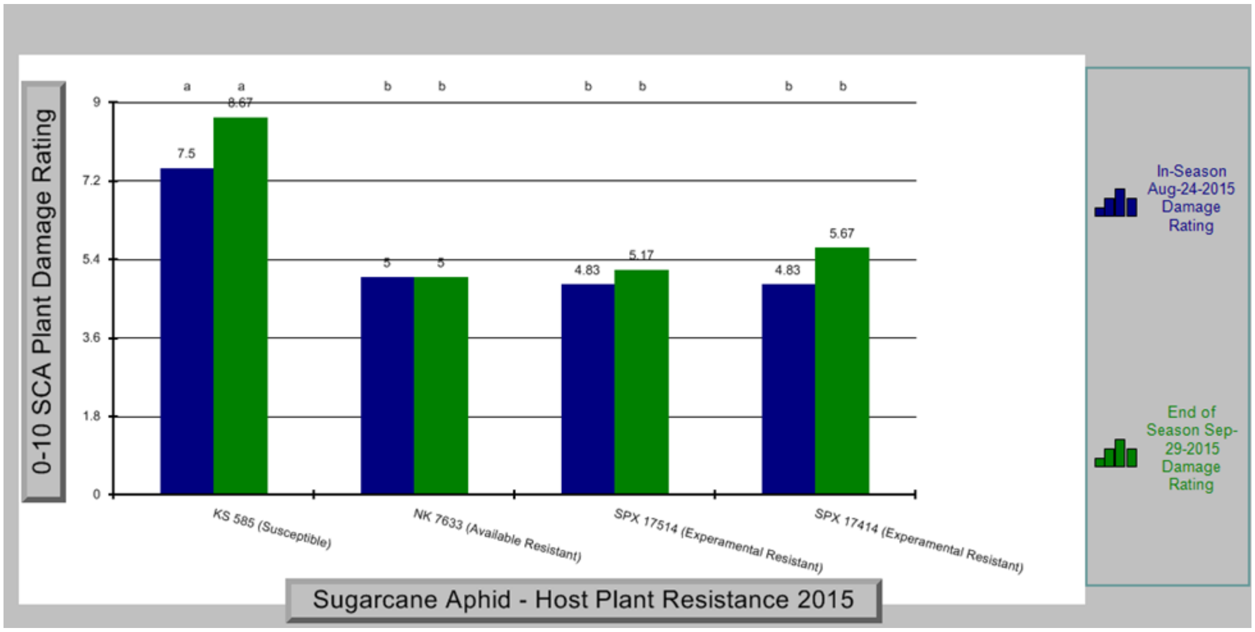
17 August total leaf counts. When upper and lower sugarcane aphid per leaf counts were combined, significant differences were found (*P*=0.0267, LSD=46.67). This indicates that these three resistant varieties are exhibiting levels of antibiosis and not tolerance.



Graph 3. 17 August total sugarcane aphids per leaf.

After unintended insecticide treatment on 21 August, aphid numbers were very low and most differences were probably due to insecticide and not differences between hybrids.

Sugarcane aphid damage rating. Once leaf counting began, sugarcane aphid populations in the trial increased rapidly, reaching suspected damaging levels within a matter of days. The damage ratings on 24 August confirm there was substantial amount of damage to the susceptible hybrid, and although damage was relatively high in the resistant varieties there was much less damage than on the susceptible hybrid. There were significant differences between resistant and susceptible varieties in terms of sugarcane aphid damage rating for both rating dates (in-season damage rating (*P*=0.0010, LSD=0.927), end of season damage rating (*P*=0.0001, LSD=0.763



Graph 4. Sugarcane aphid damage ratings 24 August and 29 September.

Harvest and Yield Data. There were significant differences between resistant and susceptible varieties in grain yield in terms of pounds of grain per acre (*P*=0.0122, LSD=704.7125). There were no significant differences between varieties in terms of percent moisture (*P*=0.3771), but there were differences in bushel weights (*P*=0.0204, LSD=0.865).

	Pounds Grain Yield Per Acre	% Moisture	Bushel Weight in Pounds
KS 585 (Susceptible)	2193.8 B (2458.9 kg/ha)	14.20%	61.17 A (27.75 kg)
NK 7633 (Available Resistant)	3605.1 A (4040.8 kg/ha)	14.23%	59.83 B (27.14 kg)
SPX 17514 (Experimental Resistant)	3706.9 A (4154.8 kg/ha)	14.97%	60.17 B (27.29 kg)
SPX 17414 (Experimental Resistant)	3178.3 A (3562.4 kg/ha)	15.10%	59.67 B (27.07 kg)

Table 1. 29 October yield data.

Conclusions

Both the commercially available sorghum hybrid and experimental hybrids containing sugarcane aphid resistant trait(s) tested here have economic benefit in limited irrigation production situations for Texas High Plains sorghum producers in terms of grain yield. In this experiment the average yield of the three resistant hybrids was 3,363 lbs./acre, a 1,169 lb. yield advantage over the susceptible hybrid. At the current November 3rd market price of $6.05 per bushel this equates to $126.29 per acre. Benefits of these traits in heavily irrigated or dryland sorghum production situations on the Texas High Plains may be anticipated.

These resistant varieties also exhibited less in season and end of season damage from the sugarcane aphid compared to the susceptible variety.

These resistant varieties had significantly fewer sugarcane aphids per leaf compared to the susceptible line in both lower and total leaves, but both resistant and susceptible hybrids had aphid populations increase rapidly to well over an economic treatable level. The currently available resistant trait(s) should not be considered a standalone sugarcane aphid control option.

Remaining Sugarcane Aphid / Available Host Plant Resistance Questions

- What is the absolute value of the readily available sugarcane aphid resistant trait(s) without the use of insecticides?
- How will resistant hybrids interact with other potential sugarcane aphid IPM control options such as planting date, insecticidal seed treatments or increased / earlier predator activity?
- Will resistant hybrids provide the same benefits when they are colonized at different growth stages?

Acknowledgements

We would cordially like to thank everyone at Chromatin Seeds for providing seed and insight into this research trial, Casey Hardin and the full 2015 staff at the Halfway Experiment Station for aid in planting, irrigation, field management, and harvest of the trial, and the 2015 Plains Pest Management field scouts, James Graham, Jonathon Thobe, and Kevin Duarte for assistance in data collection.

2015 Chemigation for Control of Economic Sugarcane Aphids in Grain Sorghum

Texas A&M AgriLife Extension / Bayer Crop Science
Hale County
Cooperator: Ronald Groves
Blayne Reed EA-IPM Hale, Swisher, & Floyd / Dr. Pat Porter District 2 Entomologist / Russ Perkins, BCS
Texas A&M AgriLife Extension, Bayer Crop Science

Summary

In the 2015 growing season, the sugarcane aphid arrived during July and quickly established its self as a severe invasive pest causing major economic damage to area sorghum much like it had during 2014 over much of the southeastern United States sorghum growing region. Control issues, stemming from lack of full treatment coverage, quickly arose in regional 2015 sorghum production fields as treatments for the sugarcane aphid were applied across the High Plains region. This lack of ideal coverage seemed to come from multiple causes and included many environmental situations unique to the Texas High Plains. The sometimes overlooked option of treatment by chemigation through center pivots was sought as an answer to rectify the situation. However, no proven sugarcane aphid product had been yet labeled for this treatment option and research data needed to be collected both from an efficacy of control understanding and to aid in gathering research data needed in obtaining a chemigation label for these products should they prove effective.

Three treatments were prescribed for this trial in a production sorghum field under pivot irrigation capable of chemigation belonging to Mr. Ronald Groves of Hale Center, Texas. These three treatments included an untreated check, a water wash treatment with LEPA pads turned for chemigation but with only water applied, and a treatment where 5 oz. Sivanto was applied via chemigation. The test area of the pivot was divided into pie sections representing each treatment. Due to the nature of application method, no true randomization was possible. Data were taken from the outside three pivot towers within each treatment section, and the area sampled under each tower was considered a pseudo-replication. Ten upper and ten lower leaves from each pseudo-replication within each treatment were counted and data analyzed via ARM utilizing AOV and LSD (*P*=0.05).

By the 7 DAT counts, the Sivanto treatment applied via chemigation had achieved significant differences from both other treatments in terms of aphids per lower leaf (*P*=0.0163), aphids per upper leaf (*P*=0.0004), and aphids per total leaf (*P*=0.0002) while the untreated check and the water wash treatments were not significantly different from each other. By the 14 DAT date, aphid numbers were no longer economic for any treatment but the Sivanto treatment remained significantly different from the untreated check and the water wash treatment in number of aphids per lower leaf (*P*=0.0336) and in total aphids per leaf (*P*=0.0328).

Objective

Determine if a chemigation treatment of Sivanto for sugarcane aphid control via irrigation system was effective on the Texas High Plains and gather field data to aid in quantifying efficacy of Sivanto for sugarcane aphid control for data to help support a chemigation label.

Materials and Methods

Three different treatment options were used in this research trial, including an untreated check, a water wash treatment which consisted of the LEPA equipped pivot pads turned for chemigation but with only water applied, and a treatment of 5 oz. Sivanto with 0.25% v/v NIS. The field was divided into three sections, each consisting of one treatment. Due to the nature of application method, no true randomization was possible but the outside three pivot towers were treated within each treatment section and counted as pseudo-replications for each treatment. Thus there were three blocks per treatment for data collection. Ten upper and ten lower leaves from each block within each treatment were counted and data analyzed via ARM utilizing AOV and LSD (P=0.05). Leaf counts were taken pretreatment, at 3 DAT, 7 DAT, and at 14 DAT

Pretreatment counts were taken and all treatments were made on August 28th, 2015. At the time of treatment there were an average of 254 sugarcane aphids per leaf. The sorghum stage was late bloom to early dough. The chemigation treatments were calculated to have applied over 1,300 GPA for both the water wash treatment and the Sivanto treatment. The untreated check treatment was made first by passing the pivot over that section of the field with no water being applied. For the water wash section of the field, irrigation water only was applied via the pivot set on chemigation mode and the chemigation treatment was made in the last section of the field by starting the chemigation injector which added the Sivanto solution to the irrigation water.

Figure 1. Photo of chemigation injector and tank at center pivot – photo: Dr. Pat Porter.

Results and Discussion

Coverage with the pivot-applied chemigation for both the water wash treatment and Sivanto treatment was visibly and quite notably much better for the target field Plants were thoroughly covered with solution from top to bottom, and this coverage was outstanding as compared to 5 GPA via airplane or 15 GPA via ground application.

Figure 2. Photo of chemigation treatment taking place – photo: Dr. Pat Porter.

At 3 DAT there was no significant change in aphid populations yet (*P*=0.2857), but a remarkable increase in predator populations was beginning to lower aphid populations numerically for two out of three treatments compared to the pretreatment aphid counts. By the 7 DAT counts, large and significant differences were found between the Sivanto treatment and the other two treatments in all categories (upper aphids per leaf *P*=0.0163, lower aphids per leaf *P*=0.0004, total aphids per leaf *P*=0.0002).

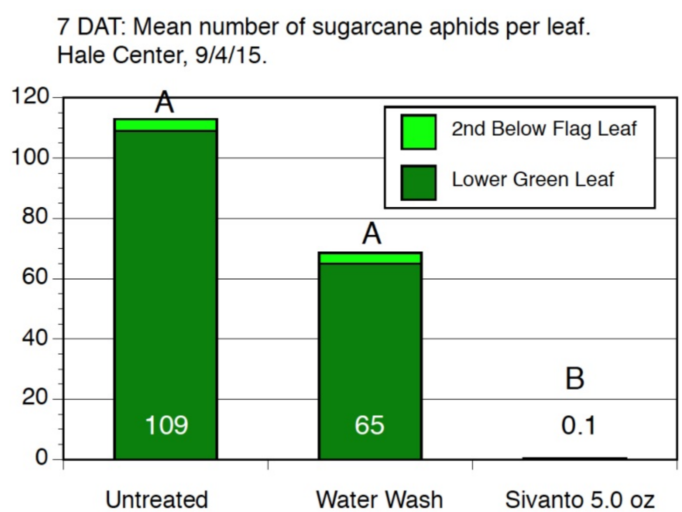


Figure 3. Total number of sugarcane aphids per leaf at 7 DAT (*P*=0.0002).

Compared to all other trials conducted in similar 2015 grain sorghum fields, the lower leaf coverage and control of the sugarcane aphid on lower leaves was far superior with Chemigation.

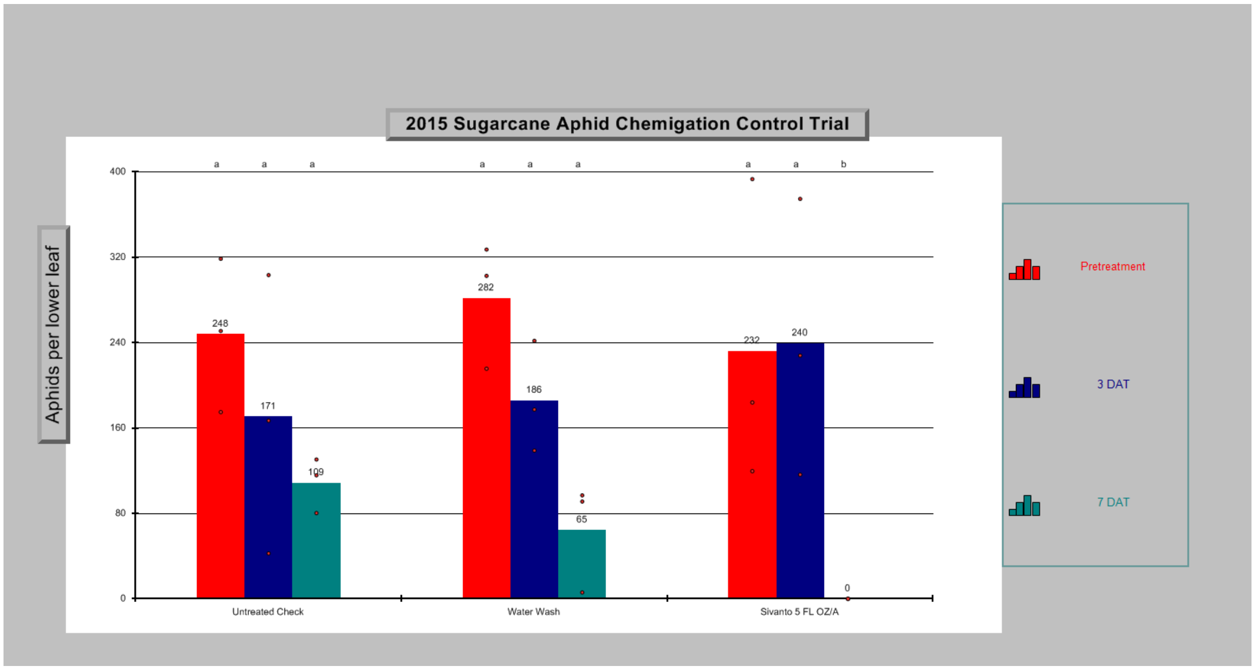


Figure 4. Sugarcane aphids per lower leaf for pretreatment, 3 DAT, and 7 DAT.

Sugarcane aphid numbers continued to drop even in the water wash and untreated check treatments due to an extremely high level of predation. Despite a drop of all treatments to below economic levels by the 14 DAT counts, the Sivanto treatment remained significantly better in terms of lower leaf counts (*P*=0.0336) and in terms of total aphids per leaf (*P*=0.0328).

Conclusions

If Sivanto receives full EPA label acceptance for chemigation in grain sorghum for 2016, chemigation will be a viable and highly effective option in sugarcane aphid control for Texas High Plains grain sorghum producers. Sivanto, with the added coverage that chemigation provides, has proven to control sugarcane aphids from the lowest leaves fully to the top of the plant by 7 DAT and continued to significantly suppress aphids through 14 DAT.

Acknowledgements

I would like to thank USDA/NIFA for salary funding of this and many other projects. I would like to extend thanks to Ronald Groves for cooperating with us to complete this trial. Russ Perkins (Bayer Crop Science) for supporting this trial, and the 2015 Plains Pest Management Field Scouts and Lab Workers for the operation, data collection, and labor associated with this trial: Jonathan Thobe, Jim Graham, Denise Reed, Kevin Duarte, Ember Reed, and Jerik Reed.

2015 Sorghum Partners Grain Sorghum Variety Trial

Texas A&M AgriLife Extension Service

Hale & Swisher County

Cooperator: Troy Klepper

Blayne Reed EA-IPM Hale, Swisher, & Floyd / Phillip Thornton, Sorghum Partners

Summary

Twelve early-mid and mid grain sorghum varieties were selected to take part in a local, independently conducted, sorghum variety trial. The trial was placed in a pivot irrigated field southwest of Kress, Texas belonging to Klepper Farms. A large plot RBD with three reps was placed on one through around the pivot. The large plots were 30 feet wide by 133 feet long (9.144m X 40.54m), on 30-inch rows with a solid planting pattern. All production and irrigation practices were normal as determined by the producer with consultations with the IPM agent and researcher. Varieties utilized in the trial were; three experimental lines SPX 12614, SPX 15714, SPX 15713, and nine commercial lines DKS 37-07, DKS 44-20, KS 310, NK 5418, KS 585, PP 727, and PP 636W with Pioneer 85Y40 and 86P90 serving as standard commercial checks.

Plots were planted on June 8, 2015. Harvest data was collected on November 10, 2015. No other data was collected from the plots.

No significant differences in yield were found (*P*=0.0954) but large numeric differences were noted with the Pioneer variety 86P90 leading yield with 3,796 pounds grain per acre and the variety KS 310 coming in with the lowest by far yield at 1,184 pounds. Significant differences in bushel weight were found with the top two performing lines 86P90 and 85Y40 being significantly heavier per bushel than the bottom two lines SPX 12614 and PP 636W. 86P90 and 85Y40 were also significantly heavier than the lines DKS 37-07, NK 5418, and KS 310. There were no significant differences in percent moisture.

Objective

The purpose of this trial was to obtain local, independently conducted, research information about little known but potentially commercially acceptable sorghum varieties for the benefit of area producers.

Materials and Methods

Twelve early-mid and mid grain sorghum varieties were selected to take part in a local, independently conducted, variety trial. The trial was placed in a pivot irrigated field southwest of Kress, Texas belonging to Klepper Farms. A large plot RBD with three reps was placed on one through around the pivot. The large plots, arranged on the single through from the 12 row planter units set for 30-inch rows, were 30 feet wide by 133 feet long (9.144m X 40.54m), with a solid planting pattern. All production and irrigation practices were normal as determined by the producer with consultations with the IPM agent and researcher. Varieties utilized in the trial were; three experimental lines SPX 12614, SPX 15714, SPX 15713, and nine commercial lines DKS 37-07, DKS 44-20, KS 310, NK 5418, KS 585, PP 727, and PP 636W with Pioneer 85Y40 and 86P90 serving as standard commercial checks.

Plots were planted on June 8, 2015 with the producers 12 row planter units.   Plots were checked weekly for insect weed and disease problems by the Plains Pest Management Association scouting program as a portion of the larger field. The sugarcane aphid reached economic levels on August 13th and one application of Transform at 1.2 oz. per acre was made for control on August 17th. A sub-economic population of sugarcane aphids persisted in field that possibly could have damaged these sorghum lines at differing levels until September 23rd when the population finally crashed below notable levels through predation.

Harvest was overseen by joint efforts by the producer, IPM agent and Sorghum Partners representatives and occurred on November 10, 2015. Plots were harvested by the producer individually. Grain was then transferred to a research and data collecting grain buggy belonging to Sorghum Partners where plot yield was recorded by weight. A sample of each plot's grain was tested for percent moisture and bushel weight. All data was analyzed utilizing ARM (*P*=0.05).

Results and Discussion

There were no significant differences in terms of grain yield per acre (*P*=0.0954) despite some large numeric differences with the two bottom performing lines KS 310 (1,185 lbs. per acre) and PP 727 (1,508 lbs. per acre) and the rest of the lines in the trial. The remainder of the trial was fairly evenly distributed in yield with the lines 86P90 (3,796 lbs. per acre) and NK 5418 (3,716 lbs. per acre) taking the top two spots. It should be noted that the two plots for KS 310 and one plot for PP 727 randomly fell into heavier than normal Johnson grass areas of the trial area.

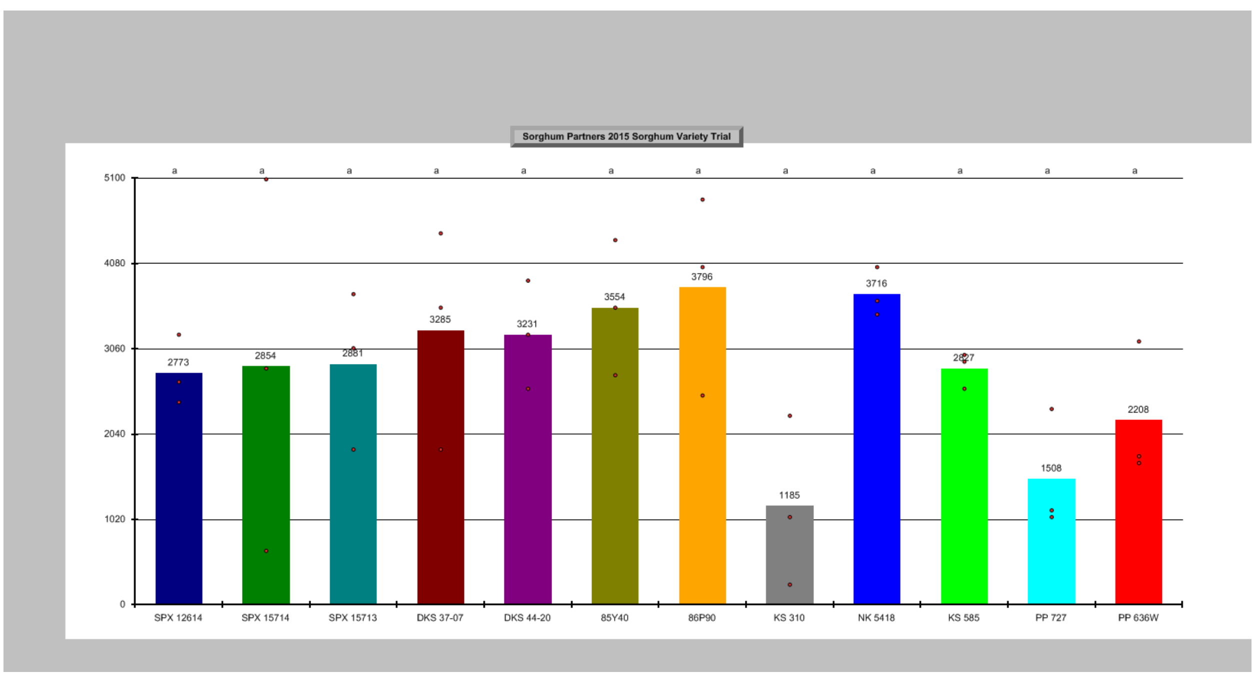


Figure 1. Average grain yield per acre (*P*=0.0954)

Significant differences in bushel weight were found with the lines 86P90 and 85Y40 being significantly heavier per bushel than the lines SPX 12614, PP 636W (*P*=0.0009). 86P90 and 85Y40 were also significantly heavier than the lines DKS 37-07, NK 5418, and KS 310. SPX 15714, SPX 15713, DKS 44-20, KS 585, and PP727 were heavier than PP 636W and SPX 12614. There were no significant differences in percent moisture.

Pest Type	O Other	O Other	O Other
Crop Code	SORVU	SORVU	SORVU
BBCH Scale	BGRM	BGRM	BGRM
Crop Scientific Name	Sorghum bicolor	Sorghum bicolor	Sorghum bicolor
Crop Name	Grain sorghum	Grain sorghum	Grain sorghum
Description	Yield per Acre	bushel wt.	% moisture
Part Rated	PLOT C	PLOT C	PLOT C
Rating Date	Nov-10-2015	Nov-10-2015	Nov-10-2015
Rating Type	YIELD	WEITES	MOICON
Rating Unit	lb/ac	BU	%
Number of Subsamples	1	1	1
Trt No. Treatment Name	1	2	3
1 SPX 12614	2773.277 a	46.03 d	14.80 a
2 SPX 15714	2854.054 a	53.93 ab	14.07 a
3 SPX 15713	2880.977 a	54.70 ab	13.93 a
4 DKS 37-07	3284.854 a	52.27 b	15.07 a
5 DKS 44-20	3231.000 a	52.70 ab	15.23 a
6 85Y40	3554.100 a	56.40 a	15.23 a
7 86P90	3796.427 a	54.40 ab	15.63 a
8 KS 310	1184.703 a	51.40 bc	15.40 a
9 NK 5418	3715.654 a	52.37 b	13.73 a
10 KS 585	2827.127 a	53.97 ab	14.50 a
11 PP 727	1507.807 a	54.00 ab	14.93 a
12 PP 636W	2207.854 a	47.77 cd	15.67 a
LSD P=.05	1749.5499	3.944	2.263
Standard Deviation	1033.1497	2.329	1.336
CV	36.66	4.44	9.0
Bartlett's X2	13.402	19.211	6.776
P(Bartlett's X2)	0.268	0.057	0.817
Skewness	-0.2396	-0.5878	0.784
Kurtosis	-0.2849	-0.8551	-0.0573
Replicate F	0.769	9.190	13.630
Replicate Prob(F)	0.4756	0.0013	0.0001
Treatment F	1.905	4.810	0.727
Treatment Prob(F)	0.0954	0.0009	0.7025

Table 1. Statistical table of yield per grain acre, bushel weight, and percent moisture with all statistics shown.

Conclusions

Not finding statistically significant differences in grain yield between sorghum varieties in this trial was disappointing. Finding significant differences in large plot trials is very difficult without multiple seasons and enormous data sets. Most single season large plot trials are evaluated by end users on numerical differences alone and the numerical differences in varieties in grain yield for this trial were fairly good for this trial and type (Figure 1). With this in mind, the values on Figure 1 can be useful to producers, although not statistically proven to be repeatable. However, with all sorghum lines being statistically similar, we should be able to assume that any of these lines should be acceptable sorghum varieties for the Swisher County area as they compare to the Pioneer 85Y40 and 86P90 standard commercial check lines with the understanding that the lines KS 310 and PP 727 did have some Johnson grass weed issues within their random plot areas.

While grain yield rightfully receives the highest priority of producer's evaluations, repeatable differences in percent moisture and bushel weight are secondary considerations that need assessment. For this trial, several significant differences in these categories were noted in bushel weight (Table1, column 2). I would suggest looking closely at a variety that performs consistently in all categories with yield being of a primary concern and bushel weight an important but secondary factor of consideration.

Acknowledgements

I would like to extend thanks everyone at Klepper Farms for cooperating with us to complete this trial. I would also like to thank Phillip Thornton for sharing products and coordinating with us for this trial. Finally I would like to thank the 2015 Plains Pest Management Field Scouts, Johnathon Thobe, Jim Graham, and Kevin Duarte for assisting with data collection associated with this trial.

2015 Population Monitoring of Adult Bollworms in Hale & Swisher Counties
Texas A&M AgriLife Extension Service
Hale & Swisher Counties
Cooperator: Jeremy Reed and Joe McFerrin

Blayne Reed EA-IPM Hale, Swisher, & Floyd, Dr. Pat Porter, Dr. Ed Bynum, and Dr. Charles Allen

Summary

Adult Lepidopteron pest monitoring is not a guarantee of pest presence or economic problem predictability, trends can be noted and timely alerts for potential egg lay and volume of the area bollworm pest populations can be extrapolated. Assumptions based upon known pest biology combined with this effort can infer aspects about general adult bollworm movement, immigration, and emergence. In an effort to help monitor for this major pest of multiple crops the information generated from this effort was shared with district and regional researchers, crop consultants, agribusiness, and area producers through the Plains Pest Management Newsletter, discussions on our weekly radio programs, and freely shared independently as requested. If compiled with similar efforts completed in the past, historical trends for the bollworm might be established.

The data generated from this effort indicated that the 2015 bollworm population in Hale and Swisher should be lower than an ‘average’ to ‘average’ for a summer growing season. This concurred with what our scouting program was finding via egg lay and young larva in our area crops fields soon afterwards.

Objective

This effort was made in order to monitor the adult bollworm (corn earworm, sorghum headworm) population trends throughout the summer growing season in Hale and Swisher County both for immediate and historical use.

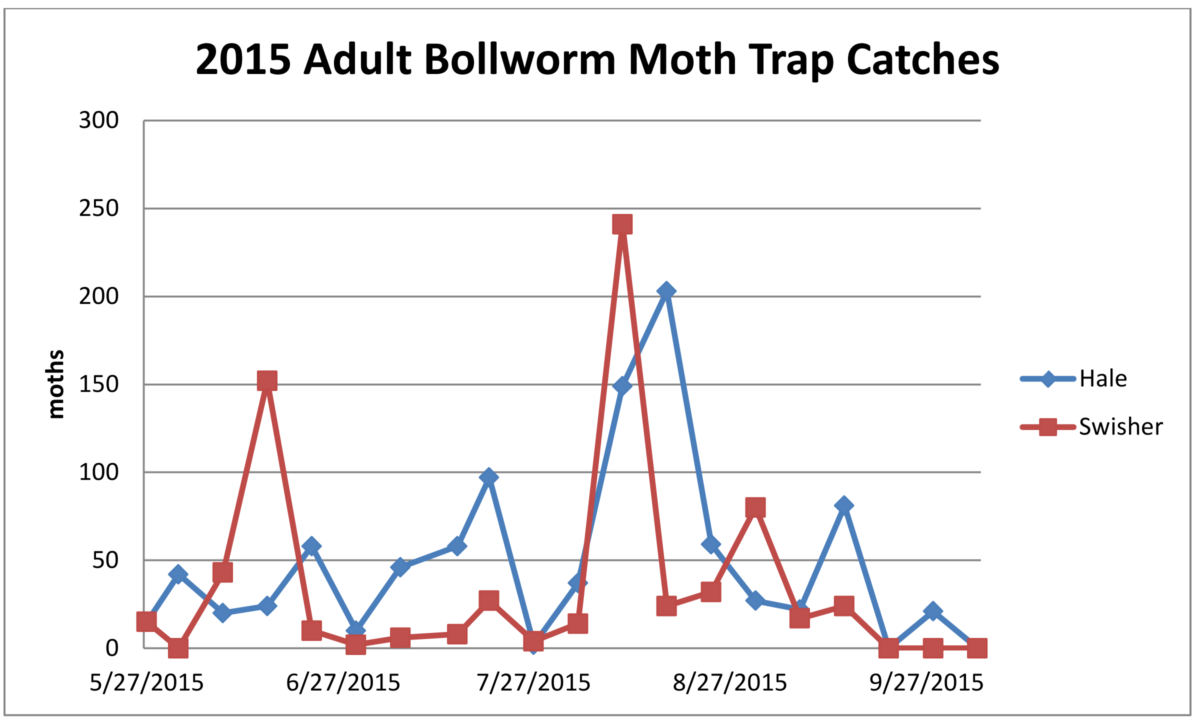
Materials and Methods

The Swisher County trap was placed 4 ½ miles north of Kress, Texas and 6 miles south of Tulia, Texas on a farm belonging to Jeff Rodgers and operated by Jeremy Reed. The site was near irrigated cotton fields with irrigated sorghum silage less than a mile away and only a few dozen yards from the banks of the South Tule Draw. The Hale County trap was placed 1 mile east of Cotton Center, Texas on a farm belonging to Joe McFerrin that lays 5 ½ miles northeast of the Black Water Draw. The Hale trap was near primary crop planted corn and secondary crop planted corn and sorghum.

The traps utilized were standard wireframe Lepidopteron traps suspended upon rebar posts at a height of roughly 4 ½ feet to the top of the trap. Standard Helicoverpa *zea*, pheromone was utilized to attract adult moths. Traps were checked, moths counted, recorded, and traps emptied weekly, and pheromone was changed bi-weekly.

Results and Discussion

The Hale County trap experienced bollworm population peaks on June 1, June 22, July 20, August 17, and September 15, 2015 with the peak moth trap count of 203 on August 17. The Swisher County trap experienced two major peaks on June 15, August 10, and August 31, 2015 with the highest being August 10 with 241 moths. These population trends were also noted as pest larva by the Plains Pest Management Scouting Program as short time later.



Graph 1. 2015 adult bollworm population trap catches for Hale & Swisher.

Conclusions

Our 2015 adult bollworm moth population distributions seemed to fall closer to what many consider a historical normal for both counties while trap bollworm trap numbers could be considered slightly below average. The peak moth population catches were multiple and gradually increasing over the growing season in Hale County while Swisher seemed to catch a population peak in overwintering moths early and heavy influxes of moths near key host plant stages and behind weather events that tend to carry opportunistic moths to areas that are only suitable for bollworm life cycles for shorter periods. Reasons for the differences in population tendencies can be hypothetical from this vantage point, but could include an increased in the use of no-till in Swisher, increase in winter tillage in Hale, an increase in later planted grain crops for both counties this season, or several other factors.

The large adult bollworm population peaks for both counties occurred in mid-August. This population peak loosely coincides with historical bollworm population peaks and the typical timing for the peak attractiveness of some of the preferred food host plants, such as local later planted corn and sorghum. There was a higher than usual occurrence of these late grain crops in both counties in 2015 due to weather events that limited cotton acres.

The Plains Pest Management Scouting program in 2015 discovered a fairly high population of bollworms pressuring late planted corn where the pest was of no consequence. The scouting program only found a few bollworms in any other crop for the season and no crop in our scouting program neared economic levels for this pest. These peak larval findings coincided with the adult population moth trappings for Hale and Swisher Counties in 2015 once developmental time for the larva was accounted for.

Acknowledgements

I would like to extend thanks to Reed Farms and Joe McFerrin Farms for cooperating with us to gather this data. I would also like to thank Dr. Ed Bynum and Dr. Pat Porter for sharing wisdom and thoughts. I would like to thank Dr. Charles Allen and the Texas A&M Department of Entomology for moth trapping supplies and the 2014 Plains Pest Management Field Scouts for data collection and labor associated with this trial: Jonathan Thobe, Jim Graham, and Kevin Duarte. Thank you all.

2015 Spider Mite Product Efficacy Evaluation in Corn

Texas A&M AgriLife Extension Service / Nichino America
Hale & Swisher Counties
Cooperator: Shane Berry
Blayne Reed, EA-IPM Hale, Swisher, & Floyd / Dr. Scott Ludwig, Nichino America

Summary

Six different commercial miticide treatments, including an untreated check, were evaluated for banks grass mite efficacy in a commercial corn for grain. Two additional numbered treatments were evaluated but will those results will not be shared here. A commercial corn field at early dough stage belonging to Shane Berry was found with a sizeable population of spider mites and utilized for the trial. Small plots were laid out in an RBD design with four replications. A mite flaring treatment of Warrior at 2.9 oz. per acre was made two weeks prior to treatment to ensure a sufficient and economic threatening population of spider mites for the trial. All applications were made via backpack CO2 sprayer with boom extension attachment to make spray applications over-the-top at 10.5 gallons per acre. The spider mite population was evaluated by harvesting and counting ten randomly selected zero leaves per plot for all mite growth stages. Counts were made pre-treatment on the day of miticide applications, 7 DAT, 14 DAT, and 21 DAT. Due to the extremely high population of spider mites in the flared plots, mite damage ratings to each plot were also made at 13 and 21 DAT.

Due to the pretreatment mite flaring treatment, an onset of drought conditions, and an overall lack of predators, mite populations increased to an extremely high level. In fact, no single treatment tested could have or did keep mite populations below economic levels. If this were in a field situation and not research situation, additional mite treatments would have been required. While significant differences were found in treatments for the 21 DAT mite damage ratings (P= 0.0200), no treatment was significantly different in zero leaf mite counts for any date. In most cases, the mite pressure was so high and damage so great that the zero leaf was in fact dead and could not support mites. While none of these single mite treatments alone kept the mites from economic levels, there were plain numeric differences in all treatments compared to the untreated check at the 13 DAT rating date (P=0.4383). These differences deepened by the 21 DAT rating that was significant (P= 0.0200) proving these treatments did in fact have a positive impact on the mite populations.

Objective

Conduct a local research trial to make current information available for area producers about the control and efficacy of available miticide products on economic populations banks grass mites in commercially grown corn for grain.

Materials and Methods

Six different miticide treatments were selected, including an untreated check, were utilized for this trial. Two additional numbered treatments were evaluated but will those results will not be shared here. The products included in this trial were Portal at 32 oz. per acre, Zeal at 2 oz. per acre, Oberon at 5 oz. per acre, Onager at 12 oz. per acre, and Comite II at 54 oz. per acre. All labeled surfactants were utilized at the appropriate rate and with the appropriate product.

On July 14, 2015 a notable population of banks grass mites was found by the Plains Pest Management field scouts in a commercial corn for grain field in southwestern Hale County belonging to Shane Berry. On July 16, plots were laid out and a mite flaring treatment of Warrior at 2.9 oz. per acre was made prior to treatment to ensure a sufficient and economic threatening population of spider mites for the trial. On July 30 all miticide treatments were applied and pretreatment counts made. Counts were made pre-treatment on the day of applications, 7 DAT, 14 DAT, and 21 DAT. The spider mite population was evaluated by harvesting ten randomly selected zero leaves per plot, transporting back to the IPM lab in Plainview for counting where all mite growth stages per leaf were carefully counted under magnification and recorded. By the 14 DAT counts it became clear that the zero leaf would be unable to support viable populations of mites due to extreme mite damage to the plots. An extra mite damage rating to each plot were made at 13 DAT in addition to the usual 21 DAT in order to capture what looked to be significant differences between treatments in plant damage from mites.

Trial Map Treatment Description

Trt	Code	Description
1	CHK	
2		Portal XLO 32 FL OZ/A
3		Zeal 2 OZ WT/A
4		Oberon 5 FL OZ/A
5		Onager 12 FL OZ/A
6		Comite 54 FL OZ/A
7		R-93059 100 g AI/A
8		R-93059 200 g AI/100 GAL

401 1	402 6	403 3	404 7	405 5	406 4	407 2	408 8
301 3	302 5	303 1	304 6	305 2	306 7	307 8	308 4
201 6	202 8	203 2	204 3	205 7	206 5	207 4	208 1
101 7	102 2	103 6	104 4	105 3	106 8	107 1	108 5

Figure 1. Detail of treatments used and field map showing randomization.

Small plots were laid out in an RBD design with four replications. Plots were six 36-inch rows wide and 42-feet long (5.49 meters X 13.41 meters) with only the middle two rows of each plot actually receiving treatment and four rows consisting of a buffer one between treatments to prevent overspray and to supply a source for predators to re-infest the plots following the mite flaring treatment. All treatments were made via CO_2 propelled backpack sprayer at 10.5 GPA with a walking ground speed of 3.5 miles per hour and a pressure of 32 PSI. A boom extension attachment was utilized with the backpack sprayer to make spray applications over-the-top from an altitude of 10 feet. All data was evaluated utilizing ARM (P=0.05).

Results and Discussion

In terms of mites per zero leaf, there were no significant differences between any treatments on any count date. This was due to the fact that most of the zero leaves in the untreated plots were soon dead and unable to support mite populations. Due to the pretreatment mite flaring treatment, an onset of drought conditions, and an overall lack of predators, mite populations increased to an extremely high level causing this extreme damage. In fact, no single treatment tested could have or did keep mite populations below proven economic damaging levels. If this were in a field situation and not research situation, additional mite treatments would have been required to maintain.

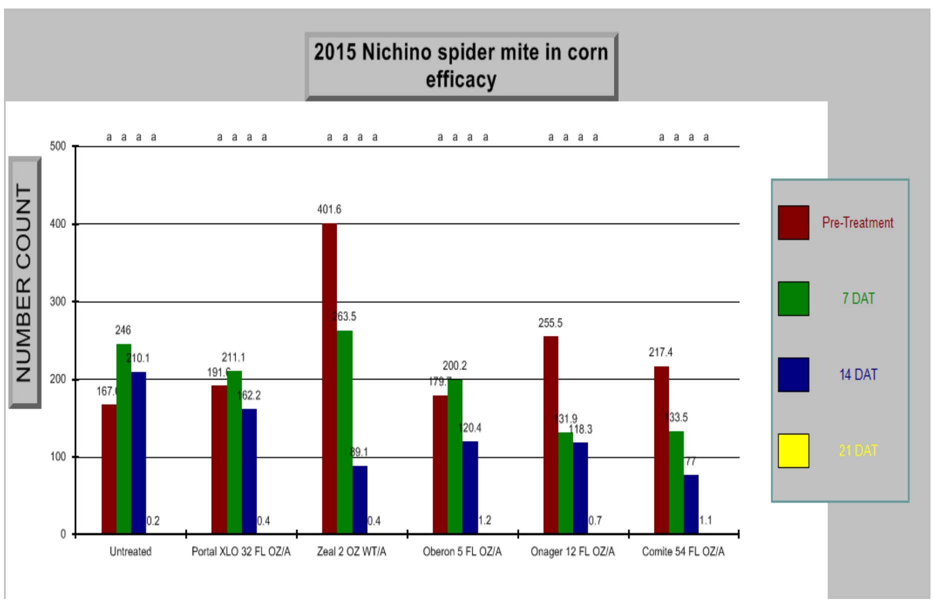


Figure 2. Pretreatment counts of spider mites by treatment (NS for any date).

There were numeric and visually notable differences in mite damage between treatments by the 13 DAT mite damage rating date. These noted differences proved to be insignificant on that date (*P*=0.4383). These numeric differences had deepened by the 21 DAT mite damage evaluation date. The Portal XLO treatment, the Oberon treatment, the Onager treatment, and the Comite treatment were all significantly different from the untreated check

(*P*= 0.0200), while the Zeal treatment did not separate significantly from any treatment but was numerically similar to all treatments.

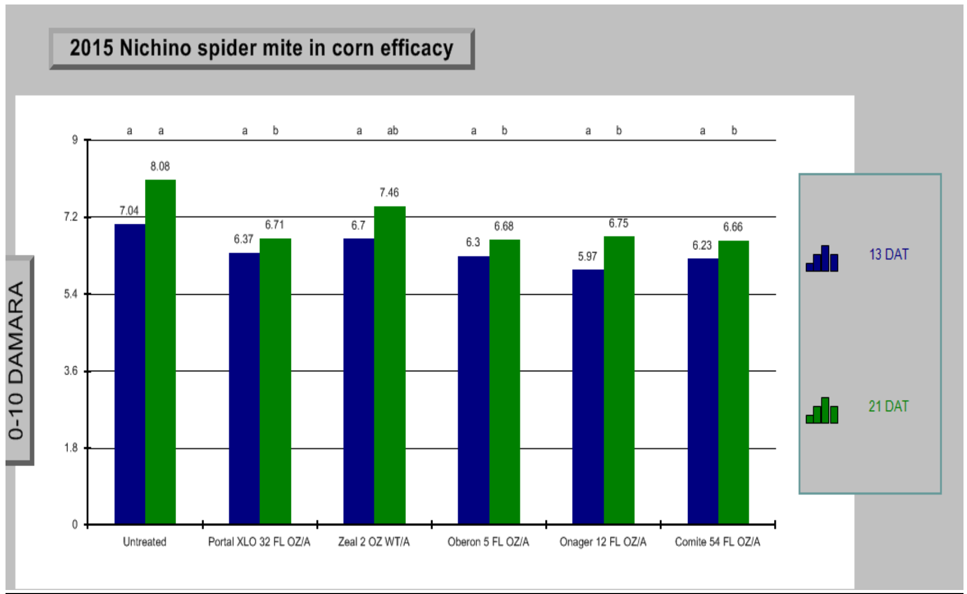


Figure 3. Spider mite damage ratings for 13 DAT (NS) and 21 DAT (*P*= 0.0200, LSD=0.91)

Conclusions

Despite the fact that no single treatment was able to keep or reduce the mite population below an economic level, this trial may prove that all labeled miticide have good and understood efficacy on banks grass mites (Figure 3, 21 DAT damage rating data). I should point out that this trial eventually fell into an extreme mite situation that was aided by the mite flaring treatment that was intended to ensure a good population of mites when the population looked very light area wide. This treatment destroyed all predator populations, which were not all that high in 2015 to begin with, and the predators never recovered to give needed aid to all of these predator soft miticide products. Shortly after this flaring treatment, the region entered drought conditions while the corn entered dough fill stage. These are both unpredictable situations well known and documented to flare spider mites in corn. All of these factors combined in this trial aided the mites in over powering the efficacy of the products at an economically feasible level. The value and efficacy of these treatments do show in the mite damage ratings, but if this were a production situation, additional treatments would have been required.

In conclusion, the Zeal treatment was added to this trial's successful treatment list. While it was not significantly different from the untreated check in the mite damage ratings it also was not significantly different from the other treatments either. Pointing out in Figure 2, the Zeal treatment had many more mites per leaf than did any other treatment at the pre-treatment count date and was very nearly significantly higher than the other treatments at that date, yet was not significantly different from the other miticide treatments at the 21 DAT damage rating date, and given past performance results, this should be a safe prediction. Others may draw a less forgiving conclusion when evaluating this data.

This trial, via the results of the mite flaring treatment, also highlights and again proves the need to preserve beneficial populations when treating for targeted pests if at all possible. In a production situation, if the Warrior application had been made to target another pressing pest, such as fall armyworms, western bean cutworms, southwestern corn borer, or corn ear worms, the banks grass mites acting as a secondary pest would have flared just like they did in this efficacy research situation. Under these circumstances, at least two miticide treatments would have been warranted, compared to the one that the surrounding and nearby to this trial corn fields did receive once the mite populations increased in the region during the 2015 growing season.

<u>Acknowledgements</u>

I would like to extend thanks to Shane Berry for cooperating with us to complete this trial. Dr. Scott Ludwig for sponsoring and supporting this trial. I would also like to thank Dr. Ed Bynum and Dr. Pat Porter for sharing products, wisdom, and opinions. The 2015 Plains Pest Management Field Scouts and Lab Workers for the operation, data collection, and labor associated with this trial: Jonathan Thobe, Jim Graham, Kevin Duarte, Ember Reed, and Jerik Reed. Thank you all.

2015 Cotton Harvest Aid Demonstration Trial, Swisher County
Texas A&M AgriLife Extension Service
Hale & Swisher County
Cooperator: Mike Goss
Blayne Reed EA-IPM Hale, Swisher, & Floyd / John Villalba CEA- Swisher / Adam Hixon, BASF

Summary

Seven different cotton harvest aid treatment combinations, including an untreated check, were compared to each other in a small plot RBD trial with four replications. A 6 pound Ethephon product was the base boll opener for all six treatments at a rate of 32 oz. per acre. One treatment consisted of the locally popular Ethephon at 32 oz. alone. The four treatments paired with the Ethephon at 32 oz. treatment were: Sharpen at 1 oz., Sharpen at 1 oz. plus Folex at 8 oz., Aim at 1 oz., Display at 1 oz., and Folex at 16 oz.

The trial was placed on September 25 and utilized as a demonstration plot for the Swisher Cotton Field Day 14 DAT on October 8, 2015. Data on percent open boll, percent defoliated, percent green leaves, percent desiccated, and regrowth were taken 17 DAT. All data was evaluated utilizing ARM (P=0.05).

Significant differences for all data categories except percent stuck leaves were found between differing treatments when compared to the untreated check. With all varying significant factors considered, the Ethephon at 32 oz. plus Sharpen at 1 oz. plus Folex at 8 oz. performed the most consistently across all categories. There were no significant differences between treatments in terms of percent open boll. The Ethephon plus Sharpen at 1 oz., the Ethephon plus Sharpen at 1 oz. plus Folex at 8 oz., and the Ethephon plus Folex at 16 oz. outperformed the other treatments and vastly outperformed the untreated check in percent defoliation and in percent remaining green leaves. The Ephephon plus Aim at 1 oz. and Ephephon plus Display at 0.8 oz. outperformed the untreated check and the Ephephon alone in terms of percent remaining green leaves while the Ephephon alone outperformed the untreated check in this category only. There significant differences in percent stuck leaves between treatments but the highest data for any treatment in this category was 2%.

Objective

The objective of this trial was to both offer a preemptive view of a wide range of cotton harvest aid products to producers as harvest aid season began and determine with local research data which harvest aid product would be most effective this season for the area. All products were viewed for economic price versus benefit in the field by the producers attending the Cotton Field Day.

Materials and Methods

Seven different cotton harvest aid treatment combinations, including an untreated check, were compared to each other in a small plot RBD trial with four replications. A 6 pound Ethephon product was the base boll opener for all six treatments at a rate of 32 oz. per acre. One treatment consisted of the locally popular Ethephon at 32 oz. alone. The other five treatments were paired with Ethephon at 32 oz. These treatments were: Sharpen at 1 oz., Sharpen at 1 oz. plus Folex at 8 oz., Aim at 1 oz., Display at 0.8 oz., and Folex at 16 oz. acre. MSO, COC, or NIS were utilized as surfactants at label suggested pairings with treatments and rates.

At the time of trial placement, the field was not fully ready for harvest aid treatments, but needed to be placed for the October 8 field day date. Each plot was 4 rows wide (40 inch rows, 1.016 meters) by 36 feet long (10.97 meters). All treatments were made via CO2 propelled backpack sprayer at 10.5 GPA with a walking ground speed of 3.5 miles per hour and a pressure of 32 PSI.

The trial was placed on September 25 and utilized as a demonstration plot for the Swisher Cotton Field Day 14 DAT on October 8, 2015. The field used belonged to Mike Goss and is located 4 miles southeast of Tulia, Texas. Tillage utilized was no-till with wheat cover and irrigation was via pivot. Data on percent open boll, percent defoliated, percent green leaves, percent desiccated, were taken all taken at 19 DAT.

Trial Map Treatment Description

Trt	Code	Description
1	CHK	
2		Prep 32 FL OZ/A;NIS 0.25 % V/V
3		Prep 32 FL OZ/A;Sharpen 1 FL OZ/A;MSO 1 % V/V
4		Prep 32 FL OZ/A;Folex 8 FL OZ/A;Sharpen 1 FL OZ/A;MSO 1 % V/V
5		Prep 32 FL OZ/A;Aim 1 FL OZ/A;COC 1 % V/V
6		Prep 32 FL OZ/A;Display 0.8 FL OZ/A;COC 1 % V/V
7		Prep 32 FL OZ/A;Folex 16 FL OZ/A;NIS 0.25 % V/V

401 4	402 1	403 3	404 5	405 7	406 6	407 2
301 1	302 6	303 2	304 7	305 4	306 3	307 5
201 6	202 2	203 7	204 4	205 3	206 5	207 1
101 7	102 6	103 4	104 1	105 5	106 2	107 3

Figure 1. Detail of treatments used and field map showing randomization and location.

Results and Discussion

All treatments proved to be statistically significant in percent open bolls compared to the untreated check. There were no significant differences between treatments, although some numeric differences were noted in the field.

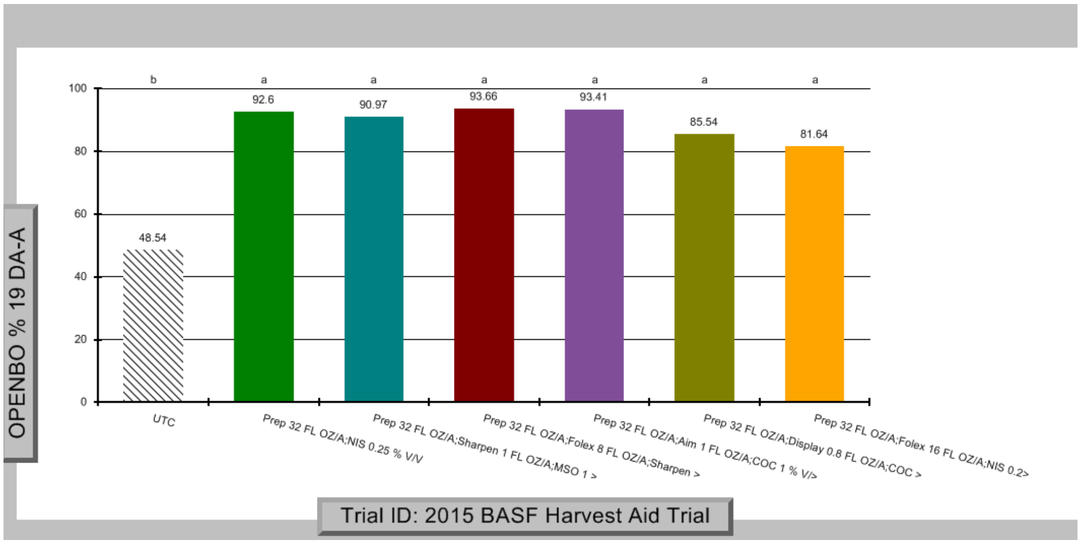


Figure 2. Percent open of harvestable bolls by treatment 19 DAT (*P*=0.00001, LSD=15.073).

In terms of percent defoliation all treatments outperformed the untreated check. The treatments of Ephephon with Sharpen, Ephephon with Sharpen and Folex, and Ephephon with Folex outperformed all other treatments while the treatments Ephephon with Aim and Ephephon with Display outperformed Ephephon alone.

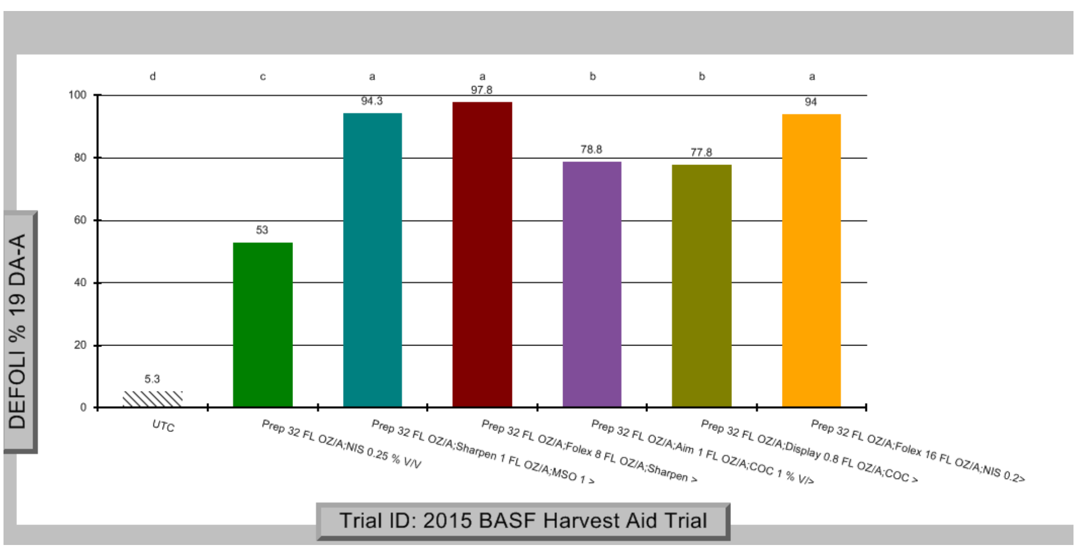


Figure 3. Percent defoliation at 19 DAT (*P*=0.0001, LSD=14.51).

Following closely but in opposite terms, the percent green leaves still left on the plant at 19 days after treatment were very similar to percent defoliated. All treatments outperformed the untreated check. Of these treatments the treatments of Ephephon with Sharpen, Ephephon with Sharpen and Folex, and Ephephon with Folex outperformed all other treatments. The Ephephon treatment with Aim and the Ephephon treatment with Display outperformed Ephephon alone.

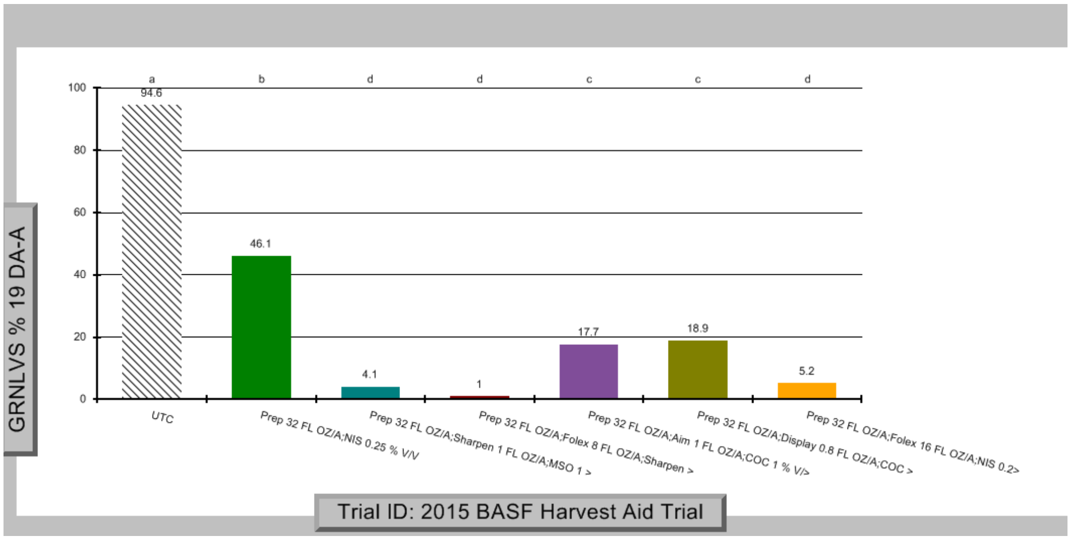


Figure 4. Percent green leaves left on the plant at 19 DAT (P=0.0001, LSD=10.92t).

Treatment results were more variable in terms of percent desiccated and stuck leaves. Significant differences were found with the Ephephon with Display and Ephephon with Aim having the most stuck leaves and Ephephon with Folex having the least percentage of stuck leaves. However, leaf stick at such a low level is not considered problematic.

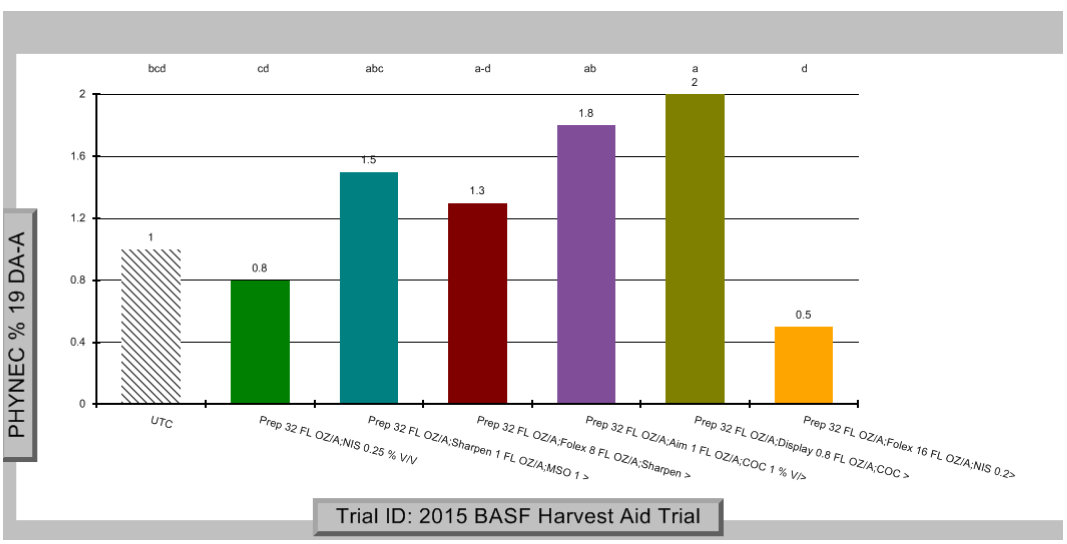


Figure 5. Percent desiccated and sticking leaves by treatment at 19 DAT (P=0.0493, LSD=0.98).

Conclusions

2015 was an interestingly different season for cotton harvest aids. All products tested were proven to have significant harvestable improvement compared to the untreated check. At 19 days after treatment, no product mix could be considered harvest ready and secondary harvest aid treatments or a killing freeze event would be necessary before any of these treated plots would be harvest ready.

The differing from expected performance of the harvest aid treatments from what could be considered 'normal' could be attributed to area wide late planting, cool wet conditions during mid-September following a hot dry period in August, and other factors. The trial results, both written and visual via the cotton tour aided crop consultants and producers alike in making adjustments to their perspective 2015 harvest aid decisions.

The superior performance of the Sharpen, Folex, and Sharpen and Folex treatments paired with Ephephon was noted by all interested and recommendation adjustments made following the trial conclusion. The economic situation at the end of the 2015 growing season, paired with the fact that no treatment made their plots completely harvest ready and a second treatment would be required anyway, turned many producers to a slightly higher rate of the Ephephon alone treatment

Acknowledgements

I would like to extend thanks to Mike Goss for cooperating with us to complete this trial. I would also like to thank Dr. Mark Kelley for sharing products, wisdom, and opinions. The late remaining 2015 Plains Pest Management Field Scout for the operation, data collection, and labor associated with this trial: Jim Graham. I would like to thank BASF for sponsorship of this trial. Finally, I would like to thank John Villalba for his cooperation and promotion of this trial's results and the hosting of the field day with this trial as one of its highlights.

2015 Cotton Seed Treatment Product Efficacy Evaluation for Thrips Control

Texas A&M AgriLife Extension / Bayer Crop Science
Swisher County
Cooperator: Mike Goss
Blayne Reed, EA-IPM Hale, Swisher, & Floyd / Russ Perkins, BCS

Summary

Six cotton seed treatment options including an untreated check, Gaucho 600 FS, Aeris, Aeris with Flouopyram 600 FS, Gaucho 600 FS with Fuoopyram 600 FS, and Avicta Complete Pak were tested in a four replication CRBD for efficacy on early season thrips pest, plant health effects, and yield responses. All plots were planted on 26 May, 2015. Data on number of thrips present, plant per acre stand counts, and seedling vigor rating were taken on 9 June. On 22 June data was collected on number of thrips per plant, thrips damage ratings, and average number of true leaves per plant. Ten randomly selected row feet sections from each plot were hand harvested on 6 November and samples were ginned at the Texas A&M AgriLife Research Cotton Improvement Lab sample gin in Lubbock.

Thrips numbers were very light with early season frequent and heavy rain showers suppressing thrips populations. Despite numeric trends favoring most of the seed treatments compared to the untreated check, the only statistically significant difference in the trial came on 22 June when the Avicta Complete Pak significantly separated from the untreated check in terms of thrips per plant (*P*=0.0202). All seed treatments came very close to significance again in terms of number of true leaves per plant compared to the untreated check (*P*=0.0652) on 22 June, but no other differences were found including per acre yield lint (*P*=0.1211) which continued to numerically trend in favor of most treatments.

Objective

Bayer Crop Science generated protocol designed to test seed treatment efficacy on thrips in seedling cotton and for impact on plant health, early season vigor, and yield responses.

Materials and Methods

Six cotton seed treatment options including an untreated check, Gaucho 600 FS, Aeris, Aeris with Flouopyram 600 FS, Gaucho 600 FS with Fuoopyram 600 FS, and Avicta Complete Pak were tested in a four replication CRBD for efficacy on early season thrips pest, plant health effects, and yield responses. All plots were planted on 26 May, 2015 directly adjacent to an active wheat production field with hopes of insuring thrips migration from that field into research plots. All plots were planted via hand 'dribbling' seed through producer's planter units with the seed boxes removed. Plots were 4, 40-inch rows by 38-feet long with 3-foot alleys between replications. The field was no-till and furrow irrigated with heavy wheat straw cover in seedbeds between alternating rows between wheat cover and irrigation skip-row furrows.

Trial Map Treatment Description

Trt	Code	Description
1	CHK	UNTREATED
2		GAUCHO 600 FS FS
3		AERIS SEED APPLIED SYSTEM FS
4		AERIS SEED APPLIED SYSTEM FS;FLUOPYRAM 600 FS FS
5		GAUCHO 600 FS FS;FLUOPYRAM 600 FS FS
6		AVICTA COMPLETE PAK - CRUISER FS

Figure 1. Treatments with trial plot map.

Only two data collection dates were taken due to heavy and frequent early season rain events which likely added to a light thrips population. On 9 June Data on number of thrips per plant were taken on 10 randomly selected seedlings per plot, 3 random plant per acre stand counts of 1/1000 of an acre per plot, and plot wide seedling vigor rating were taken. On 22 June 10 randomly selected plants per plot were again counted for thrips per plant, the same 10 plants were also counted for number of true leaves present, and a plot-wide 0-10 thrips damage rating was taken.

Ten randomly selected row feet sections from each plot were hand harvested on 6 November and samples were ginned at the Texas A&M AgriLife Research Cotton Improvement Lab sample gin in Lubbock. All data collected was statistically compared utilizing ANOVA and LSD @ 0.05.

Results and Discussion

The chart below lists all pest, yield, fiber, agronomic, and early season vigor data and statistical significance among all seed treatments tested:

Texas A&M AgriLife Extension

Insecticidal Seed Treatments / GOSHI

Trial ID: SP15USANGC2015 TD Number: LOCALCREATED Protocol Edition No.: 1.01
Project ID: DEMO-INSEC
Project Number(s): % % %
Protocol Developer: Tech. Manager
License User: Blayne Reed

		1	2	3	4	5	6	7	8	9	10	11
Unique Col. ID		1	2	3	4	5	6	7	8	9	10	11
Orig./Calc. Flag		O	O	O	O	O	O	O	O	O	O	O
SE Group		1	1	1	2	3	4	5	5	5	5	5
Target		1 THRISP	1 THRISP	1 THRISP	1 THRISP	1 THRISP	1 THRISP	1 THRISP	1 THRISP	1 THRISP	1 THRISP	1 THRISP
-Disc./Scale		I AINS	I AINS	I AINS	I AINS	I AINS	I AINS	I AINS	I AINS	I AINS	I AINS	I AINS
Crop		1 K1	1 K1	1 K1	1 K1	1 K1	1 K1	1 K1	1 K1	1 K1	1 K1	1 K1
-Disc./Scale		C BCOT	C BCOT	C BCOT	C BCOT	C BCOT	C BCOT	C BCOT	C BCOT	C BCOT	C BCOT	C BCOT
Part Rated		INSECT	AREA	PLOT	PLINRO	INSECT	INSECT	SEECOT	SEED	LINT	LIGIOU	LINT
Criterium					ABGRPA							
Assessment Type		COUINS	COUPLA	VIGOR	COPLPA	DAMINS	COUINS	YIELD	WEIGHT	YIELD	PERCEN	YIELD
Assessment Unit		PLANT	NUMBER	1-5	NUMBER	0-10	NUMBER	G	G	G	%	LB
# Subsamples		5	3	1	5	1	6	1	1	1	1	1
Assessment Date		Jun-9-2015	Jun-9-2015	Jun-9-2015	Jun-22-2015	Jun-22-2015	Jun-22-2015	Dec-9-2015	Dec-9-2015	Dec-9-2015	Dec-9-2015	Dec-21-2015
Assessment Code		A1	A1	A1	A2	A2	A2					
Appl.-Ass.Interval		14 DAA	14 DAA	14 DAA	27 DAA	27 DAA	27 DAA	197 DAA	197 DAA	197 DAA	197 DAA	209 DAA
Days after first Appl.		14 DAA	14 DAA	14 DAA	27 DAA	27 DAA	27 DAA	197 DAA	197 DAA	197 DAA	197 DAA	209 DAA
Entry No. Entry/Trt. Description	Appl. Code	1	2	3	4	5	6	7	8	9	10	11
1 UNTREATED	A	0.3 a	42250.0 a	2.0 a	3.5 a	2.8 a	0.7 a	2156.50 a	964.20 a	617.65 a	28.723 a	1781.23 a
2 GAUCHO 600 FS	A	0.2 a	35000.0 a	1.5 a	4.4 a	2.0 a	0.6 ab	2445.40 a	1100.35 a	697.65 a	28.545 a	2011.78 a
3 AERIS SEED APPLIED SYSTEM	A	0.2 a	35000.0 a	2.3 a	4.1 a	1.8 a	0.3 ab	2266.40 a	1029.83 a	643.00 a	28.443 a	1854.48 a
4 AERIS SEED APPLIED SYSTEM FLUOPYRAM 600 FS	A A	0.1 a	34833.3 a	2.0 a	4.0 a	2.3 a	0.4 ab	2197.48 a	975.03 a	639.70 a	29.120 a	1844.33 a
5 GAUCHO 600 FS FLUOPYRAM 600 FS	A A	0.1 a	38583.3 a	1.5 a	4.0 a	1.8 a	0.3 ab	1955.08 a	891.13 a	548.25 a	28.110 a	1581.10 a
6 AVICTA COMPLETE PAK - CRUISER	A	0.2 a	37583.3 a	2.0 a	4.4 a	1.8 a	0.2 b	2178.60 a	971.55 a	620.60 a	28.503 a	1790.05 a
LSD P=.05		0.44	16594.29	0.95	0.61	0.92	0.31	365.428	153.546	100.502	0.7148	289.933
Standard Deviation		0.29	11012.61	0.63	0.41	0.61	0.20	242.512	101.899	66.697	0.4743	192.411
CV		176.64	29.6	33.61	10.04	29.99	47.96	11.02	10.31	10.62	1.66	10.63
Bartlett's X2		6.728	6.095	1.107	3.756	2.658	1.643	0.654	0.976	0.813	2.619	0.813
P(Bartlett's X2)		0.242	0.297	0.893	0.289	0.753	0.896	0.985	0.964	0.976	0.758	0.976
Skewness		1.8527*	0.825	0.0581	0.8617	-0.0536	-0.0468	-0.3692	-0.3672	-0.3409	-0.3812	-0.3415
Kurtosis		3.8003*	1.5168	-0.0919	3.6084*	-0.7119	-0.8543	-0.9051	-0.9745	-1.0474	-0.2978	-1.0459
Replicate F		0.154	0.620	0.664	0.604	1.889	1.224	4.924	5.116	4.080	9.510	4.075
Replicate Prob(F)		0.9256	0.6131	0.5868	0.6228	0.1748	0.3353	0.0141	0.0123	0.0264	0.0009	0.0265
Treatment F		0.354	0.283	0.944	2.656	1.711	3.796	1.727	1.908	2.110	1.987	2.107
Treatment Prob(F)		0.8718	0.9154	0.4812	0.0652	0.1927	0.0202	0.1891	0.1527	0.1205	0.1392	0.1211

Please note above that burr weight, lint yield, and seed weight data is given in grams per 10 row feet in columns 7, 8, and 9. Lint yield has been calculated to a per acre basis in column 11.

Lint yields per acre for this trial were very good but no significant differences were found with the general trend in favor of the treatment with one exception. The numerically best performing treatment was Gaucho 600 FS with a yield of 2,011.78 pounds lint per acre while the lowest performing treatment was Gaucho 600 FS with Fluopyram 600 FS at 1,581.10 with the untreated check yielding 1,781.23.

<u>Conclusions</u>

With a thrips efficacy trial, we would expect to see more thrips population differences, unless thrips populations were environmentally suppressed as these were. Please note the significant difference on the 22 June date with Avicta Complete Pak separating from the untreated check, but not the other treatments, while the other treatments did not separate from the untreated check (*P*=0.0202). The general trend on that lone significant thrips data set lean toward the treatments over the check as do all other factors taken on that date. While we cannot note these numeric differences as real here, there are other trials under higher thrips populations that do show these trends as viable in favor of the treatments.

Acknowledgements
I would like to thank USDA/NIFA for salary funding of this and many other projects. I would like to extend thanks to Mike Goss for cooperating with us to complete this trial which included the unique use of his equipment, Dr. Ed Bynum and his crew for assistance in data collection on the 9 June date, Russ Perkins with Bayer Crop Science for sponsoring this trial, the Texas A&M AgriLife Research Cotton Improvement Lab for use of their sample gin, and finally the 2015 Plains Pest Management Field Scouts for the operation, data collection, and labor associated with this trial: Jonathan Thobe, Jim Graham, and Kevin Duarte.

2015 Floyd County Phytogen Cotton Variety Trail

Texas A&M AgriLife Extension Service / Dow Crop Science
Floyd County
Cooperator: Johnathan James
Blayne Reed, EA-IPM Hale, Swisher, & Floyd / Christen Brooks, CEA-Floyd / Dr. Ken Lege, PhytoGen Seed

Summary
Seven Phytogen Cotton varieties, PHY 333 WRF, PHY 223 WRF, PHY 222 WRF, PHY 312 WRF, PHY 243 WRF, PHY 339 WRF, PHY 308 WRF and one local industry commercial standard, FM 2334 GLT were planted on May 31, 2015 into a Floyd County drip irrigated production field in a large plot trial with 3 replications. Data on stand counts and vigor ratings were taken on 11 June and end of season agronomic data was collected on 28 September. Harvest occurred on 18 November via self modulating stripper and grab samples were taken for fiber analysis. Overall lint yield per acre was calculated from actual cotton bales run through a local gin. Results were statistically compared utilizing ANOVA and LSD = 0.05.

In terms of established plants per acre on 11 June, the variety PHY 312 WRF was superior to all other varieties while PHY 308 WRF, PHY 223 WRF, and PHT 243 WRF outperformed FM 2334 GLT (*P*=0.035). On the 28 September date, the variety PHY 222 WRF was significantly shorter than PHY 339 WRF, PHY 333 WRF, and PHY 312 WRF (*P*=0.0004) while PHY 312 WRF was significantly shorter than the two tallest varieties PHY 339 WRF, PHY 333 WRF and all other varieties were not significantly different. The varieties PHY 312 WRF, PHY 222 WRF, and PHY 333 WRF significantly had lower fruiting nodes than FM 2334 GTL, PHY 308 WRF, AND PHY 223 WRF (*P*= 0.016). No varieties were significantly different in any other agronomic category.

No varieties were significantly different in terms of lint yield, however FM 2334 GLT and PHY WRF held a 60-220 pound lint yield numeric advantage with yields per acre of 1511 and 1510 pounds lint per acre respectively. No significant differences were found in crop value in terms of $ per acre with FM 2334 GLT and PHY 333 WRF still taking numeric highs of $828.00 and $822.00 respectively. Significant differences were found in percent turnout, fiber length, micronaire, strength uniformity, loan value between varieties (please see results and discussion for details).

Objective
Determine the value of selected Phytogen Cotton Seed varieties in Floyd County compared to a competition standard variety.

Materials and Methods
Seven Phytogen Cotton varieties, PHY 333 WRF, PHY 223 WRF, PHY 222 WRF, PHY 312 WRF, PHY 243 WRF, PHY 339 WRF, PHY 308 WRF and one local industry commercial standard, FM 2334 GLT were

planted on May 31, 2015 into a Floyd County drip irrigated production field in a large plot trial with 3 replications.

A 12 row vacuum planter was utilized to plant all plots on 31 May, 2015 on a 40-inch row spacing. Data on stand counts and vigor ratings were taken on 11 June and end of season agronomic data was collected on 28 September. All in-field and in-season crop management was conducted by the cooperator Johnathan James with consultations made by Robert Carter Crop Consulting.

Harvest occurred on 18 November via 12-row self modulating stripper and grab samples were pulled from the cotton bales taken by Dow for fiber analysis. Overall lint yield per acre was calculated from actual cotton bales run through a local gin and weights recorded. Results were statistically compared utilizing ANOVA and LSD = 0.05.

Results and Discussion

The chart below lists all yield, fiber, agronomic, and early season vigor data and statistical significance:

Innovation Trial

Grower Cooperator:	Johnathan James	Planting Date:	5/31/2015
Trial Cooperator:	Blayne Reed/Cristen Brooks	Seed Treatments:	Trilex, Gaucho, Aeris
PhytoGen CDS:	Ken Lege'	Moist. @ planting:	Excellent
Location:	Mt. Blanco, TX	GPS Lat:	33.784827
Replicates:	3	GPS Long:	-101.190597
Plot Size:	12 rows x ~1734'	Harvest Date:	11/18/2015
Row Spacing:	40"		
Beds:	none		
Previous crop(s):	cotton for last 5 years		
Soil type:	Pullman silty clay loam		
Irrigation:	Drip		

Variety	Lint Yield (lb/A)	Turnout (%)	Length (in)	Micronaire	Strength (g/tex)	Uniformity (%)	Loan Value ($/lb)**	Crop Value ($/A)	plants/ acre	Vigor Rating *(1=excellent; 5=very poor)*	Plant Height (in)	Total Nodes	Node of 1st Fruiting Branch	Nodes Above Cracked Boll	Height-to-Node Ratio (in/internode)
FM 2334GLT	1511	36.03	1.24	4.17	31.8	83.4	0.5480	828	38333	2.3	23.4	17.8	6.8	2.5	1.31
PHY 333 WRF	1510	34.21	1.19	3.70	30.6	82.9	0.5447	822	40600	1.7	27.9	17.0	5.8	2.2	1.64
PHY 222 WRF	1454	32.41	1.17	4.10	30.8	84.3	0.5477	796	40800	1.7	22.8	16.1	5.8	1.1	1.42
PHY 312 WRF	1429	31.01	1.21	3.83	32.5	84.2	0.5488	784	45267	1.3	25.4	17.1	5.9	1.8	1.48
PHY 223 WRF*	1410	30.92	1.24	3.70	31.5	83.9	0.5482	773	42733	1.3	24.0	16.9	7.2	1.0	1.42
PHY 243 WRF*	1397	32.27	1.20	3.37	30.9	80.9	0.5268	736	43400	1.3	25.2	16.9	6.2	1.6	1.49
PHY 308 WRF*	1358	32.04	1.18	3.80	32.9	83.1	0.5472	743	42533	2.0	24.4	16.6	6.8	2.2	1.47
PHY 339 WRF	1293	32.45	1.22	3.83	31.6	82.8	0.5470	707	40467	2.0	28.2	17.7	6.1	1.3	1.59
Mean	*1420*	*32.67*	*1.21*	*3.81*	*31.6*	*83.2*	*0.5448*	*774*	*41767*	*1.7*	*25.2*	*17.0*	*6.3*	*1.7*	*1.48*
LSD	*ns*	*1.52*	*0.02*	*0.14*	*0.7*	*0.7*	*0.0073*	*ns*	*3711*	*ns*	*2.1*	*ns*	*0.8*		
CV (%)	*5.6*	*4.4*	*1.8*	*3.4*	*2.0*	*0.8*	*1.3*	*6.1*							
R-square	*0.60*	*0.66*	*0.68*	*0.84*	*0.70*	*0.78*	*0.62*	*0.58*							

**Formerly exp: PHY 223 WRF = PX2045-11WRF; PHY 243 WRF = PX2037-18WRF; PHY 308 WRF = PX2048-04WRF.*

***Loan value according to 2015 CCC loan schedule, assuming base color (41) and leaf (4) grades.*

Conclusions

In terms of statistical significance in the most important factors, lint yield and crop value, all varieties performed equally. There were some significant differences in agronomic and fiber results between varieties. None of the agronomic factors seem to correlate directly with the large numeric top to bottom differences in yield or crop value that could point to a cause or advantage of any one cotton variety tested.

What is most likely is that the differing agronomic traits noted gave different advantages to each variety in differing levels resulting in an even top to down distribution of yield and crop value. We are left to assume that all of these varieties are equal to the competitively tested local industry standard, FM 2334 GLT, for cotton production in Floyd County. However, large numeric differences are hard to ignore, especially if dollar signs are in front of them. A thoughtful producer's choice of a variety near the top of the yield and crop value performance list from this trial would be very understandable.

Two significant agronomic differences within this trial should be noted closely by producers before choosing from this crop value list. All of the Phytogen lines numerically outperformed FM 2334 GTL in terms of established plants per acre with several of the Phytogen cotton varieties in this trial performing significantly performing better on the 11 June check date. This difference can be critical in establishing a cotton crop in adverse conditions.

There were also large and significant differences in terms of plant height between the varieties tested here. Any significant differences in plant height between varieties treated identically during the growing season often relate to vastly differing plant growth regulation needs for varieties in high input situations. Additional PGR requirements will be needed for any variety with the tendency to be taller, or they could experience many of the common fiber quality issues normally associated with 'lateness' or 'rankness' of a harvested cotton crop.

<u>Acknowledgements</u>

I would like to thank USDA/NIFA for salary funding of this and many other projects. I would like to extend thanks to Johnathon James for cooperating with us to complete this trial which included the unique use of his equipment, Dr. Ken Lege (Phytogen Cotton Seed) for sponsoring this trial plus with helping to complete the work of planting and harvest, Robert Carter for his outstanding crop consultations and management of the field throughout the season, Cristen Brooks for finding a location for this trial and finally the 2015 Plains Pest Management Field Scouts for the operation, data collection, and labor associated with this trial: Jonathan Thobe, Jim Graham, and Kevin Duarte.

2015 Swisher County Phytogen Cotton Variety Trail

Texas A&M AgriLife Extension Service / Dow Crop Science
Swisher County
Cooperator: Mike Goss
Blayne Reed, EA-IPM Hale, Swisher, & Floyd / John Villalba, CEA-Swisher / Dr. Ken Lege, PhytoGen Seed

Summary

Seven Phytogen Cotton varieties, PHY 333 WRF, PHY 223 WRF, PHY 222 WRF, PHY 312 WRF, PHY 243 WRF, PHY 339 WRF, PHY 308 WRF and one local industry commercial standard, FM 2334 GLT were planted on 26 May, 2015 into a Swisher County flood irrigated limited-tillage production field with heavy wheat cover in a large plot trial with 3 replications. Data on stand counts and vigor ratings were taken on 9 June and end of season agronomic data was collected on 6 October. Harvest occurred on 19 November via producer stripper. Burr cotton weights were recorded and grab samples was taken for fiber analysis. Overall lint yield per acre was calculated from sample gin turnout percent calculated against burr weight. Results were statistically compared utilizing ANOVA and LSD = 0.05.

No cotton variety tested was significantly different on the 9 June early season evaluation date for plants per acre or seedling vigor. However, PHY 308 WRF was numerically superior by a large margin in plants per acre (P=0.112) and PHY 308 WRF and PHY 223 WRF were numerically superior in seedling vigor (*P*=0.1589). On the 6 October late season agronomic check date, FM 2334 GLT, PHY 222 WRF, PHY 223 WRF were significantly shorter in plant height compared to PHY 339 WRF and PHY 312 WRF (*P*=0.0221). PHY 222 WRF, FM 2334 GLT, PHY 312 WRF, and PHY 333 WRF significantly set the first fruiting branch sooner than PHY 223 WRF (*P*=0.0379). The lines PHY 339 WRF, FM 2334 GTL, and PHY 312 WRF had more total nodes per plant than PHY 222 WRF and PHY 333 WRF (*P*=0.0217). There were no significant differences in the node of the uppermost harvestable boll (*P*=0.1378), node of the uppermost cracked boll (*P*=0.2185). There were also no significant differences in cotton burr weight on the 19 November harvest date (*P*=0.1152).

No varieties were significantly different in terms of lint yield however PHY 333 WRF held a large numeric advantage of 63-258 lint pounds over all other varieties. No significant differences were found in crop value in terms of $ per acre with PHY 333 WRF taking a numeric high of $715.00. Significant differences were found in percent turnout, micronaire, and uniformity, but not in fiber length, fiber strength, or loan value (please see results and discussion for details).

Objective

Determine the value of selected Phytogen Cotton Seed varieties in Swisher County compared to a competition standard variety.

Materials and Methods

Seven Phytogen Cotton varieties, PHY 333 WRF, PHY 223 WRF, PHY 222 WRF, PHY 312 WRF, PHY 243 WRF, PHY 339 WRF, PHY 308 WRF and one local industry commercial standard, FM 2334 GLT were planted on 26 May, 2015 into a Swisher County flood irrigated, limited-tillage production field with heavy wheat cover in a large plot trial with 3 replications.

An 8 row vacuum planter was utilized to plant all plots on 26 May, 2015 on a 40-inch row spacing. Data on stand counts and vigor ratings were taken on 9 June and end of season agronomic data was collected on 6 October. All in-field and in-season crop management was conducted by the cooperator Mike Goss with consultations made by Plains Pest Management.

Harvest occurred on 19 November via producer's 8-row stripper and grab samples were pulled when burr weights were recorded and taken by Dow for fiber analysis. Overall lint yield per acre was calculated from sample gin turnout percent calculated against burr weight. Results were statistically compared utilizing ANOVA and LSD = 0.05.

Results and Discussion

The chart below lists all yield, fiber, agronomic, and early season vigor data and statistical significance:

Innovation Trial

Grower Cooperator:	Mike Goss	Planting Date:	5/26/2015
Trial Cooperator:	Blayne Reed	Seed Treatments:	Trilex, Gaucho, Aeris
PhytoGen CDS:	Ken Lege'	Moist. @ planting:	Excellent
Location:	Kress, TX	GPS Lat:	34.437913
Replicates:	3	GPS Long:	-101.740984
Plot Size:	8 rows x ~2600'	Harvest Date:	11/19/2015
Row Spacing:	40"		
Beds:	yes		
Previous crop(s):	wheat/fallow		
Soil type:	Pullman clay loam		
Irrigation:	Furrow		

(sorted by Crop Value)

Variety	Lint Yield (lb/A)	Turnout (%)	Length (in)	Micronaire	Strength (g/tex)	Uniformity (%)	Loan Value ($/lb)**	Crop Value ($/A)	plants/ acre	Vigor Rating *(1=excellent; 5=very poor)*	Plant Height (in)	Total Nodes	Node of 1st Fruiting Branch	Nodes Above Cracked Boll	Height-to-Node Ratio (in/internode)
PHY 333 WRF	1309	35.99	1.15	4.05	31.4	82.9	0.5463	715	37000	2.0	32.9	16.2	6.0	4.0	2.03
PHY 223 WRF*	1072	32.66	1.16	3.63	30.2	80.8	0.5390	671	34533	1.3	29.1	17.3	7.6	3.6	1.68
PHY 222 WRF	1166	33.32	1.15	4.33	30.6	83.2	0.5432	644	35933	2.3	29.4	16.1	5.6	2.7	1.83
PHY 308 WRF*	1246	34.85	1.17	3.93	32.9	83.5	0.5475	633	43333	1.3	31.3	17.1	7.1	4.3	1.83
PHY 312 WRF	1185	35.25	1.16	3.83	32.1	83.1	0.5408	631	38067	1.7	33.7	18.1	6.4	5.2	1.86
FM 2334GLT	1110	36.52	1.20	4.20	32.5	83.2	0.5468	607	37867	2.3	27.5	17.7	6.3	3.9	1.55
PHY 243 WRF*	1156	32.00	1.17	3.90	31.8	83.0	0.5470	587	39600	2.0	30.9	17.1	6.7	3.8	1.81
PHY 339 WRF	1051	31.60	1.16	3.77	31.5	82.6	0.5455	573	37000	2.7	34.0	18.7	6.6	4.4	1.82
Mean	*1155*	*33.94*	*1.17*	*3.95*	*31.6*	*82.8*	*0.5444*	*629*	*37917*	*2.0*	*31.1*	*17.3*	*6.5*	*4.0*	*1.80*
LSD	*ns*	*1.61*	*ns*	*0.18*	*ns*	*0.7*	*ns*	*ns*	*ns*	*ns*	*3.8*	*1.4*	*1.1*		
CV (%)	*8.5*	*4.4*	*1.9*	*4.3*	*3.9*	*0.7*	*0.8*	*8.6*							
R-square	*0.58*	*0.69*	*0.50*	*0.78*	*0.47*	*0.75*	*0.46*	*0.56*							

**Formerly exp: PHY 223 WRF = PX2045-11WRF; PHY 243 WRF = PX2037-18WRF; PHY 308 WRF = PX2048-04WRF.*

***Loan value according to 2015 CCC loan schedule, assuming base color (41) and leaf (4) grades.*

Conclusions

In terms of statistical significance in the most important factors, lint yield and crop value, all varieties performed equally. There were some significant differences in agronomic and fiber results between varieties. While no one variety seemed to dominate the significantly different agronomic traits measured, the variety PHY 333 WRF did perform admirably in almost all of these measurements which likely provides for this line leading this trial numerically in lint yield and per acre crop value.

Because no cotton variety was significantly different from the one local industry commercial standard, FM 2334 GLT, we can assume that all of these lines are acceptable cotton varieties for cotton production in Swisher County. However, large numeric differences are hard to ignore, especially if dollar signs are in front of them. A thoughtful producer's choice of a variety near the top of the yield and crop value performance list from this trial would be very understandable.

There are some significant agronomic differences within this trial should be noted closely by producers before choosing from exclusively from this crop value list. The most pertinent might be the significant differences in terms of plant height between varieties. Any significant differences in plant height between varieties treated identically during the growing season often relate to vastly differing and likely increased plant growth regulation needs for varieties in high input situations. Additional PGR requirements will be needed for any variety with the tendency to be taller, or they could experience many of the common fiber quality issues normally associated with 'lateness' or 'rankness' of a harvested cotton crop.

Acknowledgements

I would like to thank USDA/NIFA for salary funding of this and many other projects. I would like to extend thanks to Mike Goss for cooperating with us to complete this trial which included the unique use of his equipment, Dr. Ken Lege (Phytogen Cotton Seed) for sponsoring this trial plus with helping to complete the work of planting and harvest, John Villalba for cooperation during harvest and promoting the results of this trial in field days, and finally the 2015 Plains Pest Management Field Scouts for the operation, data collection, and labor associated with this trial: Jonathan Thobe, Jim Graham, and Kevin Duarte.

TWO YEARS OF PRE-PLANT RESIDUAL HERBICIDE EFFICACY TRIALS ON TEXAS HIGH PLAINS COTTON

Blayne Reed (1), John Villalba (2), Dr. Wayne Keeling (3)

(1) Texas A&M AgriLife Extension, Plainview, (2) Texas A&M AgriLife Extension, Tulia, (3) Texas A&M AgriLife Research, Lubbock

Hale & Swisher County 2014 & 2015
Cooperators: Reed Farms and Kent Springer

Summary

With the development of glyphosate resistant pigweed on the Texas High Plains, producers in the region have been struggling to return to using pre-plant residual products for maximum weed efficacy with current production practices. These trials field tested the efficacy of the maximum rate of commonly used pre-plant incorporated herbicide products. Both trials were of randomized complete block design with four replications where an additional pre-emergence factorial herbicide treatment was evaluated. All pre-plant herbicides were applied at the earliest practical labeled date and incorporated via the cooperator's preferred method and concluded in mid-July. In 2014, the trial was placed into a conventional-tillage field. Pre-plant herbicide treatments were an untreated check, Prowl H2O, Treflan, Valor, and a Prowl H2O + Treflan mix with the factorial treatment being Cotoran. In 2015, the trial was placed into a no-till field. Treatments were an untreated check, Prowl H2O, Direx, Valor, and a Prowl H2O + Treflan mix with the factorial treatment of Cotoran. In both seasons, all treatments were significantly different from the untreated check early in the trial. By mid-July in the 2014 trial, the Prowl H2O and the Prowl, Treflan mix treatments remained significantly different from the check and all treatments containing the Cotoran factorial remained superior while the Valor and Treflan alone treatments were not significantly different from the check. By mid-July for the 2015 trial, all treatments remained significantly different from the check with the Prowl H2O and the Cotoran factorial treatment separating out as superior to all other treatments.

Objective

In 2011 Palmer amaranth, aside from being the most common weed found in West Texas production fields (commonly referred to as pigweed or careless weed locally), was confirmed to be resistant to over the top glyphosate cotton field applications in several counties in the Texas High Plains region (International Survey of Herbicide Resistant Weeds). This building problem initiated the need for a massive shift in weed IPM management strategies for area producers away from a glyphosate only centered management plans in cotton fields back to a more integrated approach to dealing with this long time and very prolific weed pest species while maintaining overall weed control for all weed pest species. Producers quickly began to struggle with going back to utilizing the once commonly used pre-plant residual herbicides for cotton effectively under modern production practices.

The purpose of these trials were to evaluate the maximum efficacy of several of the commonly available pre-plant residual herbicides labeled for cotton production in Texas under modern production practices on a local level and to present the findings to area producers for the benefit of cotton production in the region.

Materials and Methods

For both the 2014 and 2015 trials a small plot randomized complete block design with 4 replications was utilized. Both fields utilized for the trials were in heavy clay Pullman Mollisols. All plots consisted of 4, 40 inch rows by 36 feet long. Both trials consisted of 5 pre-plant herbicide treatments which included an untreated check and a post planting, pre-emergence herbicide factorial treatment giving both trials 10 distinct treatments. All applications were made with a CO2 backpack sprayer at 10.5 gallons per acre. All pre-plant treatments were targeted for the earliest practical application date and the factorial pre-emergence was made post planting and pre crop emergence. A regional standard surfactant treatment of 0.25 % v/v was added to all treatments. Both trials were incorporated by the cooperator's best preferred modern standard method. Weed counts began 2-4 weeks before planting and continued on a bi-weekly basis but were also conducted on targeted dates of interest. Actual weed counts were taken early in both trials until weed populations increased to a point that made actual counts impractical. Once weed populations reach were deemed too high to count, a percent control compared to the untreated check was taken in place of weed counts. Data was also collected on cotton crop-herbicide damage on all counting dates. Both trials were concluded in early July in conjunction with the plots being utilized as demonstrations for field days. No in-season over the top herbicide was applied or any cultural weed control practice was utilized on the plots for the duration of the trials. Following the conclusion of both trials, all surviving weeds in all plots were hand hoed and weeded until weed free.

2014

The 2014 trial was conducted in a conventionally tilled, furrow irrigated field. The treatments utilized for the 2014 trial are found in Table 1.

Table 1. 2014 Residual Herbicide in Cotton Trial Treatments.

Pre-plant treatment	Pre-emerge treatment	rate(s)
untreated	untreated	na
Prowl H2O	untreated	3 PT / na
Trifluralin	untreated	3 PT / na
Valor	untreated	2 oz. / na
Prowl H2O + Trifluralin	untreated	1.5 PT + 1.5 PT/ na
untreated	Cotoran	na / 4 PT
Prowl H2O	Cotoran	3 PT / 4 PT
Trifluralin	Cotoran	3 PT / 4 PT
Valor	Cotoran	2 oz. / 4 PT
Prowl H2O + Trifluralin	Cotoran	1.5 PT + 1.5 PT / 4 PT

All pre-plant herbicide treatments for this trial were made on March 12, 2014. Incorporation was done later on March 12 via lister tillage. On April 10 the trial area was pre-irrigated via flood irrigation. Weed counts began on April 21. Early in the trial, counts were made for individual weed species until it was noted later that the only weed of significance in the trial was pigweed. At that point, only total weed counts were made with no differentiation in weed species. The trial area was mechanically ‘rod-weeded’ on May 9 and cotton was planted on May 12. The pre-emergence Cotoran treatments were made on May 14. The cotton field containing the trial experienced a weather induced failure to establish a viable cotton stand. The field and trial area was ‘rod-weeded’ again on June 1 and was replanted on June 2. The trial was concluded with the last weed count date of July 7.

2015

The 2015 trial was planted into a no-till, pivot irrigated field with terminated wheat cover. The treatments utilized for the 2015 trial are found in Table 2.

Table 2. 2015 Residual Herbicide in Cotton Trial Treatments

pre-plant treatment	pre-emerge treatment	rate(s)
untreated	untreated	na
untreated	Cotoran	na / 3 PT
Prowl H2O	untreated	3 PT / na
Prowl H2O	Cotoran	3 PT / 3 PT
Valor	untreated	2 oz. / na
Valor	Cotoran	2 oz. / 3 PT
Direx 4L	untreated	1.6 QT / na
Direx 4L	Cotoran	1.6 QT / 3 PT
Prowl H2O + Trifluralin	untreated	1.5 PT + 1.5 PT / na
Prowl H2O + Trifluralin	Cotoran	1.5 PT + 1.5 PT / 3 PT

All pre-plant herbicide treatments were made on March 30, 2015. Incorporation was done via 2 inch irrigation on the night of March 30-31. Weed counts began on April 20. No differentiation in weed species were ever made in weed counts in 2015. The field was planted on May 15 and Cotoran pre-emergence treatments were made on May 18. The rate of the pre-emergence treatment of Cotoran was reduced from the 2014 rate for economic concerns from 4 PT/ac to 3 PT/ac. The trial was concluded with the last weed count date of July 13.

Results and Discussion

Only selected dates for weed counts will be shared from both trials to prevent replication in data reporting. No cotton damage was noted from any herbicide treatment including all of the Cotoran pre-emergence treatments.

2014

Differences between the untreated check and any residual herbicide treatment were noted by the first weed count date of April 21 and continued through the hectic month of May following the first planting (*P*=0.0432). On April 21, all plots treated with any residual herbicide remained weed free, while those plots left untreated by a pre-plant residual herbicide or not treated yet with the pre-emergence Cotoran treatment had notable weed populations.

By June 5, the Trifluralin treatment was no longer significantly different from the untreated check and treatments with the newly applied pre-emergence treatment of Cotoran added began to significantly differentiate from Trifluralin (P=0.0034).

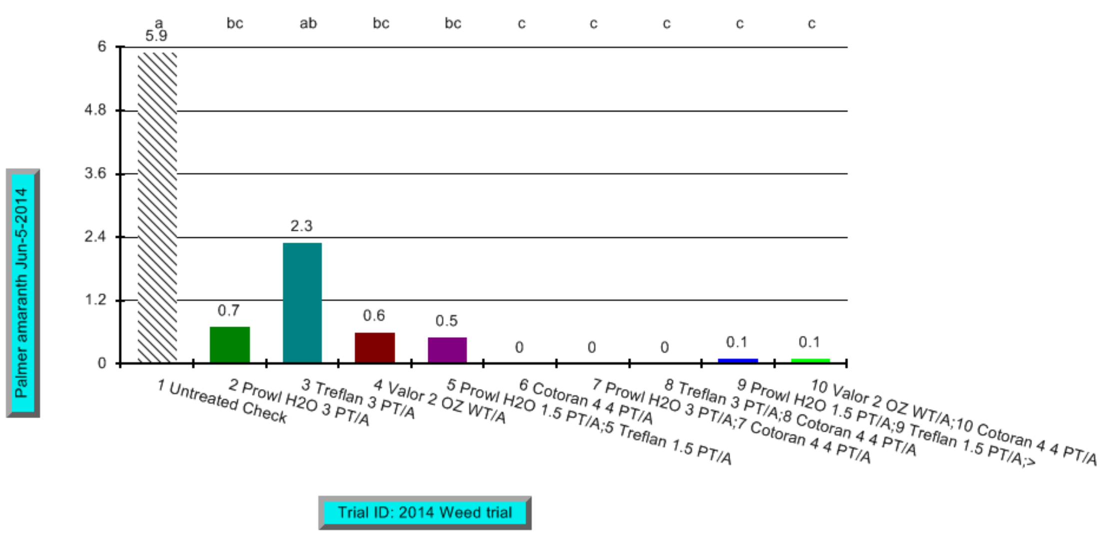


Figure 2. Number of emerged pigweeds per plot on June 5, 2014 (P=0.0034).

By the July 7 final weed count date, taken in terms of percent control compared to the check, Trifluralin and Valor were not significantly different from the untreated check. Prowl H2O remained significantly different from the check but not significantly different from Trifluralin or Valor. The Prowl H2O + Trifluralin treatment was significantly different from the check, Trifluralin and Valor and was statistically similar to all other treatments. All treatments that included the Cotoran pre-emergence treatment were significantly different from the check, Trifluralin, Valor and Prowl H2O treatment with the exception of the Trifluralin / Cotoran treatment which remained similar to the Prowl H2O treatment (*P*=0.0001).

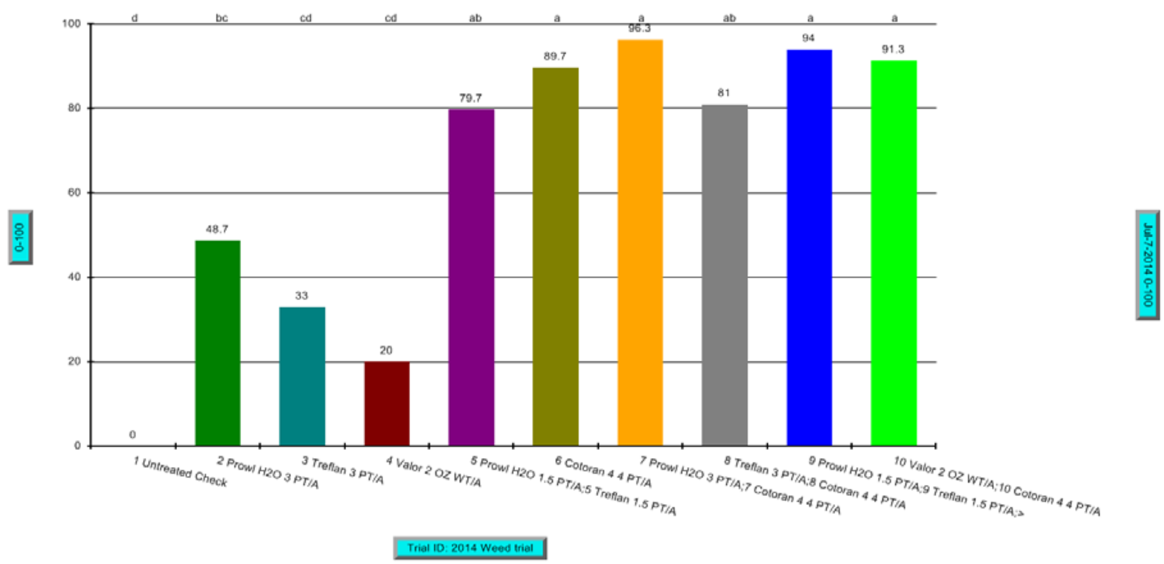


Figure 3. Percent weed control compared to the untreated checks, July 7, 2014 (*P*=0.0001).

<u>2015</u>

By the first weed count date of April 20, numeric but not significant differences could be noted between plots treated with any residual herbicide and those that had not been treated or not yet treated. Plots treated with any residual herbicide contained an average of 0.22 weeds per plot while untreated plots contained an average of 0.88 weeds per plot.

By May 18, significant differences were noted between plots treated with any residual herbicide and the check but no plots were weed free (*P*=0.0087).

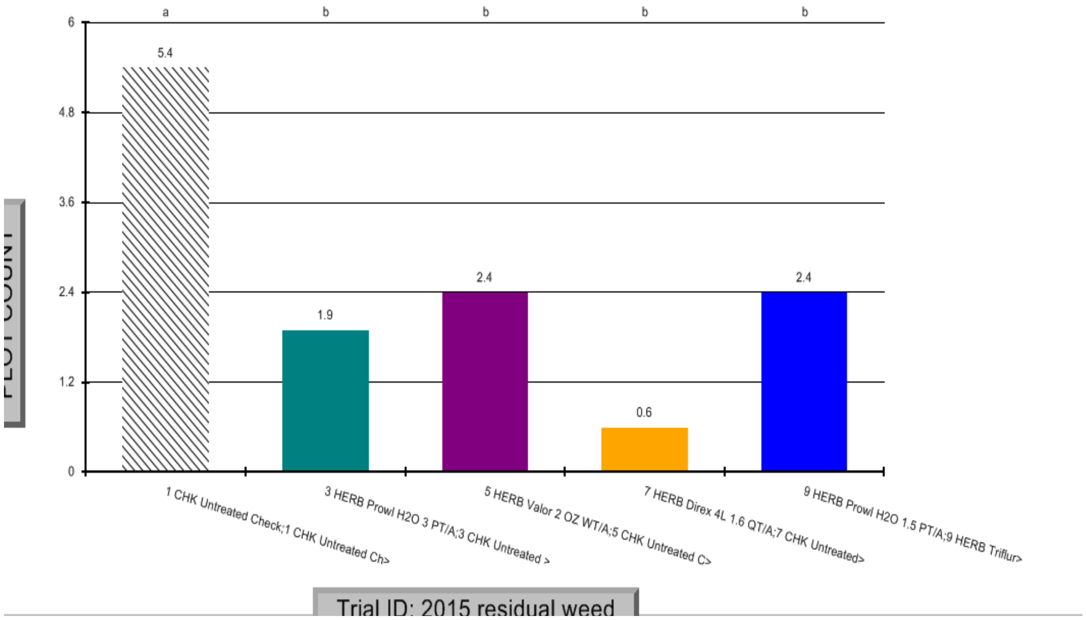


Figure 5. Weeds per plot May 18, 2015 (P=0.0087).

By June 10, all treatments had been applied and significant differences from the check increased for all treatments. All treatments that included the pre-emergence Cotoran treatment were significantly different from all single chemistry treatments except the Direx 4L / Cotoran treatment. While not significant the Direx 4L / Cotoran treatment held the same numeric trend as those treatments with significance (P=0.0001).

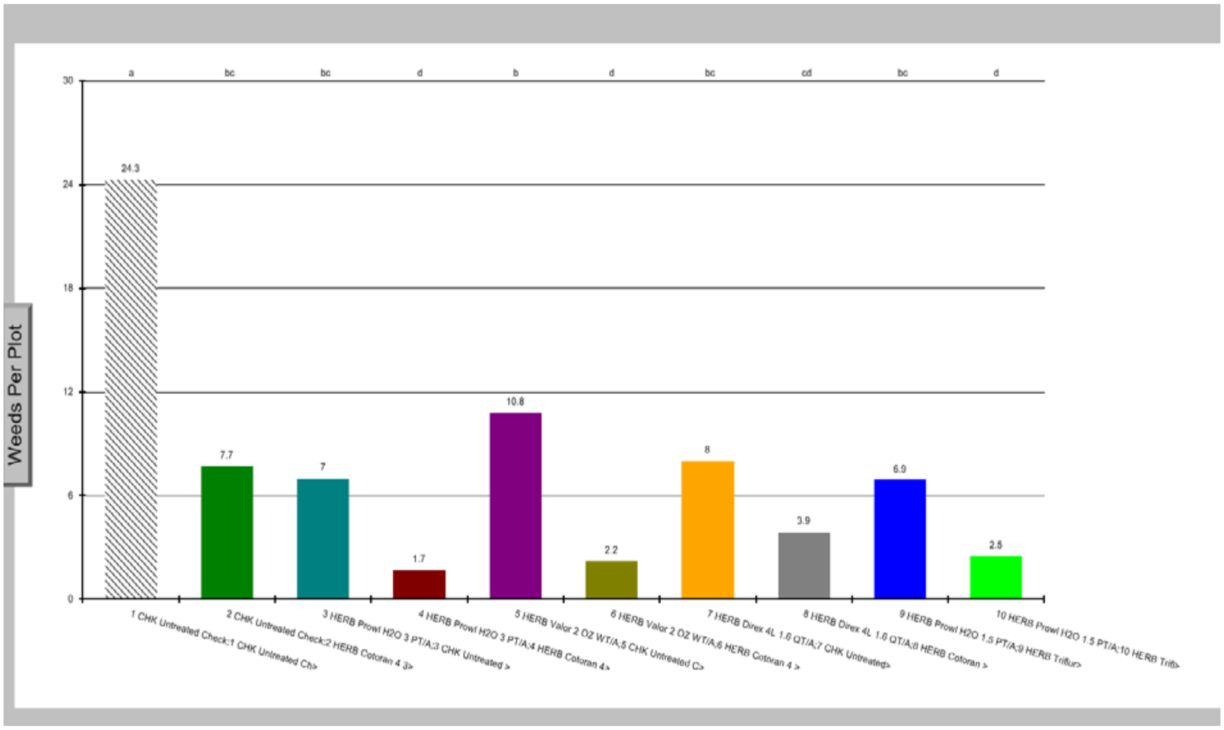


Figure 6. Number of weeds per plot on June 10, 2015 (*P*=0.0001).

On the final count date of July 13, all treatments remained significantly different from the check. The numeric trend of increased percent weed control by adding the Cotoran pre-emergence treatment continued, but this trend was not significantly different for any treatment except the Prowl H2O / Cotoran treatment which was superior to all other treatments numerically but remained statistically similar to the untreated / Cotoran treatment and the Prowl H2O + Trifluralin / Cotoran treatment (*P*=0.001).

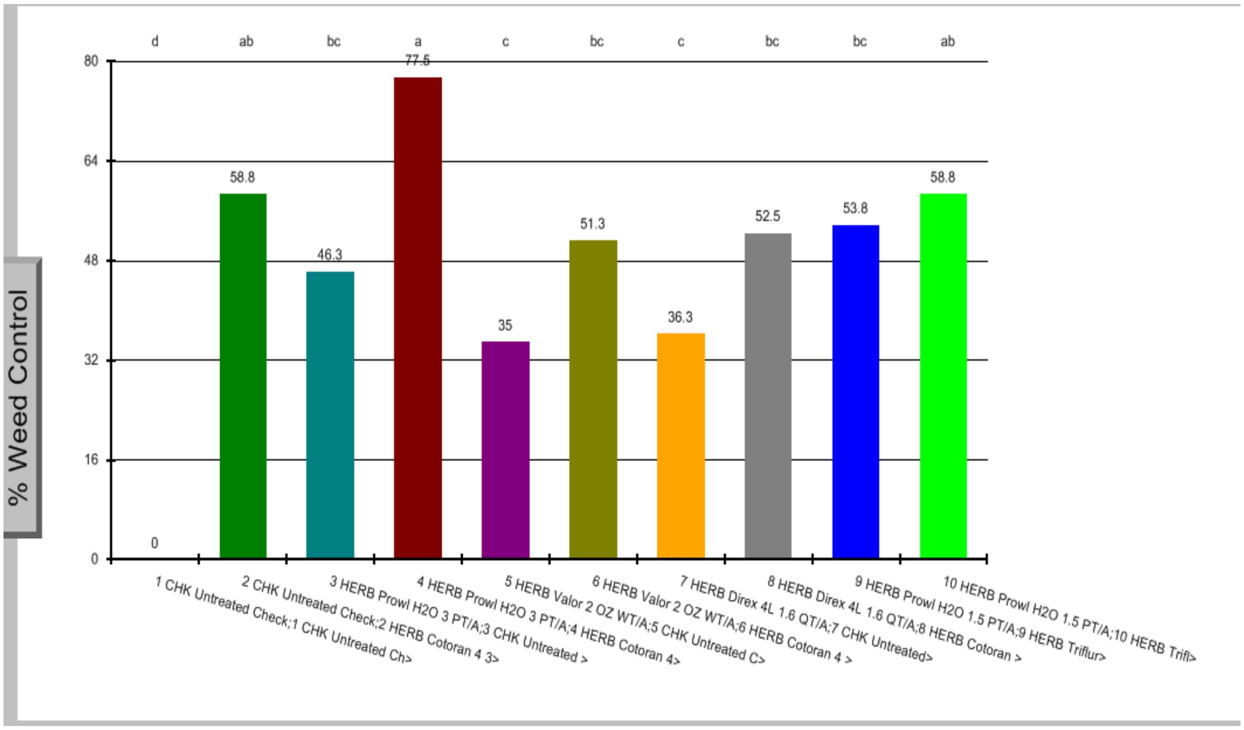


Figure 7. Percent weed control on July 13, 2015 (*P*=0.001).

Conclusions

First, it should be noted that all pre-plant residuals were significantly superior compared to the untreated checks at some point in both trials proving that all pre-plant incorporated cotton herbicides have value on the Texas High Plains under modern production practices. While some individual treatments, at least numerically and somewhat significantly, appeared to hold a longer residual than others, the product characteristics of the treatments tested vary greatly. For example, some products will incorporate with water far better than others. These more readily soil incorporated products are very likely to not remain stable and active in the weed seed germination zone as long. In many modern cotton production situations an increase in effective incorporation could be an ideal trade for length of residual as long as the length of effective efficacy is understood and additional modes of action are in place from a solid weed IPM plan that are in place.

It should also be noted that the addition of the pre-emergence treatment of Cotoran as a second mode of residual herbicide action trended numerically and sometimes quite significantly in both trials to increase weed control. It should also be underscored that no herbicide damage from this or any other treatment was noted throughout both trials. While the threat of crop damage from Cotoran remains, this treat might not be as great in heavier clay soils and could be less than suspected for most soil types. This could be of special significance in situations similar to the 2014 trial with the failure to establish a cotton stand due to weather issues as the pre-emergence treatment of Cotoran was actually applied pre-replant. Also to be underscored is the fact that the 2014 untreated / Cotoran pre-emergence alone treatment was twice mechanically plowed and was made weed-free. Prior to this mechanical plowing for seedbed preparation, these plots had substantial populations of weeds present.

The performance of the Prowl H2O + Trifluralin treatment in the 2014 trial was a surprise and looks to be a very good fit for conventionally tilled cotton fields. The reasons for the increased performance over both the Prowl H2O and the Trifluralin alone treatments is not understood at this time as both products contain almost identical active ingredients. It is suspected that a wider band of incorporation might be responsible for this mixtures success but no information has been gathered to substantiate this suspicion. This mixture does not seem to hold the same advantage over Prowl H2O alone in no-till situations in the 2015 trial.

No treatment for either trial obtained 100 % weed control for the duration of the trials. The results from these trials do show that the products tested with these treatments are and should be substantial tools in modern production practices in maintaining weed control through IPM and that additional modes of action and / or methods of control should be utilized to achieve optimum weed control.

Acknowledgements

I would like to extend thanks everyone at Reed Farms and Kent Springer Farms for cooperating with us to complete these trials: Kent Springer, Jeremy, Jimie, Johnie, Joe, and Jeff Reed. I would also like to thank Dr. Wayne Keeling for sharing products, wisdom, and opinions. The 2014 and 2015 Plains Pest Management Field Scouts for the operation, data collection, and labor associated with this trial: Jonathan Thobe, Jim Graham, and Kevin Duarte. Finally, I would like to thank John Villalba for his cooperation and promotion of this trial's results.

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Baumann, P., Dotray, P., Keeling, W., Klosterboer, A., Masabni, J.G., Miller, T. 2014. Status of Resistant Weeds in Texas. International Survey of Herbicide Resistant Weeds.

2015 Velum Total in Swisher/Hale County Cotton for Nematode & Thrips Control
Texas A&M AgriLife Extension Service / Bayer Crop Science
Hale & Swisher County
Cooperator: Kent Springer

Blayne Reed, EA-IPM Hale, Swisher, & Floyd / Russ Perkins, BCS

Summary

Seven differing treatments primarily targeted for thrips control, but also wireworms and nematodes, were evaluated for efficacy, plant health, and yield impacts. These treatments included an untreated check, Aeris Seed treatment at 0.75mg ai./seed, Temik 15G at 5 pounds per acre, Velum Total at 14 oz. per acre, Velum Total at 18 oz. per acre, Aeris Seed Treatment plus Velum at 14 oz. per acre, and Aeris plus Admire Pro Systemic Pro at 9 oz. per acre. This trial was set up in an RBD design with four replications. Plots were planted in a pivot irrigated field belonging to Kent Springer on the Hale / Swisher County line north of Edmonson on June 3, 2015. All treatments were made on the Planting date by a combination of turned on or off chemical boxes on the planter that had been recently calibrated, or were made as a liquid in-furrow with a CO2 backpack sprayer, also turned on and off as needed, that was rigged, fitted, and attached to the planter with a four row modified soil injector boom. Plots were planted four rows at a time with a through and equipment was set for needed application between plots. Once the field established, data collection began at 9 DAT with per acre stand counts and continued with weekly thrips counts, plant stage collection, and / or plant damage assessments until the field developed passed economic thrips damage at 29 DAT. Nematode counts began roughly 60 DAT but ended quickly due to lack of nematode pressure.

Weather had a notable impact on the trial as frequent and sometimes heavy rains often cleaned leaves of thrips early in the season and mid-season hail events damaged plots heavily making yield differences hard to detect. At 9 DAT, the Temik treatment had significantly fewer plants per acre (P=0.0343) compared to the Aeris plus Velum treatment and the Aeris plus Admire Pro treatment, but exhibited more plant vigor (P=0.0006) compared to all other treatments. Also at the 9 DAT date, all treatments that included the Aeris Seed Treatment exhibited significantly less wireworm damage compared to all other treatments (P=0.0154), but there were no other significant differences between treatments in terms of thrips numbers or damage ratings. At 19 DAT there were no significant differences in number of thrips, thrips damage ratings, or in number of true leaf stage. At 29 DAT, all treatments were numerically better than the untreated check in terms of thrips damage ratings with the Velum at 14 oz., Velum at 18 oz., Aeris with Velum at 14 oz., and the Aeris with Admire Pro being significantly better than the untreated check (P=0.0282). No yield differences were significant at the end of the season.

Objective

Since the loss of Temik to producers in seedling cotton for thrips and nematode control there has been a shortcoming of tools to control these cotton pests. Recently Bayer Crop Science has released Velum Total, an in-furrow liquid product for nematode control that could also offer some protection for thrips.

Much needed actual field trial data involving Velum's performance on the Texas High Plains remains scarce, especially in terms of thrips control. This company designed protocol was one of a few planned in 2015 in Texas to capture that data. This trial conducted in Swisher County was specifically designed to capture the much needed data on thrips particularly due to this pest's annually high populations.

Materials and Methods

This company conceived protocol required seven differing treatments that primarily targeted thrips and nematodes for control, but data on wireworm efficacy was also recorded. All plots and treatments were evaluated for pest efficacy, plant health, and yield impacts. These treatments included an untreated check, Aeris Seed treatment at 0.75mg active ingredient /seed, Temik 15G at 5 pounds per acre, Velum Total at 14 oz. per acre, Velum Total at 18 oz. per acre, the Aeris Seed Treatment plus Velum at 14 oz. per acre, and Aeris plus Admire Pro Systemic Pro at 9 oz. per acre.

This trial was set up in a CRBD design with four replications. Plots were planted in a pivot irrigated field belonging to Kent Springer on the Hale / Swisher County line north of Edmonson on June 3, 2015. All treatments were made on the Planting date by a combination of turned on or off chemical boxes on the planter that had been recently calibrated, or were made as a liquid in-furrow with a CO2 backpack sprayer, also turned on and off as needed, that was rigged, fitted, and attached to the planter with a four row modified soil injector boom. Plots were planted four rows at a time with a through and equipment was set for needed application between plots. Once the field established, data collection began at 9 DAT with per acre stand counts, thrips counts, plant stage collection, and / or plant damage assessments. At 19 DAT data was collected for plant leaf stage, thrips damage rating, and number of thrips per plant. At 29 DAT only a thrips damage rating was taken due to heavy rain events that cleaned leaves of all thrips but left damage since the 19 DAT check. Nematode counts began roughly 60 DAT but ended quickly due to lack of nematode pressure.

On November 9, 2015 10 randomly selected row feet sections from each plot were hand harvested and samples were ginned at the Texas A&M AgriLife Research Cotton Improvement Lab sample gin in Lubbock on December 9. All data collected was statistically compared utilizing ANOVA and LSD @ 0.05.

Trial Map Treatment Description

Trt	Code	Description
1	CHK	UNTREATED
2		AERIS SEED APPLIED SYSTEM 600 0.75 MG A/SEED
3		TEMIK 15G 15 5 LB/A
4		VELUM TOTAL 440 14 FL OZ/A
5		VELUM TOTAL 440 18 FL OZ/A
6		AERIS SEED APPLIED SYSTEM 600 0.75 MG A/SEED;VELUM TOTAL 440 14 FL OZ/A
7		AERIS SEED APPLIED SYSTEM 600 0.75 MG A/SEED;ADMIRE PRO SYSTEMIC PRO 550 9 FL OZ

401 3	402 4	403 6	404 1	405 7	406 2	407 5
301 3	302 2	303 5	304 7	305 6	306 4	307 1
201 4	202 3	203 2	204 6	205 1	206 7	207 5
101 7	102 5	103 1	104 2	105 3	106 6	107 4

Table 1. Trial treatment list and plot map.

Results and Discussion

At 9 DAT, the Temik treatment had significantly fewer plants per acre (*P*=0.0343) compared to the Aeris plus Velum treatment and the Aeris plus Admire Pro treatment, but exhibited more plant vigor (*P*=0.0006) compared to all other treatments. Also at the 9 DAT date, all treatments that included the Aeris Seed Treatment exhibited significantly less wireworm damage compared to all other treatments (*P*=0.0154), but there were no other significant differences between treatments in terms of thrips numbers or damage ratings.

				1	2	3	4
Unique Col. ID				1	2	3	4
Orig./Calc. Flag				O	O	O	O
SE Group				1	1	1	2
Target				1 THRISP	1 THRISP	1 THRISP	2 CONOSP
-Disc./Scale				I AINS	I AINS	I AINS	I AINS
-Characteristic							SOILBORN
Crop				1 K1	1 K1	1 K1	1 K1
-Disc./Scale				C BCOT	C BCOT	C BCOT	C BCOT
Part Rated				AREA	PLOT	INSECT	PLOT
Assessment Type				COUPLA	VIGOR	COUINS	DAMINS
Assessment Unit				HA	1-5		1-10
# Subsamples				3	1	6	1
Assessment Date				Jun-12-2015	Jun-12-2015	Jun-12-2015	Jun-12-2015
Assessment Code				A1	A1	A1	A1
Days after first Appl.				9 DAA	9 DAA	9 DAA	9 DAA
ARM Action Codes					AL		
Handheld Abbr.							
Entry No.	Entry/Trt. Description	Dose Dose Unit	Appl. Code	1	2	3	4
1	UNTREATED		A	37416.7 ab	1.7 b	0.2 a	2.3 a
2	AERIS SEED APPLIED SYSTEM	0.75 mg ai/seed	A	39250.0 ab	1.2 b	0.0 a	1.0 a
3	TEMIK 15G	5 lb/a	B	25166.7 b	2.9 a	0.0 a	2.5 a
4	VELUM TOTAL	14 fl oz/a	C	42000.0 ab	1.2 b	0.1 a	2.3 a
5	VELUM TOTAL	18 fl oz/a	C	40666.7 ab	1.2 b	0.1 a	2.3 a
6	AERIS SEED APPLIED SYSTEM VELUM TOTAL	0.75 mg ai/seed 14 fl oz/a	A C	49416.7 a	2.0 b	0.0 a	1.5 a
7	AERIS SEED APPLIED SYSTEM ADMIRE PRO SYSTEMIC PRO	0.75 mg ai/seed 9 fl oz/a	A C	45333.3 a	1.2 b	0.1 a	1.0 a
LSD P=.05				13160.69	0.63 - 0.87	0.20	1.00
Standard Deviation				8858.98	0.07t	0.14	0.67
CV				22.21	17.79t	165.23	36.93
Bartlett's X2				6.568	0.005	5.523	4.87
P(Bartlett's X2)				0.363	1.00	0.238	0.432
Skewness				-0.497	0.5742	1.9189*	0.3681
Kurtosis				-0.7525	-0.4472	3.1174*	0.4197
Replicate F				0.966	2.742	2.302	1.553
Replicate Prob(F)				0.4302	0.0734	0.1116	0.2354
Treatment F				2.962	6.955	0.977	3.632
Treatment Prob(F)				0.0343	0.0006	0.4689	0.0154

Table 2. 9 DAT data / result columns: 1 – Plants per acre, 2 – Plant vigor rating, 3 – Thrips per plant, 4 – Wireworm damage rating.

There were no significant differences in any 19 DAT data for true leaf stage, thrips damage ratings, or number of thrips per plant.

At 29 DAT only a thrips damage rating was taken due to heavy rain events that cleaned leaves of all thrips but left damage since the 19 DAT check. The treatments Velum @ 14 oz. per acre, Velum at 18 oz. per acre, Aeris plus Velum at 14 oz. per acre, and Aeris plus Admire Pro @ 9 oz. per acre all proved to be significantly different in thrips damage rating compared to the untreated check (*P*=0.0282)

Unique Col. ID				8
Orig./Calc. Flag				O
SE Group				5
Target				1 THRISP
-Disc./Scale				I AINS
-Characteristic				
Crop				1 K1
-Disc./Scale				C BCOT
Part Rated				PLOT
Assessment Type				DAMINS
Assessment Unit				0-10
# Subsamples				1
Assessment Date				Jul-2-2015
Assessment Code				A3
Days after first Appl.				29 DAA
ARM Action Codes				
Handheld Abbr.				
Entry No. Entry/Trt. Description	Dose	Dose Unit	Appl. Code	8
1 UNTREATED			A	3.3 a
2 AERIS SEED APPLIED SYSTEM	0.75	mg ai/seed	A	2.3 ab
3 TEMIK 15G	5	lb/a	B	2.3 ab
4 VELUM TOTAL	14	fl oz/a	C	1.8 b
5 VELUM TOTAL	18	fl oz/a	C	1.8 b
6 AERIS SEED APPLIED SYSTEM VELUM TOTAL	0.75 14	mg ai/seed fl oz/a	A C	1.8 b
7 AERIS SEED APPLIED SYSTEM ADMIRE PRO SYSTEMIC PRO	0.75 9	mg ai/seed fl oz/a	A C	1.8 b
LSD P=.05				0.94
Standard Deviation				0.63
CV				29.9
Bartlett's X2				3.696
P(Bartlett's X2)				0.718
Skewness				0.2961
Kurtosis				-0.1754
Replicate F				1.770
Replicate Prob(F)				0.1889
Treatment F				3.120
Treatment Prob(F)				0.0282

Table 3. 29 DAT data / result column: Thrips damage rating.

There were no nematodes found in any treatment at the 60 DAT date. There were no significant differences in lint yield per acre, percent turnout, or seed weight at the end of the season.

Unique Col. ID	13
Orig./Calc. Flag	O
SE Group	10
Target	1 THRISP
-Disc./Scale	I AINS
-Characteristic	
Crop	1 K1
-Disc./Scale	C BCOT
Part Rated	LINT
Assessment Type	YIELD
Assessment Unit	LB
# Subsamples	1
Assessment Date	Dec-9-2015
Assessment Code	A4
Days after first Appl.	189 DAA
ARM Action Codes	
Handheld Abbr.	PERACRE

Entry No.	Entry/Trt. Description	Dose	Dose Unit	Appl. Code	13
1	UNTREATED			A	1245.93 a
2	AERIS SEED APPLIED SYSTEM	0.75	mg ai/seed	A	1334.23 a
3	TEMIK 15G	5	lb/a	B	1229.55 a
4	VELUM TOTAL	14	fl oz/a	C	1287.48 a
5	VELUM TOTAL	18	fl oz/a	C	1285.18 a
6	AERIS SEED APPLIED SYSTEM VELUM TOTAL	0.75 14	mg ai/seed fl oz/a	A C	1334.23 a
7	AERIS SEED APPLIED SYSTEM ADMIRE PRO SYSTEMIC PRO	0.75 9	mg ai/seed fl oz/a	A C	1160.90 a

LSD P=.05	197.560
Standard Deviation	132.986
CV	10.49
Bartlett's X2	2.829
P(Bartlett's X2)	0.83
Skewness	0.1363
Kurtosis	-0.4597
Replicate F	0.200
Replicate Prob(F)	0.8950
Treatment F	0.863
Treatment Prob(F)	0.5404

Table 4. Yield data / result column.

Conclusions

All treatments of Velum Total tested in this trial, did at least minimally in a light thrips population situation with harsh weather conditions, prove to have some value in terms of limiting thrips damage in this trial (Table 3) compared to the untreated check. Velum is a product designed and likely to be primarily utilized for nematode control in cotton. The results of this research indicate that producers who apply Velum Total at planting, in-furrow either with or without Aeris Seed Treatment should be able to count on some level of thrips control.

The trial indicated that Admire Pro should enhance the level of thrips damage prevention to Aeris compared to the untreated check (Table 3).

This trial also shown that Temik reduced plant populations compared to the Aeris plus Velum and the Aeris plus Admire Pro treatments (Table 2). Temik also provided more seedling vigor compared to all other treatments (Table 2).

Acknowledgements

I would like to thank USDA/NIFA for salary funding of this and many other projects. I would like to extend thanks to Kent Springer for cooperating with us to complete this trial which included the unique use of his equipment, Russ Perkins with Bayer Crop Science for sponsoring this trial, the Texas A&M

AgriLife Research Cotton Improvement Lab for use of their sample gin, and finally the 2015 Plains Pest Management Field Scouts for the operation, data collection, and labor associated with this trial: Jonathan Thobe, Jim Graham, and Kevin Duarte.

2015 Hale County Sugarcane Aphid Product Efficacy in Grain Sorghum

Texas A&M AgriLife Extension / Bayer Crop Science
Hale County
Cooperator: Shane Blount

Blayne Reed (1), Dr. Patrick Porter (2), Dr. Ed Bynum (3), and Russ Perkins (4)

(1) Texas A&M AgriLife Extension, Plainview, TX, (2) Texas A&M AgriLife Extension, Lubbock, (3) Texas A&M AgriLife Extension, Amarillo, (4) Bayer Crop Science

Summary

On 5 August 2015, 3 commercially available sugarcane aphid control products with differing rates, including an untreated check were utilized to form 7 possible sugarcane aphid treatments for this trial. All treatments were applied in a 4 replication, CRBD efficacy trial within a commercial sorghum production field 2 miles east of Hale Center at 16.5 GPA. The plots were 6-rows wide and 30-feet long with only the first two rows treated to prevent drift between plots. Data on sugarcane aphids per lowest green leaf, second-leaf below flag leaf (upper leaf), sugarcane aphid damage ratings per plot, and yield data were taken with pre-treatment counts, 3 DAT counts, 7 DAT counts, 14 DAT counts, 15 DAT damage ratings, 21 DAT counts, 21 DAT damage ratings, and continued through plot sample hand harvest and sample threshing on 1 and 2 October. Treatments in addition to the untreated check included 3 different rates of Sivanto, 2 different rates of Transform, and 1 high rate of Lorsban. Due to a misunderstanding in dealing with unfamiliar partnering of equipment, GPA output, and chemical calculations, a 16.7% lower rate than what was intended for each treatment was actually applied. Actual applied amounts are shared in materials and methods.

Ten lower and ten upper leaves were counted for number of aphids on each sampling date from the second treated row within each plot. A 0-10 sugarcane aphid damage rating system was designed to capture ratings for the treated plot area. For harvest samples, 10 randomly selected row-feet were harvested from the second treated row within plots. Due to time and equipment capabilities, only the UTC, middle rate of Sivanto, high rate of Sivanto, high rate of Transform, and the Lorsban treatments were harvested.

Optimal insecticide coverage of the lower leaves for all treatments and plots was not achieved during treatment application. No differences in sugarcane aphids per lower leaves were found, and following the 7 DAT count date, sampling of the lower leaves was dropped. Aphid re-infestation of all plots continued throughout the data collection period of this trial with heavy aphid populations moving from the lower leaves up the plant and from outside the field area via winged adults.

By the 3 DAT count date, all treatments except Lorsban had significantly fewer sugarcane aphids per upper leaf compared to the UTC (*P*=0.0062). This trend of separation for all treatments except Lorsban from the UTC continued with the 7 and 14 DAT (*P*=0.0001 & *P*=0.0001). Also by the 7 DAT and continuing with the 14 DAT counts, all three Sivanto treatments also had significantly fewer aphids than

both Transform treatments.   By the 21 DAT counts both Transform treatments and the lowest rate of Sivanto were no longer significantly different from each other, the UTC, or the Lorsban treatment while the middle and high rates of Sivanto still had significantly fewer aphids per upper leaf (P=0.0006). The 15 DAT damage ratings followed the same trend with the UTC and Lorsban treatments having the most damage, all three Sivanto treatments the least, while both rates of Transform remained significantly different from the UTC, but only the high rate was significantly different from the Lorsban treatment (P=0.0001). At the 21 DAT damage rating, all three Sivanto treatments remained significantly different from all other treatments, but both Transform treatments and the Lorsban were not significantly different from the UTC (P=0.0001). In terms of grain yield, the middle rate of Sivanto, high rate of Sivanto, high rate of Transform were significantly higher yielding than the UTC or Lorsban treatment which were statistically identical (P=0.0001).

Objective

The sugarcane aphid, *Melanaphis sacchari* (Zehntner), first appeared as a pest of South Texas grain sorghum during the 2013 growing season and quickly spread to several sorghum producing regions. Sugarcane aphid did not reach the key Texas High Plains sorghum production region until late August of 2014. By October of 2014 the pest was heavily ensconced on the High Plains sorghum crop but, due to the pest's late arrival and the advanced developmental stage of the sorghum crop at first colonization, the sugarcane aphid had limited economic impact during the 2014 growing season. However, the sugarcane aphid caused major yield and harvest losses throughout most of the southeastern United States in 2014. Because the sugarcane aphid greatly expanded its range to new areas in 2014 it was expected to arrive much earlier on the Texas High Plains during the 2015 growing season. In 2015 the sugarcane aphid was detected on the High Plains on 27 June, a full two months earlier than in 2014. Earlier infestations of the sugarcane aphid would pose a serious threat to the grain sorghum hybrids that are grown on the unique Texas High Plains.

This commercial product efficacy research was quickly undertaken to determine if the labeled and available sugarcane aphid control products had good efficacy on the Texas High Plains.

Materials and Methods

Three commercially available sugarcane aphid control products with differing rates and an untreated check formed the seven treatments that were selected for this research trial. The treatments included an untreated check, a low rate of Sivanto, a middle rate of Sivanto, a high rate of Sivanto, a low rate of Transform, a high rate of Transform, and a high rate of Lorsban. Due to a misunderstanding in dealing with unfamiliar partnering equipment, GPA output, and chemical calculations, a 16.7% lower rate than what was intended for each treatment was actually applied.   Actual amounts applied for this trial are listed.

1.	Untreated Check
2.	Sivanto @ 3.33 oz.
3.	Sivanto @ 4.17 oz.
4.	Sivanto @ 5 oz.
5.	Transform @ 0.83 oz.
6.	Transform @ 1 oz.
7.	Lorsban @ 13.33 oz.

Table 1. Actual treatment rates applied.

All treatments were applied on 5 August via backpack spray with boom attachment at 16.5 GPA and included a standard 0.25% V/V NIS as a surfactant for all treatments. The trial was designed as a 4 replication, CRBD efficacy trial within a commercial sorghum production field 2 miles east of Hale Center belonging to Shane Blount. The plots were established as being 6-rows wide and 30-feet long with only the first two rows treated to prevent drift between neighboring plots; this left four untreated rows between each plot, and we did not observe insecticide drift between plots at the time of application.

Starting on 5 August, pre-treatment data were collected on sugarcane aphids per lowest green leaf and second leaf below flag leaf (upper leaf). Ten upper and ten lower leaves were randomly selected from the first treated row of each plot and aphid counts were recorded. An identical counting method was utilized for 3 DAT, and 7 DAT counts. Treatment coverage by the 5 August application of the lower leaves for all treatments and plots was lacking, and knockdown of the sugarcane aphid on the lower leaves was not achieved. Aphid numbers on the lower leaves were not affected by any treatment and the lower leaf counts were dropped for the 14 DAT and 21 DAT counts. Aphid re-infestation of all plots continued throughout the data collection portion of this trial with heavy aphid populations moving from the lower leaves up the plant and from outside the field area via winged aphids.

By 15 DAT, it was determined that sufficient sugarcane aphid damage and differences between treatments had occurred to warrant a damage rating evaluation. To complete this for the new and invasive sugarcane aphid, a new damage rating system to sorghum on the Texas High Plains had to be invented. A 0-10 sugarcane aphid damage rating system loosely based upon the existing greenbug in sorghum and spider mite in corn damage ratings was designed to capture damage on all treated plot areas. The description of this sugarcane aphid in sorghum rating system is below. Sugarcane aphid damage ratings per treated plot area were taken at 15 DAT and 21 DAT.

SCA Damage Ratings

0 = No evaluation possible / no aphids or honeydew found

1 = 1-10 % of leaf area infested or damaged / colonies establishing on a few lower leaves

2 = 11-20 % of leaf area infested or damaged with large colonies

3 = 21-30 % of leaf area infested with large colonies, damaged, or dead

4 = 31-40 % of leaf area infested with large colonies, damaged, or dead

5 = 41-50 % of leaf area infested with large colonies, damaged, or dead

6 = 51-60 % of leaf area infested with large colonies, damaged, or dead

7 = 61-70 % of leaf area infested with large colonies, damaged, or dead

8 = 71-80 % of leaf area infested with large colonies, damaged, or dead

9 = 81-90 % of leaf area infested with large colonies, damaged, or dead

10 = 91-100 % leaf area damaged or dead plant / lodged plant

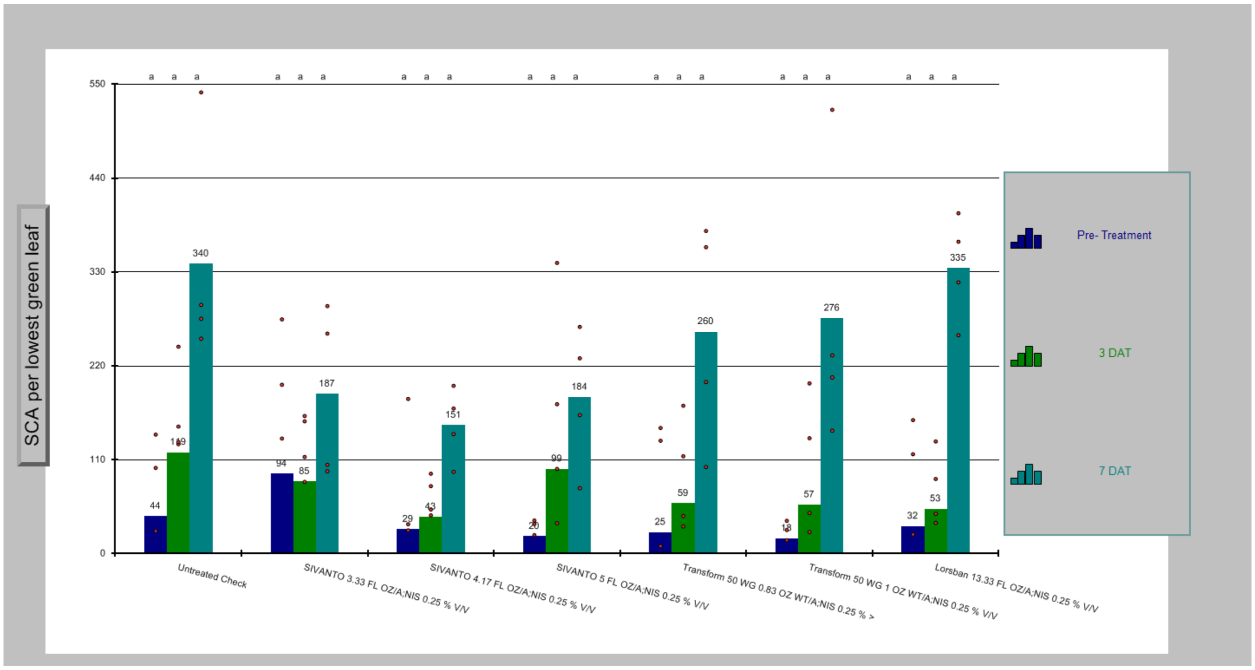
Table 2. Description of Sugarcane Aphid in Sorghum Damage Rating Used.

Aphid re-infestation of all plots continued throughout the data collection portion of this trial with heavy aphid populations moving from the lower leaves up the plant and from outside the field area via winged aphids.

Harvest was conducted on 1 October by hand harvesting 10 randomly selected row feet from the second treated row of each plot. Due to time and equipment capabilities, only the UTC, middle rate of Sivanto, high rate of Sivanto, high rate of Transform, and the Lorsban treatments were harvested. On 1 and 2 October all harvested plots were threshed utilizing an ALMACO small plot thresher. Grain samples were later cleaned, with grain yield, bushel weight, and percent moisture data recorded. All grain yields were adjusted to a per acre basis. Grain yields were then regressed against the 21 DAT damage rating to determine the relationship of yield to damage rating.

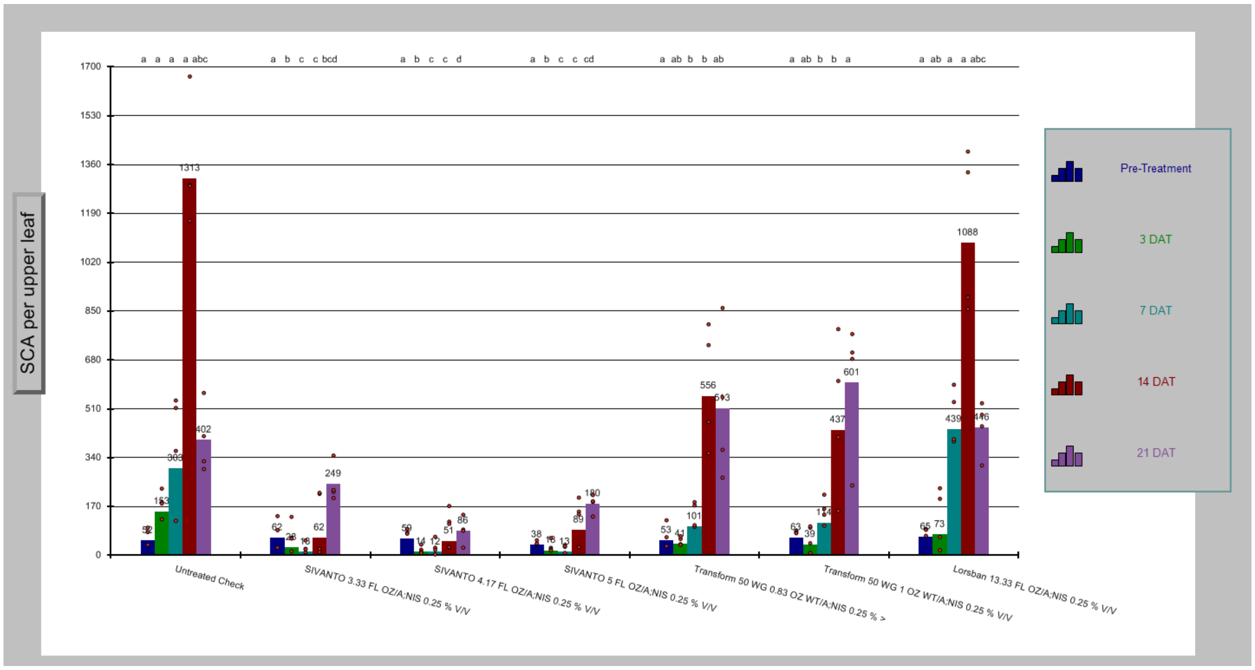
Results and Discussion

Due to the lack of coverage and penetration deep in to the plant canopy with all treatments on the application date there were no significant differences in terms of sugarcane aphids per lower leaf on the 3 DAT or 7 DAT count dates. No additional lower leaf data were collected after this date as aphid numbers on these lower leaves in all plots remained high and continued increasing throughout the trial and acted as one source for re-infestation up the plant.



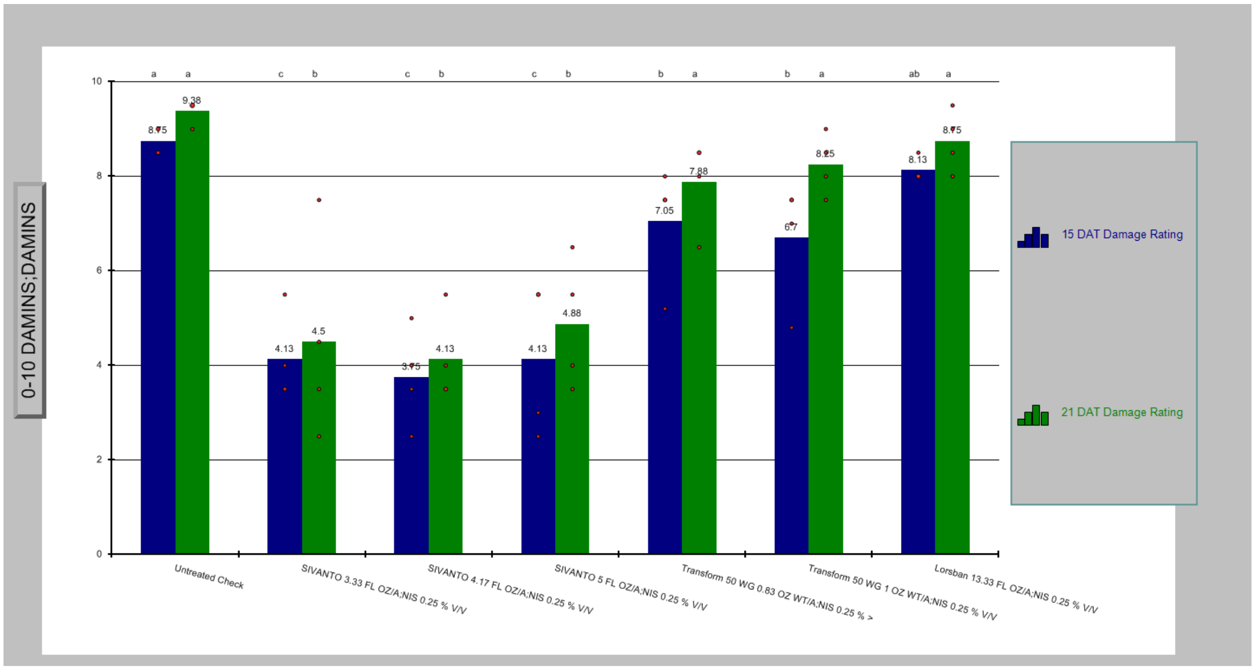
Graph 1. Number of sugarcane aphids per lower leaf for all counted dates.

Significant differences in sugarcane aphids per upper leaf were found throughout the trial starting at 3 DAT. At the 3 DAT count date, all treatments except Lorsban had significantly fewer sugarcane aphids per upper leaf as compared to the UTC (*P*=0.0062). This trend of separation for all treatments except Lorsban from the UTC continued with the 7 and 14 DAT (*P*=0.0001 & *P*=0.0001). Also by 7 DAT and continuing with the 14 DAT counts, all three Sivanto treatments had significantly fewer aphids than both Transform treatments. By the 21 DAT counts both Transform treatments and the light rate of Sivanto were no longer significantly different from each other, the UTC, or the Lorsban treatment, but the middle and high rates of Sivanto had significantly fewer aphids per upper leaf (*P*=0.0006). By the 21 DAT count, many of the treatments had aphid populations that were finally crashing on the upper leaf. Some of this was due to predation, but much of it was due to severe damage to the leaves making them no longer suitable for aphid habitation, and some plant lodging had begun.



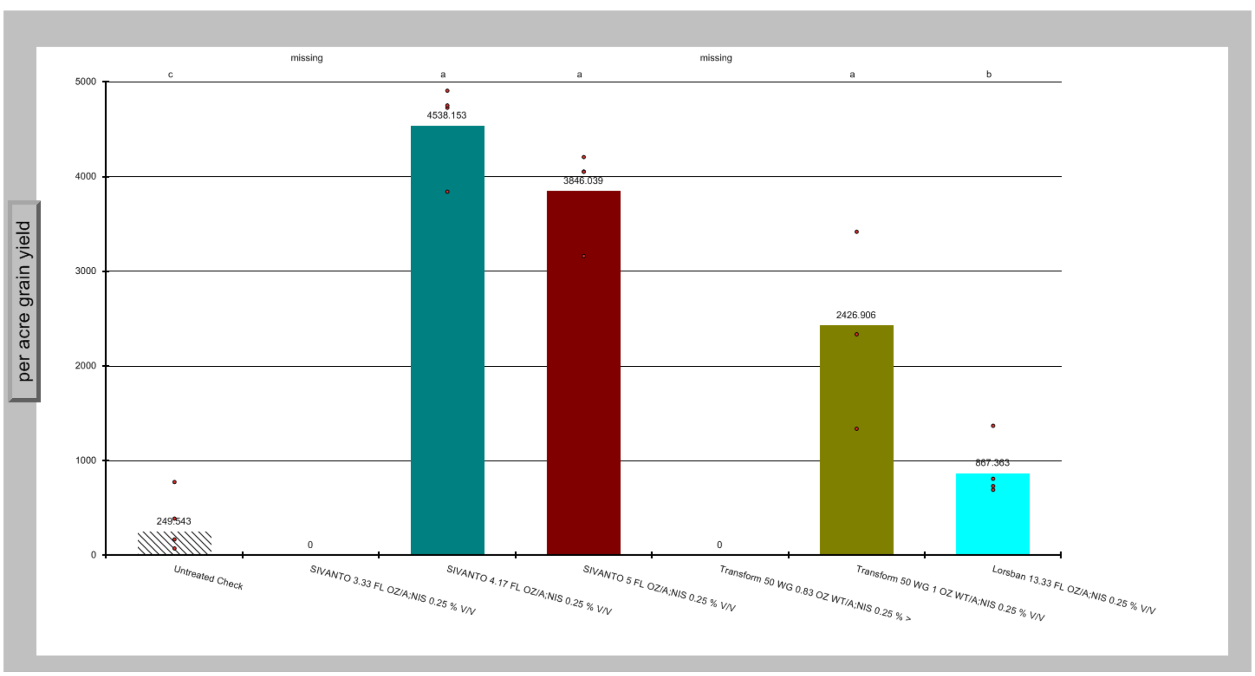
Graph 2. Sugarcane Aphids per Upper Leaf; pretreatment through 21 DAT.

All noted plant damage differences between treatments were captured by the 15 DAT and 21 DAT damage ratings. The 15 DAT damage ratings followed the same trend as the aphid counts, only conversely. The UTC and Lorsban treatments had the most damage, all three Sivanto treatments the least, while both rates of Transform remained significantly different from the UTC but only the high rate was significantly different from the Lorsban treatment (*P*=0.0001). At the 21 DAT damage rating, all three Sivanto treatments remained significantly different from all other treatments but both Transform treatment and the Lorsban were not significantly different from the UTC (*P*=0.0001).



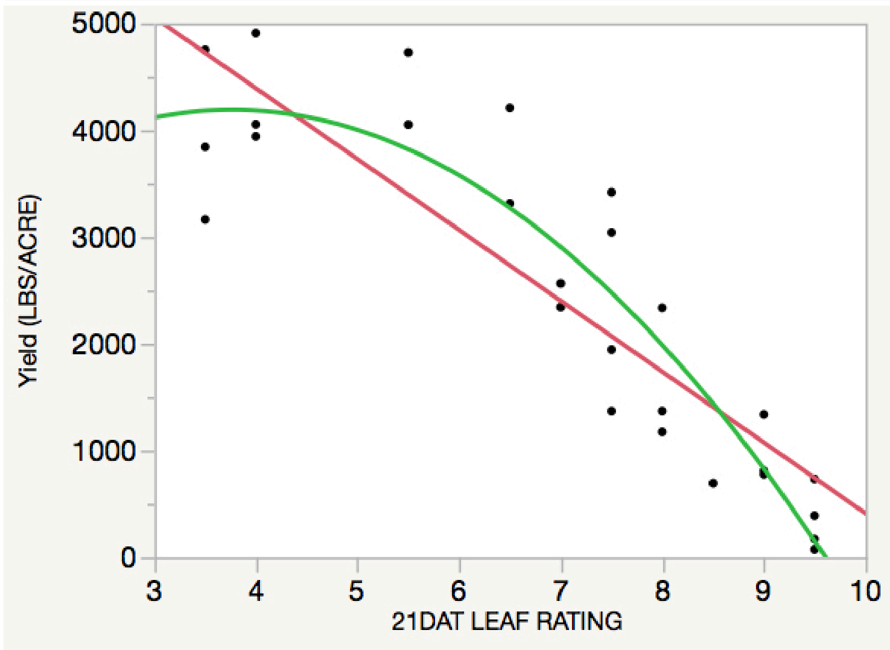
Graph 3. Sugarcane Aphid Damage ratings on a 0-10 scale at 15 DAT and 21 DAT.

Not all treatments were harvested due to the equipment and time limitations mentioned in the materials and methods. In terms of grain yield, the middle rate of Sivanto, high rate of Sivanto, high rate of Transform were significantly higher yielding than the UTC or Lorsban. The Lorsban treatment was significantly better than the UTC despite low yield numbers for both (*P*=0.0001).



Graph 4. Grain yield in terms of pounds grain per acre for selected treatments.

When the harvested plot yields were correlated against the 21 DAT 0-10 sugarcane aphid damage rating, the result was a good linear fit between the two.



Graph 5. Correlation between harvested plot grain yield and the 0-10 21 DAT sugarcane aphid damage ratings.

Conclusions

The insecticides Sivanto and Transform both proved value to the producer by significantly outperforming the untreated check in terms of aphids per upper leaf, plant damage, and yield. Furthermore, the Sivanto treatments outperformed all treatments including both Transform treatments in terms of aphids per upper leaf and in plant damage while also holding a numeric advantage in yield. The Lorsban treatment only significantly outperformed the UTC in yield slightly.

The elsewhere described longer residual activity of Sivanto likely aided in maintaining superiority over the other treatments for a longer period of time on the upper leaves, especially when it is understood that no treatment gained control lower in the canopy. Aphid re-infestation of the upper leaves from the uncontrolled lower leaves and additional winged aphids moving into the trial area was a constant factor. It should be noted that all care should be given when making a sugarcane aphid treatment in terms of lower canopy coverage and control, but that this might not always be possible in dense canopy situations on the Texas High Plains.

The Lorsban treatment did prove to have some limited value by significantly separating from the UTC in terms of pounds grain per acre. In all other factors, Lorsban was not different from the UTC. Lorsban's harshness to predators compared to Sivanto and Transform makes it an undesirable sugarcane aphid in sorghum insecticide; it might provide some limited benefits in small plot trials, but its ability to kill beneficial insects might cause aphid resurgence in commercial fields. It should also be noted that Lorsban was outperformed by all Sivanto and Transform treatments in yield and all other factors; the Lorsban treatment is therefore undesirable for several reasons.

This was a single treatment, product evaluation efficacy trial. However, the correlation between the 21 DAT damage ratings and yield loss indicates some strong hope in developing this rating system for field use as a secondary treatment decision guide in grain sorghum once grain development is well underway.

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