2012 Evaluation of Insecticides for Lygus Bug Control in Blackeye Cowpeas

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Lygus bugs (*Lygus spp.*) are the most important insect pests of blackeye cowpeas in California. Growers expect to spray for them at least once per season and, in most years, more than one application is necessary. They reduce crop yield because buds, flowers and young pods abort due to feeding damage. Feeding on developing pods kills small seeds and blemishes larger seeds. USDA grading standards allow limited numbers of blemished seeds before reducing the grade and thereby the price for a given seed lot. Current treatment thresholds recommended by UC IPM guidelines are 0.5 lygus per sweep (5 per 10 sweeps) at bloom and 1 lygus per sweep (10 per 10 sweeps) during podfill. For threshold purposes, adults and nymphs of any size are counted the same.

Conducting trials for lygus bugs is challenging because these insects are very mobile and require large plots. In 2011, insecticide treatments were applied with a backpack sprayer. This year insecticides were applied using the UC Kearney Research and Extension Center's tractor-pulled sprayer in order to make applications after row closure.

METHODS

The trial was conducted at the UC Kearney Research and Extension Center (KREC) in Parlier, CA. Blackeye cowpea variety CB 46 was planted into pre-irrigated beds on June 8, 2012, with a seeding rate of 35 lbs/A. The trial was 320 feet wide and 275 feet long consisting of 128 rows (30-inch) with border rows on each side. Individual plots were 16 rows wide and 48 feet long. The exterior 4 rows on each side of each plot served as drive rows, leaving the middle 8 rows of each plot without tractor traffic damage. Four of the interior 8 rows were sampled with sweep nets to assess lygus bug populations through the course of the trial. The center two rows of the remaining 4 rows were harvested for yield data. Prior to application of the intended treatments, the entire trial was sprayed on July 6, 2012, with 1 lb Lannate/A to control cowpea aphids.

Lygus bug populations were evaluated by taking 10 sweeps per plot with an insect sweep net. Lygus bugs and beneficial insects were sorted and counted. Lygus counts were divided into three categories: adults, large nymphs having wing pads, and small nymphs without wing pads.

Seven insecticides and one untreated control (UTC) were evaluated and replicated 5 times in a randomized complete block design. Insecticides and the rates are listed in Table 1. Hero EW and Warrior II are pyrethroids that affect the nervous system. Belay and Closer also affect insect nerves but with different modes of action from each other and from the pyrethroids. Rimon is a growth regulator that interferes with insect development. Beleaf is a feeding blocker that does

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not kill insects immediately but stops them from feeding. Sivanto is a very new material that has activity on sucking-type insects and is reported to have anti-feeding impact. The surfactant Dyne-Amic was added to each treatment at a rate of 3 pt/100 gal.

Table 1. Treatments for the 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA

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Material	Active ingredient	Rate Product/A	Rate a.i./A	Dates applied	Company
UTC	-	-	-	-	-
Hero EW	zeta-cypermethrin + bifenthrin	11.2 oz	0.10 lb	July 23, Aug 13	FMC
*Closer	sulfoxaflor	3 fl oz	0.05 lb	July 23, Aug 13	Dow AgroSciences
*Belay	clothianidin	4.5 fl oz	0.07 lb	July 23, Aug 13	Valent
*Beleaf	flonicamid	2.8 oz	0.09 lb	July 23, Aug 13	FMC
*Steward	indoxacarb	11.3 fl oz	0.11 lb	July 23, Aug 13	DuPont
Warrior II + Rimon 0.83EC	lambda-cyhalothrin + novaluron	1.92 fl oz + 12 fl oz	0.03 lb + 0.08 lb	July 23, Aug 13	Syngenta + Chemtura
*Sivanto 1.6SL	flupyradifurone	14 fl oz	0.18 lb	July 23, Aug 13	Bayer

*Not registered on dry beans in CA.

Applied broadcast by ground in 50 gal/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Treatments were applied with an 8-row sprayer at a volume of 50 gpa with 8004 nozzles, 30 psi pressure, and speed of 2 mph. The 8-row spray rig covered 4 rows under the tractor and 4 rows to one side of the tractor. Treatments were applied twice. The first application date was July 24 when plants were in bloom and lygus counts were below the threshold. However, aphid populations had increased to damaging levels and the decision was made to apply the treatments and observe the impact on aphid activity as well as monitoring lygus bugs. The second application occurred August 13 when several treatments were approaching, or had exceeded, the action threshold recommended for pod development (1 lygus/sweep or 10 lygus/10 sweeps).

On September 6, harvest rows were cut and covered with nets to protect pods from birds. After drying in the field for 3 weeks, beans were threshed on September 28. Yield data were based on the weight of blackeyes per plot after sifting twice to remove large debris. A seed splitter was used to obtain 5 lb samples that were then passed through several smaller screens. All seeds passed through the 24/64 screen; all but a very few went through the 20/64. Most of the seed did not pass through the 11/64 x ¾ oblong screen but dirt and peewees fell through. A 100 gram subsample of the seed caught on the 11/64 x ¾ oblong screen was evaluated for lygus damage, splits, and trash. Each blackeye seed in the 100 gram sample was evaluated and sorted into one of six categories; no damage, 1 lygus sting, 2 or more lygus stings, worm damage, stained or split, or trash. After the blackeyes were sorted into the categories each category was weighed and beans were counted.

RESULTS

Insect Populations

Cowpea aphids (*Aphis craccivora*) were a problem in this trial because they could not be selectively controlled without impacting lygus bugs. The first application of treatments occurred at bloom when lygus counts were still below the threshold but aphid populations were increasing. All the insecticides were effective in killing aphids with the exception of Steward. Aphid populations continued throughout the summer in some of the Steward and untreated plots, making interpretation of yield data difficult.

Lygus bug counts (combined nymphs and adults) are shown in Table 2. Tables 5, 6, and 7 at the end of this report show the counts separated for adults, large nymphs and small nymphs. Counts were low prior to the first treatment date which was timed more for aphid control than for lygus bugs. Four days after the July 24 application, lygus counts in most treatments either dropped, maintained, or rose slightly while the untreated check increased over three-fold. The one treatment in which the counts increased similar to the control was Beleaf, which is known to stop lygus bug feeding but not to kill them directly. These differences were not significant at the 5% probability level. Six days after the first lygus spray most of the treatments had lower counts than the untreated check, but these differences were not statistically significant. Nine days after application (9DAT), the impact of treatments was gone.

Table 2. Lygus bug (adults, large and small nymphs) counts in 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.

	Average Number of Lygus (adults & nymphs) per 10 Sweeps									
Material	23-Jul Pre-treat	28-Jul 4 DAT	30-Jul 6 DAT	2-Aug 9 DAT	6-Aug 13 DAT	9-Aug 16 DAT	17-Aug 4 DAT	20-Aug 7 DAT	24-Aug 11 DAT	Total Post-Treat
UTC	0.8	2.8	4.6	4.4	2.6	10.0	11.6 b	23.0	21.0	80.0
Hero	3.4	0.4	1.2	3.2	4.2	9.6	7.2 ab	9.2	20.6	55.6
*Closer	1.2	1.8	1.6	2.8	7.2	7.8	5.6 a	13.2	22.8	62.8
*Belay	1	0.8	2.4	1.0	5.8	8.8	4.6 a	13.4	13.2	50.0
*Beleaf	0.8	2.6	2.0	2.6	3.4	4.4	7.6 ab	19.4	14.2	56.2
*Steward	1.6	2.0	2.8	2.0	6.8	8.0	2.6 a	10.2	14.0	48.4
Warrior II + Rimon	1.6	1.4	2.4	1.6	5.0	7.4	4.6 a	14.2	17.2	53.8
*Sivanto	1.2	1.8	1.6	2.0	3.8	12.8	11.4 b	12.8	17.0	63.2
P- Value	0.46	0.11	0.08	0.43	0.50	0.67	0.03	0.09	0.60	0.07
LSD (0.05)	NS	NS	NS	NS	NS	NS	5.759	NS	NS	NS
CV%	131.4	78.5	70.8	94.0	78.7	74.4	64.4	50.0	51.9	26.2

*Not registered on dry beans in CA.

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Lygus populations had increased by the Aug. 13 treatment date (see counts for Aug. 9, Table 2). Four days after application (4 DAT), Closer, Belay, Steward and Warrior II+Rimon had significantly fewer lygus than the control treatment and Sivanto. Hero and Beleaf treatments had counts in between. At 7 DAT, the untreated control had the highest count relative to the treatments but these differences were not significant at the 5% level of probability. By 11 days, the benefit of the treatments was gone.

Comparing the total number of lygus from July 28 through August 24, (last column of Table 2), the probability that there were differences among treatments is 7%, and all spray treatments had lower counts than the control. (Figures 1-4 at the end of this report illustrate the lygus counts in graphs).

Beneficial insects

Statistical analyses are not shown for the beneficial insects because the numbers are relatively low and the assumptions on additivity for the analysis of variance are not valid for most dates. Populations of lacewings, damsel bugs, and minute pirate bugs were low throughout the trial in all treatments. (Counts for these insects are presented in Tables 9, 10 and 11at the end of this report). Lady beetle numbers varied throughout the trial with the highest numbers recorded in the untreated and Steward treatments, which is not surprising because that is where aphids populations were highest (Table 3).

Table 3. Lady beetle adults and larvae counts, 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.

	Average Number of Lady Beetles per 10 Sweeps													
	23-Jul PRE		28-Jul 4 DAT		30-Jul 6 DAT		2-Aug 9 DAT		6-Aug 13 DAT		9-Aug 16 DAT		24-Aug 11 DAT	
Material	Adults	Larvae	Adults	Larvae	Adults	Larvae	Adults	Larvae	Adults	Larvae	Adults	Larvae	Adults	Larvae
UTC	0.8	3.0	0.2	12.4	0.4	11.2	2.2	21.2	1.6	3.6	7.8	0.8	1.8	0.4
Hero	0.2	0.4	0.2	0.0	0.0	0.0	0.6	2.0	0.8	0.0	0.4	0.4	0.8	0.4
*Closer	0.6	1.0	0.0	2.4	0.4	1.8	0.8	0.6	0.4	0.0	0.4	0.0	0.8	0.0
*Belay	0.2	2.0	0.4	1.4	1.2	0.6	1.0	0.4	2.2	1.2	2.4	1.6	2.4	0.4
*Beleaf	0.6	0.0	0.2	3.2	0.0	1.0	0.6	0.6	1.6	0.0	0.4	0.0	1.6	0.4
*Steward	0.4	1.0	1.4	2.0	1.4	0.2	1.2	5.0	3.4	2.2	11.2	6.8	6.0	1.0
Warrior II + Rimon	0.6	3.2	0.2	0.4	0.0	0.2	0.6	0.6	1.6	0.2	2.2	0.2	1.6	0.8
*Sivanto	0.2	0.0	1.0	1.2	0.4	0.6	0.0	0.0	1.2	0.0	0.4	0.0	2.6	0.0

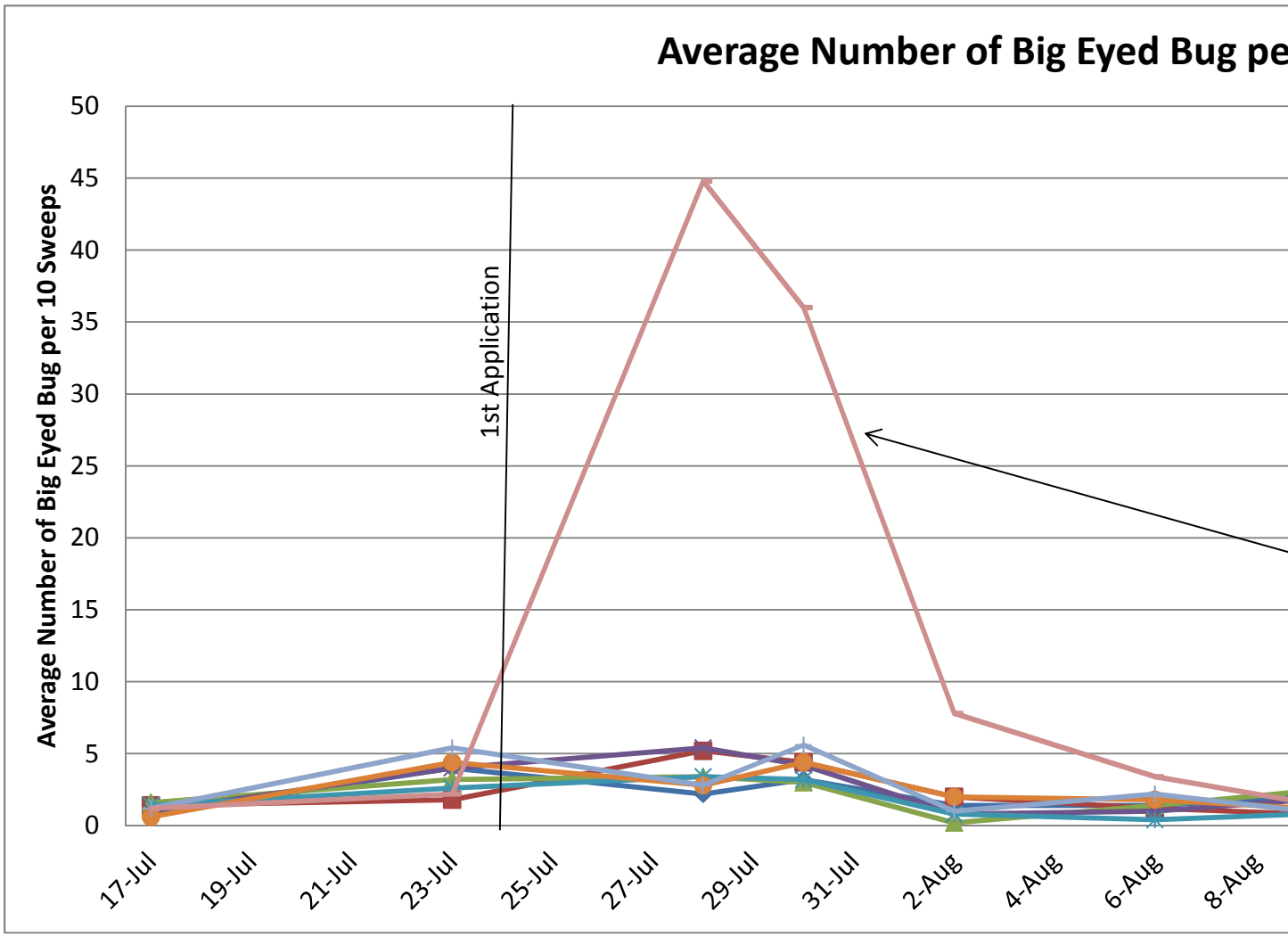
*Not registered on dry beans in CA

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

The most curious result with beneficial insects was that big eye bugs occurred in much higher numbers in the Sivanto treatment than in all of the other treatments including the untreated check just after the first application of treatments (Figure 1). These high counts were consistent in all 5 replications. This did not occur after the second treatment date.

Fig. 1. Average number of bigeyed bugs per 10 sweeps, 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.



Yield

There were significant differences in yields among treatments. Hero at a rate of 11.2 fl oz/A was the only treatment that had significantly higher yield than the untreated control (Table 4). The Steward treatment at a rate of 11.3 fl oz/A had significantly lower yield than all other insecticide treatments but was not significantly different than the untreated control. Yields in both the Steward and untreated control plots were reduced by aphids. Aphids are not listed on the Steward label and aphid levels were very high in some of Steward-treated plots, higher than the untreated control plots. Yields from Steward-treated plots were less than 10 lbs/plot in 3 of the 5 replications and, in the corner of the trial with the heaviest aphid pressure, the Steward-treated

plot produced only 3.11 lbs. It was also observed at the end of the season that spider mites were more prevalent in Steward-treated plots than in any of the other plots. Untreated plots also had significant aphid populations but they were lower than in the Steward plots. The range in yield for the untreated control plots for the 5 replications was 6.52 lbs to 17.09 pounds. The low yield of 6.52 lbs was from the plot where aphids were more severe relative to the other 4 reps which produced yields ranging from 12.40 to 17.09 lbs/plot. Higher yields in the other insecticide treatments must be attributed not only to lygus bug control but also in large part to aphid control.

Table 4. Blackeye yield based on 2 rows x 48 foot from the untraveled portion of each plot, 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.

Treatment	Rate	Weight after cleaning lbs	Weight Expressed as lbs/A
UTC	-	12.49 bc	2,267
Hero	11.2 fl oz	16.66 a	3,024
*Closer	3 fl oz	15.62 ab	2,835
*Belay	4.5 fl oz	15.60 ab	2,831
*Beleaf	2.8 oz	14.82 ab	2,690
*Steward	11.3 fl oz	9.33 c	1,693
Warrior II +Rimon	1.92 fl oz + 12 fl oz	14.77 ab	2,861
*Sivanto	14 fl oz/A	14.17 ab	2,572
	P-Value	0.02	
	LSD (0.05)	3.85	
	Coefficient of Variation (%)	20.97	

*Not registered on dry beans in CA.

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Quality

Essentially all beans in each treatment passed through the 20/64 screen but not the 11/64 x 3/4 oblong screen, indicating no size differences among treatments. Quality data, shown in Table 5, indicate no differences among treatments for the amount of worm damage, splits or stains, and trash. There were significant differences among treatments for weight and number of beans (based on a 100 gram sample) for several parameters concerning lygus damage. The untreated control had significantly fewer undamaged beans by weight than any of the insecticide treatments. The same is true for the number of undamaged beans except for Sirvanto which was

not significantly different from either the untreated check or from the other insecticide treatments. Hero at a rate of 11.2 fl oz/A had 81% blackeye beans by number without damage compared to 61% of the beans in the untreated control. The untreated check also had significantly more beans with 2 or more lygus stings than any of the insecticide treatments. The Hero, Belay and Beleaf treatments had fewer seeds by count with 1 lygus sting than the untreated control. There was not a significant difference among insecticide treatments for the weight or count of beans with 2 or more lygus stings but all of the chemical treatments had significantly fewer damaged beans in this category than the untreated control (Table 5).

Table 5. Seed damage data from 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.

	No Damage		1 Lygus Sting		2 or More Lygus Stings		Worm Damage		Stained or Split		Trash
Material	Weight (g)	Bean Count	Weight (g)	Bean Count	Weight (g)	Bean Count	Weight (g)	Bean Count	Weight (g)	Bean Count	Weight (g)
UTC	63.3 c	312.2 b	10.0	52.6 a	21.2 a	119.6 a	2.7	16.4	2.3	12.2	0.2
Hero	82.6 a	410.2 a	5.9	31.4 c	8.6 b	49.2 b	1.7	9.6	1.3	7.2	0.1
*Closer	76.7 ab	378.4 a	8.8	47.0 ab	11.3 b	63.6 b	2.0	12.2	1.1	6.0	0.1
*Belay	80.5 ab	398.0 a	6.4	32.0 c	9.4 b	53.0 b	2.0	12.0	1.5	8.2	0.3
*Beleaf	76.9 ab	381.4 a	7.4	38.0 bc	13.1 b	74.6 b	0.9	5.8	1.5	8.0	0.1
*Steward	73.0 b	367.0 a	8.2	44.2 abc	13.8 b	79.2 b	3.1	17.0	2.2	12.0	0.1
Warrior II + Rimon	79.4 ab	394.8 a	7.9	40.8 abc	9.3 b	51.6 b	1.5	8.0	1.6	8.2	0.2
*Sivanto	73.2 b	359.0 ab	8.7	45.0 ab	14.0 b	78.2 b	2.4	14.4	1.5	7.6	0.2
P-Value (0.05)	0.00	0.02	0.09	0.03	0.01	0.00	0.26	0.25	0.76	0.65	0.36
LSD (0.05)	7.94	52.69	NS	12.99	6.16	33.81	NS	NS	NS	NS	NS
CV %	8.1	10.8	26.5	24.2	37.8	36.7	64.8	63.5	74.4	67.4	95.8

*Not registered on dry beans in CA.

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

SUMMARY

The Steward treatment and the untreated control produced the lowest yields, due in part to cowpea aphids. Because the quality of seed from the Steward-treated plots was better than the untreated plots, it suggests that lygus bugs were controlled at least to some degree by Steward and that the low yields for that treatment were primarily due to aphids. All of the other treatments controlled aphids as well as having some impact on lygus bugs. Although the Hero treatment produced signficantly more yield than the untreated control, it can't be entirely attributed to lygus control because of impact on yield from the cowpea aphid populations in the

untreated control plots. With the exception of Steward, there were no differences in yield among the insecticide-treated plots.

All of the insecticide treatments produced beans with significantly less lygus damage than the untreated control. Among the insecticides, there were no consistent differences.

Although none of the insecticide treatments stood out as clearly better than the others in controlling lygus bug, it would be helpful to the industry to have a wider choice of insecticides with different modes of action for managing this insect.

We would like to acknowledge the invaluable assistance from the UC Kearney REC field staff, in particular Dale Pattigan and Bryan Heyano.

Table 6. Counts of lygus bug adults, 2012 blackeye lygus bug trial, UC KREC, Parlier, CA.

	Average Number of Adult Lygus per 10 Sweeps									
Material	23-Jul Pre-treat	28-Jul 4 DAT	30-Jul 6 DAT	2-Aug 9 DAT	6-Aug 13 DAT	9-Aug 16 DAT	17-Aug 4 DAT	20-Aug 7 DAT	24-Aug 11 DAT	Total Post-Treatment
UTC	0.4	1.0	3.2	2.2	2.2	4.2	5.2	15.2	13.0	46.2 a
Hero	1.2	0.2	0.4	0.0	2.6	3.0	3.8	2.8	8.8	21.6 d
*Closer	0.8	1.0	0.2	2.2	3.2	3.4	3.0	8.4	14.2	35.6 ab
*Belay	0.2	0.0	1.2	0.0	5.6	3.8	2.2	4.4	5.4	22.6 cd
*Beleaf	0.4	0.8	0.0	1.4	3.4	2.2	4.4	9.4	8.6	30.2 bcd
*Steward	1.2	1.4	2.8	1.0	4.2	4.0	2.6	4.6	7.6	28.2 bcd
Warrior II + Rimon	1.2	0.8	1.4	0.4	4.8	3.2	3.4	8.6	8.4	31.0 bcd
*Sivanto	0.6	0.6	0.6	1.8	2.4	4.0	5.8	7.2	10.6	33.0 bc
P- Value	0.529	0.555	0.016	0.478	0.093	0.786	0.577	0.019	0.247	0.004
LSD (0.05)	NS	NS	1.99	NS	NS	NS	NS	6.53	NS	11.399
CV (%)	130.0	151.3	125.3	186.3	54.4	57.6	81.7	66.5	57.2	28.3

*Not registered on dry beans in CA.

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Table 7. Counts of lygus bug large nymphs, 2012 blackeye lygus bug trial, UC KREC, Parlier, CA.

Material	Average Number of Lygus Large Nymphs (wing pads) per 10 Sweeps									
	23-Jul Pre-treat	**28-Jul 4 DAT**	**30-Jul 6 DAT**	**2-Aug 9 DAT**	**6-Aug 13 DAT**	**9-Aug 16 DAT**	**17-Aug 4 DAT**	**20-Aug 7 DAT**	**24-Aug 11 DAT**	**Total Post-Treatment**
UTC	0.2	1.2	1.4	2.0	0.4	0.2	3.4	4.4	4.4	17.4
Hero	2	0.0	0.4	3.2	1.0	0.2	1.4	5.0	3.4	14.6
*Closer	0.4	0.0	0.8	0.6	1.8	0.6	1.2	4.6	3.4	13.0
*Belay	0.4	0.6	1.0	1.0	0.2	0.6	0.8	5.2	2.6	12.0
*Beleaf	0	0.6	1.8	0.6	0.0	0.0	1.6	7.6	3.2	15.4
*Steward	0.4	0.2	0.0	1.0	2.2	0.6	0.0	4.0	1.4	9.4
Warrior II + Rimon	0.4	0.4	0.8	0.8	0.2	0.2	0.6	4.6	2.8	10.4
*Sivanto	0.2	0.8	1.0	0.0	1.0	0.6	2.6	5.4	1.4	12.8
P- Value (0.05)	0.568	0.424	0.509	0.130	0.398	0.928	0.072	0.782	0.175	0.232
LSD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV (%)	305.1	190.4	144.3	145.7	203.2	254.2	116.0	64.8	64.2	37.4

*Not registered on dry beans in CA.
Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.
Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Table 8. Counts of lygus bug small nymphs, 2012 blackeye lygus bug trial, UC KREC, Parlier, CA.

Material	Average Number of Small Lygus Nymphs (no wing pads) per 10 Sweeps									
	23-Jul Pre-treat	**28-Jul 4 DAT**	**30-Jul 6 DAT**	**2-Aug 9 DAT**	**6-Aug 13 DAT**	**9-Aug 16 DAT**	**17-Aug 4 DAT**	**20-Aug 7 DAT**	**24-Aug 11 DAT**	**Total Post-Treatment**
UTC	0.2	0.6	0.0	0.2	0.0	5.6	3.0	3.4	3.6	16.4
Hero	0.2	0.2	0.4	0.0	0.6	6.4	2.0	1.4	8.4	19.4
*Closer	0.0	0.8	0.6	0.0	2.2	3.8	1.4	0.2	5.2	14.2
*Belay	0.4	0.2	0.2	0.0	0.0	4.4	1.6	3.8	5.2	15.4
*Beleaf	0.4	1.2	0.2	0.6	0.0	2.2	1.6	2.4	2.4	10.6
*Steward	0.0	0.4	0.0	0.0	0.4	3.4	0.0	1.6	5.0	10.8
Warrior II + Rimon	0.0	0.2	0.2	0.4	0.0	4.0	0.6	1.0	6.0	12.4
*Sivanto	0.4	0.4	0.0	0.2	0.4	8.2	3.0	0.2	5.0	17.4
P- Value	0.667	0.838	0.771	0.625	0.572	0.548	0.042	0.685	0.358	0.576
LSD (0.05)	NS	NS	NS	NS	NS	NS	1.931	NS	NS	NS
CV%	246.4	227.9	315.5	330.2	407.2	96.3	90.3	209.5	71.1	53.5

*Not registered on dry beans in CA.
Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.
Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Table 9. Lacewing counts, 2012 blackeye bean lygus bug trial, UC KREC, Parlier, CA.

	Average Number of Lace Wings per 10 Sweeps															
	17-Jul		23-Jul		28-Jul		30-Jul		2-Aug		6-Aug		9-Aug		24-Aug	
Material	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph
UTC	0	0	0.6	0.8	0.2	3.6	0	0	0.6	1	0	0	0.8	0	0.8	12.6
Hero	0.2	0.2	0.2	4.6	0.6	0.2	0	0	1.6	0	0	0	0.6	0	0.4	0
*Closer	0.2	0.6	1.4	5.8	0.2	1.2	1.8	0.2	1.2	0.2	0.2	0.2	0.4	0	1.4	7.4
*Belay	0	0.2	0.4	1.4	3.4	1	1	0.2	0	0.2	0	0	0.2	0	0.4	0.6
*Beleaf	0	0.2	0.2	1.4	0.2	0.8	0	0.2	0.4	0	0	0	0.8	0	0.8	1.2
*Steward	0.4	0	0.8	3	0.4	2.4	0.6	0	0	0.2	0.2	0.2	0	0	0.2	1
Warrior II + Rimon	0.2	0.2	0.6	4.8	0.4	0.6	0.2	0.2	1.6	0	0.6	0	0	0	1	0.6
*Sivanto	0.2	0.2	0.4	2.8	0	1.2	0	0	0.2	0.2	0.2	0	0.4	0	0.4	0.2

*Not registered on dry beans in CA..

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Table 10. Damsel bug counts, 2012 blackeye lygus bug trial, UC KREC, Parlier, CA.

	Average Number of Damsel Bugs per 10 Sweeps					
Material	23-Jul	28-Jul	30-Jul	6-Aug	9-Aug	24-Aug
UTC	0	0	0	0	0	0.4
Hero	0	0	0	0	0	0
*Closer	0	0	0.2	0.2	0	0.2
*Belay	0	0	0.4	0	0	0
*Beleaf	0.2	0	0	0.2	0	0
*Steward	0.4	0.2	0	0.6	0	0.4
Warrior II +	0	0	0.2	0	0	0
*Sivanto	0	0	0	0	0.2	0

*Not registered on dry beans in CA.

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Table 11. Minute pirate bug counts, 2012 blackeye lygus bug trial, UC KREC, Parlier, CA.

	Average Number of Minute Pirate Bug per 10 Sweeps							
Material	17-Jul	19-Jul	28-Jul	30-Jul	2-Aug	6-Aug	9-Aug	24-Aug
UTC	0.8	0.4	2.2	0	2.4	0.6	2.2	0.6
Hero	0.4	1.6	0.8	0	0.4	2.2	1.2	0
*Closer	0.2	0	0.4	0.8	1.2	1	3.2	0.2
*Belay	0.2	2	0.6	0.2	0	0.6	4	0
*Beleaf	0.4	0.6	1	0	3.2	0.6	1.2	0.4
*Steward	0	0.2	1	0	0.6	2.8	4.4	0
Warrior II +	0.2	0	0.4	0	1.2	1.6	1.4	0.2
*Sivanto	0	0.4	1.2	0	0.2	0.8	2.6	0

*Not registered on dry beans in CA.

Applied 7/24 and 8/13 broadcast by ground in 50 gal water/A with 8004 nozzles, 30 psi, 2 mph.

Dyne-Amic was included in all insecticide treatments at rate of 3 pt/100 gallons.

Figure 2. Adult lygus counts per 10 sweeps, 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.

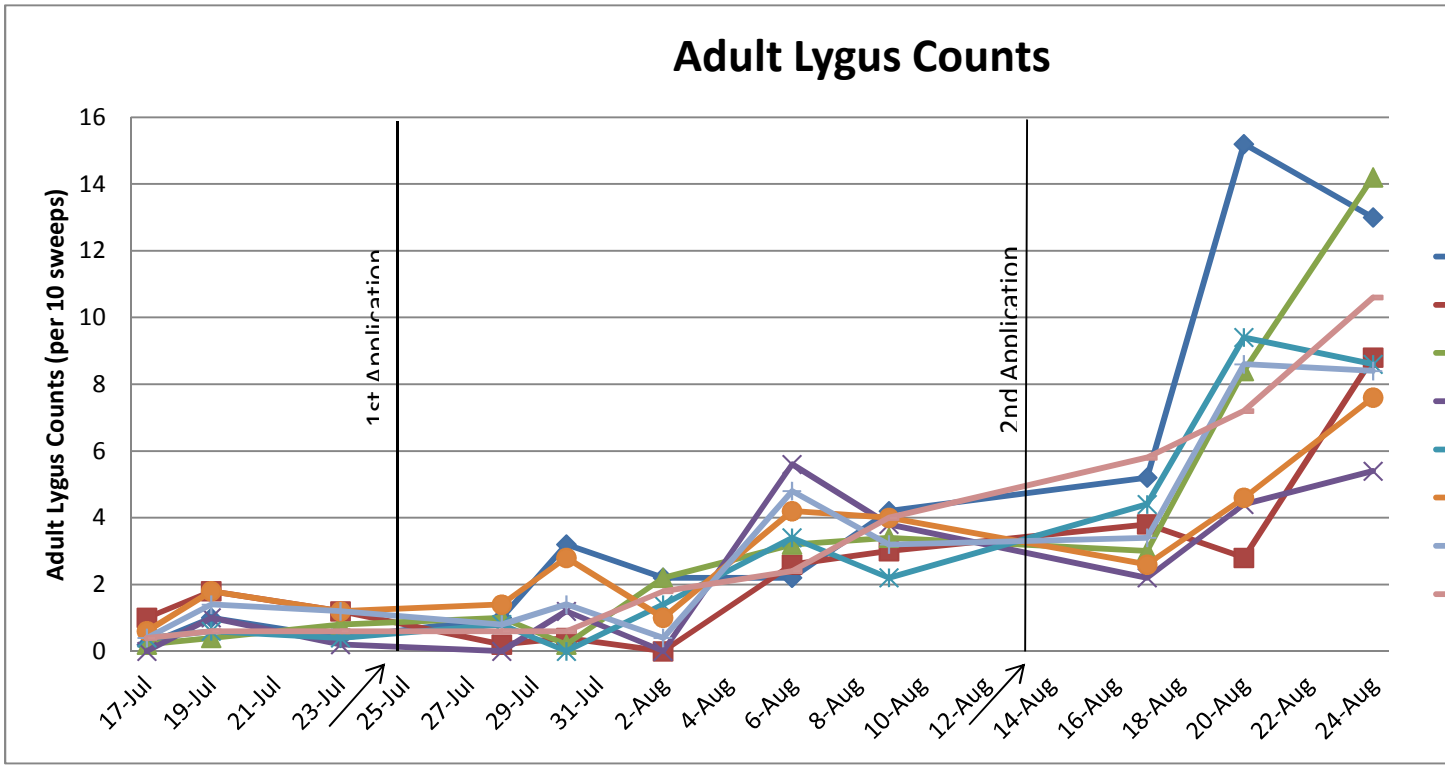


Figure 3. Large lygus nymphs (with wing pad) counts per 10 sweeps, 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.

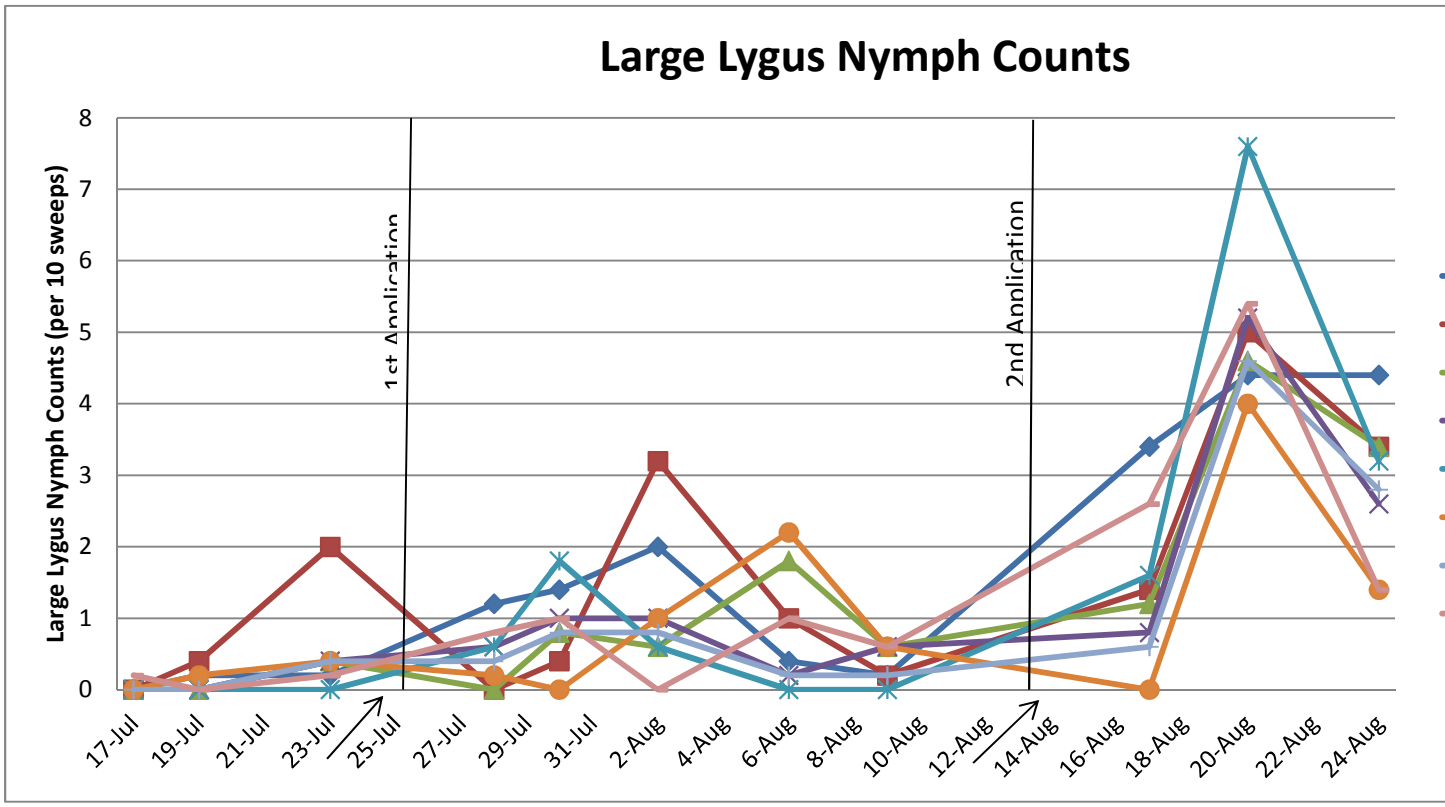
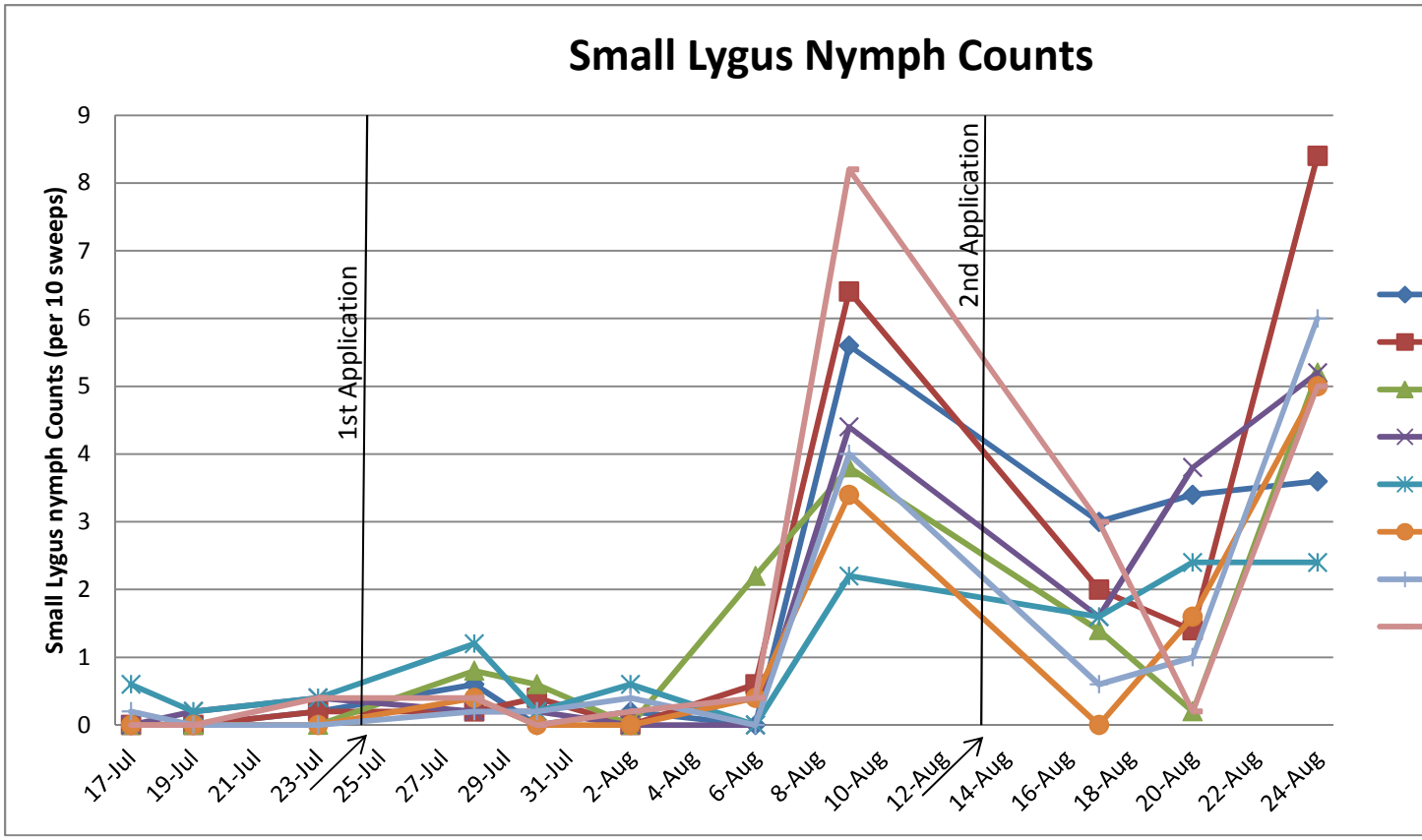


Figure 4. Small lygus nymph (no wing pads) per 10 sweeps of an insect sweep net, 2012 blackeye lygus bug trial, UC Kearney REC, Parlier, CA.


Small Lygus Nymph Counts
Small Lygus nymph Counts (per 10 sweeps)
0
1
2
3
4
5
6
7
8
9
1st Application
2nd Application
17-Jul
19-Jul
21-Jul
23-Jul
25-Jul
27-Jul
29-Jul
31-Jul
2-Aug
4-Aug
6-Aug
8-Aug
10-Aug
12-Aug
14-Aug
16-Aug
18-Aug
20-Aug
22-Aug
24-Aug