BEET ARMYWORM AND CABBAGE LOOPER CONTROL TRIALS IN THE TEXAS HIGH PLAINS

Tommy Doederlein, Lamesa, TX
Brant Baugh, Lubbock, TX
Greg Cronholm, Plainview, TX
Clyde Crumley, Seminole, TX
James Leser, Lubbock, TX
Johnna Patterson, Dimmitt, TX
Cherinell Riley, Farwell, TX
Scott Russell, Brownfield, TX
Texas Agricultural Extension Service

Abstract

Beet armyworms (BAW) infestations were a serious problem on the Texas High Plains during the 2000 crop year, with over 3,000,000 acres involved and yield losses amounting to almost 600,000 bales. Several new insecticides had recently been registered or been made available through Section 18s. These included: Tracer®, Denim®, Steward® and Intrepid®. Producers were very interested in the comparative effectiveness of the various insecticides because of the threat of severe yield losses and probable high control costs. There were six tests conducted to evaluate the newer insecticides as well as some of the older chemicals which have activity against caterpillar larvae, especially BAW. Four of these tests were applied with ground application equipment and two were applied through center pivot irrigation systems. The newer insecticides proved to be highly efficacious when applied in the appropriate manner. Preliminary results with chemigation were not very promising for Tracer®. The newer insecticides appeared to be more coverage dependent than their older counterparts, especially in larger stature cotton.

Introduction

Beet armyworms (BAW), *Spodoptera Exigua* [Hubner], are considered an occasional pest and as such do not cause economic loss on an annual basis. However, BAW were a serious problem on the Texas High Plains during the 2000 crop year. Such an outbreak had not been seen in the High Plains since 1980 and in the Lower Rio Grande Valley and Concho Valley of Texas in 1995. There were a total of 3,010,000 acres infested on the Texas High Plains with an average of a 9.5% yield reduction (Williams, 2001). Of these infested acres, 2,317,700 were treated an average of 1.8 times at a cost of $14.50 per acre for a total cost of $60.5 million spent on caterpillar control, mostly for BAW. Both cabbage loopers and cotton bollworms were often mixed in with BAW infestations.

BAW larvae are both leaf feeders and fruit feeders, sometimes causing considerable damage to squares and bolls. The nominal threshold established in Texas for BAW control is 20,000 larvae per acre and at least 10% of the plants examined are infested. Sometimes larval infestations will feed almost exclusively on fruit and are in such cases treated in a similar manner as bollworms at a threshold of 10,000 larvae per acre. Other times infestations can be almost exclusively defoliators and as such their threshold is elevated to 30,000 or more per acre.

Several factors were thought to contribute to the 2000 BAW problem. A mild winter followed by spring rains that encouraged pigweed production provided favorable early season conditions. A summer characterized by hot, dry conditions with almost no rainfall added to the factors favorable for BAW outbreaks. Heavy, early boll weevil activity necessitating increased insecticide applications by producers or by the Texas Boll Weevil Eradication Foundation in three new eradication zones also are implicated as outbreak factors.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1000-1007 (2001)
National Cotton Council, Memphis TN

BAW infestations first appeared in the southern acreage of the High Plains where sandy, skip row, droughty fields were first attacked. Infestations in this area were low to moderate in severity but persisted from early July through September. As the season progressed, BAW infestations spread northward into irrigated acreage where their numbers increased to much higher levels, sometimes reaching 300,000 to 500,000 per acre.

Six insecticide screening trials were initiated to evaluate the newer caterpillar chemistry and to compare their efficacy to the older materials. Four of these test were applied with ground application equipment and two were applied through center pivot irrigation systems (chemigation).

Materials and Methods

Tahoka Test (Dryland)

This study was conducted in a dryland production system. The objective of this test was to evaluate the older BAW insecticides with various additives against the two registered new products, Tracer® and Confirm®. There were 10 treatments and an untreated check randomized in a block design with 4 replications. Treatments consisted of the lowest rate of insecticides recommended by Texas Agricultural Extension Service (Sansone, et. al., 2000). These insecticide treatments included: Lorsban® 4E at 32.0 fl. oz. per acre with and without a crop oil, Lannate® 2.4LV at 24.0 fl. oz. per acre, Curacron® 8E at 12.0 fl. oz. per acre, Tracer® 4SC at 2.14 fl. oz. per acre, Confirm® 2F at 4.0 fl. oz. per acre and Larvin® 3.2F at 32.0 fl. oz. + Hyper-active at 1.6 fl. oz. per acre. Hyper-active is an adjuvant manufactured by the Helena© Chemical Company. There were also three Decis® combination treatments including: Decis® 1.5E at 2.13 fl. oz. + at 32.0 fl. oz. per acre or Lorsban® 4E at 24.0 fl. oz., and Decis® 1.5E at 2.13 fl. oz. + Larvin® 3.2F at 32.0 fl. oz. + Hyper-active at 1.6 fl. oz. Both Decis® + Lorsban® combinations were in crop oil. Crop oil was added to the designated treatments at 32.0 fl. oz. per acre.

Treatments were applied on August 4 with a small plot self-propelled ground sprayer using three nozzles per row (one over the top and two on 12 inch drops on each side), 10 GPA and 40 psi. Plots were 4 rows by 100 feet of solid planted cotton. Plots were monitored on the day of application and 4,7,11,14 and 21 days after treatment (DAT) for BAW larvae. The counts consisted of five random whole plant inspections per plot. Larvae were classified as either small (less than ½ inch in size) or large (½ inch or larger in size). On the 11, 14 and 21 DAT counts, aphids were also counted. Aphids were counted on two-mainstem leaves, one from the fourth-fifth node from the top of the plant and one from the lower portion of the plant, from five randomly selected plants per plot. All sampling occurred from the middle two rows of each plot.

Shallowater Test (Irrigated)

The objective of this study was to evaluate the utility of multiple low rates of Tracer® as a cost savings technique to achieve extended residual control under chronic BAW infestation pressure. Seven treatments and an untreated check were randomized in a complete block design with three replications. Treatments consisted of Tracer® 4SC applied at 2.14 and 2.9 fl. oz. per acre on August 14, and 1.0, 1.5 and 2.14 fl. oz. per acre of Tracer® 4SC applied on August 14 and again on August 21. A grower standard, Lorsban® 4E at 32.0 fl. oz. per acre and a microbial insecticide, Lepinox® 15WSC at 64.0 oz per acre were also included. Treatments were applied with a CO_2 backpack sprayer using three nozzles per row (one over the top and two on 18 inch drops on each side), 40 psi and 12.5 gallons of water. Plot size was 4 rows x 100 feet in solid planted row watered cotton.

Five randomly selected whole plant counts were made from the middle two plot rows, for BAW and cabbage looper larvae just prior to the initial applications and 5, 9 and 12 DAT. BAW larvae were classified as small (< ¼ inch), medium (¼ inch to < ½ inch) and large (½ inch or larger). Cabbage looper larvae were all grouped together.

Kress Test(Irrigated)
The objective of this study was also to evaluate the utility of multiple low rates of Tracer® as well as single applications of the newer insecticides. Nine treatments and an untreated check with four replications were randomized in a complete block design. The treatments and rates per acre consisted of Confirm® 2F at 6 fl. oz., Denim® 0.16EC at 6 fl. oz., Steward® 1.25SC at 7.0 fl. oz., Intrepid® 2SC at 2.0 fl. oz., and Tracer® 4SC at 1.0 fl. oz., 1.5 fl. oz., 2.0 fl. oz., 2.14 fl. oz and 2.9 fl. oz. per acre. Treatments were applied on August 17 with a CO_2 backpack sprayer using 3 nozzles per row (one over the top and two on drops on each side), 8.7 GPA and 40 psi. A second application was made on August 24 (7DAT) to the 1.0 fl. oz. and 2.0 fl. oz. Tracer® treatments.

Plots were 3 rows x 45 feet of solid planted row watered cotton. Two row feet from the middle row of each plot was sampled using a beat sheet just prior to initial applications and 7, 14 and 26 DAT. Beet armyworms were classified as small (< ¼ inch), medium (¼ inch to < ½ inch) and large (½ inch or larger in size). Cabbage loopers were all grouped together.

Brownfield Test(Irrigated)
This study was conducted in solid planted cotton utilizing center pivot irrigation. Fourteen treatments and an untreated check were replicated four times in a randomized complete block design. Treatments were applied on August 17 with a small plot self-propelled ground sprayer using three nozzles per row (one over the top and two on drops on each side) and 17.5 GPA at 40 psi. Treatments and rates per acre consisted of Confirm® 2F at 8.0 fl. oz., Intrepid® 2SC at 4.0 fl. oz. and 8.0 fl. oz., Denim® .16EC at 6.0 fl. oz. and 8.0 fl. oz., Denim® 0.16EC at 8.0 fl. oz. + Curacron® 8E at 4.0 fl. oz., Valent S-1812® 35WP at 4.6 fl. oz., Tracer® 4SC at 2.0 fl. oz. and 3.0 fl. oz., Steward® 1.25SC at 11.0 fl. oz., Steward® 1.25SC at 6.6 fl. oz. and 9.2 fl. oz. + AsanaXL® 0.66E at 6.2 fl. oz., Decis® 1.5E at 1.0 fl. oz. and Karate®Z 2.08SC at 15.4 fl. oz.

Plots were 8 rows by 100 feet. Five random whole plant inspections per plot were conducted prior to application and at 4, 7, and 14 DAT for BAW and cabbage looper larvae. Beet armyworm larvae were classified as small (< ¼ inch), medium (¼ inch to < ½ inch) and large (½ inch or larger in size). Cabbage loopers were grouped together.

Sunnyside Chemigation Test
This study was not replicated. Three treatments: Lorsban® 4E at 32.0 fl. oz and Tracer® 4SC at 1.44 fl. oz and 2.14 fl. oz per acre were applied using a center pivot irrigation system. These treatments were applied with 0.11 inches of water per acre through Senninger® nozzles which were set in the bubble mode. Each treatment was 10 acres in size and was not replicated. There were 3 marked sub-sample plots per treatment and each sampling plot was 4 rows x 100 feet in size. Five whole plant inspections per plot were made prior to application and 4, 12 and 19 DAT. BAW larvae were classified as small (¼ inch or smaller) or large (larger than ¼ inch) and cabbage looper larval sizes were combined. Counts from the treatments, were compared to an equal area being sampled the same way, but left untreated.

Edmonson Chemigation Test
This study was not replicated. The effectiveness of four rate treatments of Confirm® 2F at 8.0 fl. oz. per acre on 130 acres and 16.0 fl. oz. per acre on 24 acres and Tracer® 4SC at 1.44 fl. oz. per acre on 10 acres and 2.14 fl. oz. per acre on 20 acres was evaluated as applied through a center pivot irrigation system fitted with an Agri-Inject system. Each treatment also contained 3.2 fl. oz. of Karate® 1E per acre for boll weevil control and was injected with cottonseed oil as a carrier. Treatments were applied on August 9 with the Tracer® plots being retreated on August 18 (3 days after 1st post treatment evaluations) because of lack of performance in a grower's field. These treatments were compared to an area left untreated.

There were three sub-samples per treatment with 5 whole plants inspected per sub-sample. Caterpillar larvae were counted prior to application and at 6, 13 and 21 DAT. Beet armyworm larvae were classified as small (< ¼ inch), medium (¼ inch to < than ½ inch) and large (½ inch in size and larger).

Data in all six tests was analyzed using SAS (SAS Institute, 1985). Mean separation was determined using ANOVA and either LSD or DMRT. Percent control was calculated for all size classes of larvae and total larvae using Henderson's Formula but only percent control for total larvae is given in the tables (Henderson and Tilton, 1955).

Results and Discussion

Tahoka Test (Dryland)
There were no significant differences during any observation period between any of the treatments for small BAW larvae (Table 1). The 11 DAT counts for both of the Decis® + Lorsban® + crop oil treatments and the 14 DAT counts for the Confirm® treatment represent the number of larvae on a single plant from a new egg mass. The 14 DAT counts for both of the Decis® + Lorsban® + crop oil treatments represent the number of larvae from 2-3 plants, all from the same plot with the majority coming from a single plant. All treatments provided excellent control when compared to the untreated check at both 4 and 7 DAT for small larvae. Percent control was still good at 11 DAT for all treatments with the exception of the two Decis® + Lorsban® treatments. All treatments provided good control of larger BAW larvae with the exception of the Lannate® treatment and the Larvin® treatment at 7 DAT (Table 2).

The total number of BAW larvae per acre and percent control are given in Table 3 and Table 4, respectively. All treatments provided good control at 4 DAT but both the Larvin® and Lannate® treatments were not different from the untreated check at 7 DAT. None of the treatment counts were different from the check on subsequent plot inspections. Percent control was not calculated after 11 DAT because the population in the check declined significantly after that point.

At 11 DAT, the effects of the Larvin® treatments on aphid infestation increases was evident (Table 5). A similar effect was observed with the pyrethroid treatments, Decis®, 14 DAT. Pyrethroids appear to increase aphid numbers by directly impacting the aphids rate of increase, while Larvin® appears to effect the aphid increases as a mortality agent for lady beetles. (Parajulee and Slosser, 2001).

Shallowater Test (Irrigated)
Numbers of small BAW larvae declined to low levels 5 DAT (Table 6). Only the Lepinox® treatment had significantly more small larvae than all other treatments . Percent control was not calculated as infestations in the untreated check plots "crashed" after treatments were applied on August 16. There were no differences between treatments for any observations when comparing the number of medium BAW larvae per acre (Table 7). By 9 DAT, all treatments resulted in percent control of medium size BAW larvae of 80% or greater. As with the medium size category of BAW larvae, there were no differences between treatments at any time during the study for large larvae (Table 8).

Treatment differences for the BAW infestation when all larval sizes were combined did not result until 9 DAT when all treatments reduced larvae numbers significantly below the level of the untreated check, with the exception of Lepinox®, Lorsban®, and the single high rate application of Tracer® (Table 9). None of the treatments provided adequate control of the BAW infestation until 9 DAT when the multiple low rate Tracer® applications out performed all other treatments (Table 10).

All five Tracer® treatments had significantly fewer cabbage looper larvae than did the Lorsban® or Lepinox® treatments and the untreated check at 5 DAT (Table 11). At 9 DAT, four of the five Tracer® treatments differed from the untreated check with three still differing from the remaining two treatments. The Tracer® treatment at 1.5 fl. oz. per acre with two applications resulted in 100% control at 5 DAT and maintained that level through the 12 DAT observations while the Tracer® treatment at 1.0 fl. oz. with two applications reached 100% control at 9 DAT then declined to 40% after the sequential applications were terminated (Table 12). The single high rate application of Tracer® at 2.9 fl .oz. per acre resulted in less than adequate control of cabbage loopers. The Lepinox® treatment was slow to exhibit control but did achieve 100% control by 12DAT.

Kress Test(Irrigated)
Following the initiation of this test there was very little BAW infestation recruitment based on declining numbers of small larvae (Table 13). At 7 DAT none of the insecticide treatments had small larvae counts significantly lower than the untreated check. At 14 DAT only the single low rate application of Tracer® resulted in poor residual control for small larvae. Significant reductions in the medium BAW size category infestations did not occur until 14 DAT when all insecticide treatments except the two application regimen for Tracer® at the 2.0 fl. oz. rate per acre were significantly lower than the check (Table 14). After 7 days, and only one application into the two application regimens, only the Intrepid® and 1.0 fl. oz. rate of Tracer® was different from the check (Table 15). When control of the total infestation was evaluated, there were no significant reductions in BAW numbers after 7DAT but there were reductions with all treatments except the single application of Tracer® at the 1.5 fl. oz. rate at 14 DAT (Table 16). Only the Intrepid treatment provided adequate BAW control at 7 DAT while all treatments provided good to excellent control after 14 DAT (Table 17).

Cabbage looper larval infestation levels ranged from 48,800 to 79,600 per acre at the start of this test (Table 18). At 7 and 14 DAT all insecticide treatments resulted in significantly fewer larvae than the untreated check. Percent control ranged from 81.6 to 100 at 7 DAT and 75.2 to 100 at 14 DAT (Table 19).

Brownfield Test (Irrigated)
There were no differences between any of the insecticide treatments and the untreated check for the number of small or medium sized BAW larvae following treatment (Table 20, 21). All treatments, with the exception of Confirm and the 8.0 fl. oz. rate of Denim, significantly reduced large larvae numbers compared to the check at 4 DAT (Table 22). By 7 DAT, there were no treatment differences. There were no differences between treatments when evaluating the infestation of all combined sizes of larvae (Table 23).

Percent control at 4 DAT for total number of BAW larvae per acre was lowest for Confirm®(43%) and the low rate of Intrepid® (Table 24). By 7 DAT, all treatments were providing at least 75% control. Apparently the low rates of both IGRs were slow to express mortality.

Sunnyside (Chemigation)
The efficacy of Tracer® applied as a chemigation treatment was evaluated and compared to Lorsban®, which is already labeled for chemigation. Reduction in the number of small BAW larvae was only accomplished in the low Tracer® rate treatment at 4 and 12 DAT (Table 25). Percent control was 97.7 for the low rate and 83.6 for the high rate of Tracer®. Lorsban® did not control small BAW. Reduction of larger BAW numbers was not accomplished until 12 DAT when both the Lorsban® and low rate Tracer® treatment had fewer caterpillars than the untreated check (Table 26). None of the treatments reduced the BAW infestation level below the threshold of 20,000 per acre except for the low rate Tracer® treatment at 12 DAT (Table 27). This resulted in a 94.4% reduction (Table 29). Percent control is not calculated out to 18 DAT due to a natural decline of the infestation to very low levels.

Cabbage looper control was not that good for either the Lorsban® treatment or the low rate Tracer® treatment (Table 29, 30). There were no loopers in the high Tracer® rate treatment during the testing period.

Edmonson Chemigation Test
The efficacy of both Tracer® and Confirm® were evaluated as applied through chemigation. Because of observed inadequate control 3 days after 1st application both Tracer® treatments were retreated. The standard rate of Tracer® applied twice and both Confirm® treatments provided good control of small and medium size BAW larvae (Table 31,32). Control was maintained through 13 days following the first applications. Both Confirm® treatments reduced BAW counts of large larvae, The Tracer® treatments did not (Table 33). All treatments with the exception of the multiple application low rate Tracer® treatment provided adequate reductions in the overall BAW infestation during the testing period (Table 34,35).

The pre-treatment counts of cabbage looper larvae were at low levels ranging from 2,600 to 22,100 per acre. Numbers of larvae increased 6 days after the initial applications with no treatments providing a high level of control (Table 36, 37). By 13 DAT, control ranged from good to excellent.

Summary

Although the High Plains of Texas experienced a high level of caterpillar activity in 2000 and the highly efficacious Pirate® was not made available by EPA, there were several chemicals available through new registrations or the section 18 process which could be used to address the problem. While beet armyworms represented the bulk of the problem, cabbage loopers, followed by cotton bollworms were mixed in with the caterpillar infestations, posing interesting management concerns. The new materials available through a Section 18 emergency specific exemption were Denim®, Intrepid® and Steward®. These generally provided higher levels of efficacy and longer residual control for both BAW and cabbage loopers. The older products were less consistent in their control. The exception was Tracer®, which also generally provided control equal to that of the section 18 products. With optimized coverage, control was often achieved even with insecticides which are considered "marginal" in performance and at lower rates. The newer materials did appear to be less tolerant to low rate usage. Once caterpillars infested taller cotton, especially once the canopy "closed", the typical application of 3-5 gallons by ground equipment or 1-2 gallons by air appeared to greatly compromise the performance of the newer materials. Three nozzles per row and drops appeared to be needed to optimize ground applications. Tracer® appeared to be the most affected by coverage problems. Intrepid® appeared to be a good replacement for Confirm® by providing higher levels of efficacy and a more rapid expression of mortality. Under extended pressure, multiple applications of low rates of Tracer® may have a fit although the single 2.14 fl. oz. rate appeared to be generally optimal for this product. There was a rate response with Tracer® in which the higher rates did not generally perform as well or as consistently as the lower rates. The addition of a pyrethroid to Larvin® did not improve its performance. Both Larvin® and Decis® increased aphid problems.

The results of chemigation as an alternative method of application for the newer products was inconsistent. Confirm provided the best control of BAW while both Confirm® and Tracer® provided some control of cabbage looper but were slow acting. Lorsban® did not provide acceptable control for either BAW or cabbage loopers.

Acknowledgments

This study was funded in part by Dow AgriSciences, Dupont, Aventis, Rohm and Haas Co., Valent, and Syngenta.

References

Henderson, C. F. and E. W. Tilton. 1955. Tests with acaricides against brown wheat mite. JJ. Econ. Entomol. 48:157-61.

Parajulee, M. N. and J. E. Slosser. 2001. Cotton biology as affected by cyhalothrin (Karate): aphid or host plant modification? Proc. Beltwide Cotton Conf. *In press*.

Sansone, C. G., M. Muegge, J. FF. Leser and P. Kidd. 2000. Suggested insecticides for managing cotton insects in the High Plains Rolling Plains and Trans Pecos areas of Texas. Texas Ag Ext. Ser. E-6A. 9 pp.

SAS Institute. 1985. SAS user's guide: statistics, version 5 ed. SAS Institute. Cary, NC.

Williams. R. W. 2001. Cotton Insect losses. Proc. Beltwide Cotton Conf. *In press*.

Table 1. Total number of small beet armyworms per acre (x1000). Tahoka, Texas 2000.

Treatment	Rate (oz./A)	Days after treatment 0	4	7	11	14	21
Decis + Lorsban + Crop Oil	2.13 + 24 + 32	54 a [1/]	2 a	0 a	104 a	62 a	4 a
Decis + Lorsban + Crop Oil	2.13 + 32 + 32	56 a	14 a	0 a	88 a	86 a	4 a
Lorsban + Crop Oil	32 + 32	30 a	2 a	0 a	2 a	20 a	4 a
Lorsban	32	28 a	4 a	2 a	2 a	12 a	0 a
Decis + Larvin + Hyper-active	2.13 + 32 + 1.6	76 a	2 a	2 a	2 a	2 a	0 a
Larvin + Hyper-active	32 + 1.6	42 a	4 a	4 a	2 a	0 a	0 a
Curacron	12	76 a	12 a	0 a	0 a	4 a	0 a
Lannate	24	108 a	6 a	14 a	2 a	4 a	2 a
Tracer	2.14	30 a	2 a	0 a	2 a	12 a	0 a
Confirm	4	46 a	2 a	0 a	0 a	100 a	2 a
Untreated Check	--	42 a	78 a	22 a	24 a	8 a	4 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 2. Total number of large beet armyworms per acre (x1000). Tahoka, Texas 2000.

Treatment	Rate (oz./A)	Days after treatment 0	4	7	11	14	21
Decis + Lorsban + Crop Oil	2.13 + 24 + 32	60 ab [1/]	16 cd	2 c	0 a	0 b	2 a
Decis + Lorsban + Crop Oil	2.13 + 32 + 32	72 a	6 cd	6 bc	2 a	0 b	0 a
Lorsban + Crop Oil	32 + 32	60 ab	10 cd	4 c	2 a	0 b	0 a
Lorsban	32	34 bcd	10 cd	6 bc	2 a	0 b	0 a
Decis + Larvin + Hyper-active	2.13 + 32 + 1.6	54 abc	10 cd	2 c	2 a	0 b	0 a
Larvin + Hyper-active	32 + 1.6	30 cd	16 cd	16 a	0 a	2 b	0 a
Curacron	12	58 ab	22 bc	4 c	2 a	8 a	0 a
Lannate	24	14 d	34 ab	20 a	8 a	2 b	2 a
Tracer	2.14	38 bcd	2 d	0 c	0 a	0 b	0 a
Confirm	4	38 bcd	4 d	0 c	2 a	0 b	0 a
Untreated Check	--	20 d	44 a	14 ab	4 a	8 a	0 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 3. Total number of beet armyworms per acre (x1000). Tahoka, Texas 2000.

Treatment	Rate (oz./A)	Days after treatment 0	4	7	11	14	21
Decis + Lorsban + Crop Oil	2.13 + 24 + 32	114 a [1/]	18 b	2 bc	104 a	62 a	6 a
Decis + Lorsban + Crop Oil	2.13 + 32 + 32	128 a	20 b	6 bc	90 a	86 a	4 a
Lorsban + Crop Oil	32 + 32	90 a	12 b	4 bc	4 a	20 a	4 a
Lorsban	32	62 a	14 b	8 bc	4 a	12 a	0 a
Decis + Larvin + Hyper-active	2.13 + 32 + 1.6	130 a	12 b	4 bc	4 a	2 a	0 a
Larvin + Hyper-active	32 + 1.6	72 a	20 b	20 ab	2 a	2 a	0 a
Curacron	12	134 a	34 b	4 bc	2 a	12 a	0 a
Lannate	24	122 a	40 b	34 a	10 a	6 a	4 a
Tracer	2.14	68 a	4 b	0 c	2 a	12 a	0 a
Confirm	4	84 a	6 b	0 c	2 a	100 a	2 a
Untreated Check	--	62 a	122 a	36 a	28 a	16 a	4 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 4. Percent control [1/] of total beet armyworms. Tahoka, Texas 2000.

Treatment	Rate (oz./A)	Days after treatment 4	7	11
Decis + Lorsban + Crop Oil	2.13 + 24 + 32	91.9	97	-100
Decis + Lorsban + Crop Oil	2.13 + 32 + 32	92.0	91.9	-54.7
Lorsban + Crop Oil	32 + 32	93.2	92.4	90.2
Lorsban	32	88.5	77.8	93.2
Decis + Larvin + Hyper-active	2.13 + 32 + 1.6	95.3	94.7	87.8
Larvin + Hyper-active	32 + 1.6	85.8	52.2	92.9
Curacron	12	87.1	94.9	96.7
Lannate	24	83.3	52.1	82.0
Tracer	2.14	97.0	100	93.5
Confirm	4	96.4	100	94.8

1/ As calculated using Henderson's formula.

Table 5. Average number of aphids per leaf following treatments targeting beet armyworms. Tahoka, Texas 2000.

Treatment	Rate (oz./A)	Days after treatment 11	14	21
Decis + Lorsban + Crop Oil	2.13 + 24 + 32	11.4 b [1/]	19.4 bc	2.0 b
Decis + Lorsban + Crop Oil	2.13 + 32 + 32	12.8 b	34.6 ab	1.0 b
Lorsban + Crop Oil	32 + 32	9.2 b	13.8 c	2.0 b
Lorsban	32	4.9 b	7.7 c	2.0 b
Decis + Larvin + Hyper-active	2.13 + 32 + 1.6	27.2 a	51.9 a	35.7 a
Larvin + Hyper-active	32 + 1.6	30.3 a	45.0 a	13.7 b
Curacron	12	12.0 b	6.0 c	2.1 b
Lannate	24	7.2 b	9.0 c	1.6 b
Tracer	2.14	6.6 b	7.2 c	1.1 b
Confirm	4	6.5 b	16.6 c	3.1 b
Untreated Check	--	4.5 b	9.2 c	1.8 b

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 6. Total number of small beet armyworms per acre (x1000). Shallowater, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	5	9	12
Tracer (2)	1.0	77.2 a [1/]	0 b	0 a	1 a
Tracer (2)	1.5	32 a	5.2 b	0 a	0 a
Tracer (1)	2.14	24 a	2.8 b	0 a	0 a
Tracer (2)	2.14	26.8 a	2.8 b	5.2 a	0 a
Tracer (1)	2.9	42.8 a	5.2 b	0 a	0 a
Lorsban (1)	32	136 a	.2 b	2.8 a	0 a
Lepinox (1)	2	56 a	16 a	2.8 a	0 a
UTC	- - - -	64 a	0 b	2.8 a	0 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 7. Total number of medium beet armyworms per acre (x1000). Shallowater, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment Pre	5	9	12
Tracer (2)	1.0	66.8 a [1/]	4 a	0 a	1 a
Tracer (2)	1.5	66.8 a	3 a	0 a	0 a
Tracer (1)	2.14	64 a	5.2 a	5.2 a	0 a
Tracer (2)	2.14	98.8 a	13.2a	5.2 a	0 a
Tracer (1)	2.9	42.8 a	8 a	2.8 a	0 a
Lorsban (1)	32	122.8 a	8 a	2.8 a	0 a
Lepinox (1)	2	34.8 a	21.2a	2.8 a	2.8a
UTC	- - - -	26.8 a	16 a	10.8a	0 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 8. Total number of large beet armyworms per acre (x1000). Shallowater, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	5	9	12
Tracer (2)	1.0	48 a [1/]	10.8a	0 a	2.8 a
Tracer (2)	1.5	2.8 a	8 a	0 a	0 a
Tracer (1)	2.14	29.2a	5.2 a	5.2 a	0 a
Tracer (2)	2.14	32 a	10.8a	0 a	0 a
Tracer (1)	2.9	29.2a	10.8a	0 a	0 a
Lorsban (1)	32	26.8a	0 a	2.8 a	0 a
Lepinox (1)	2	32 a	0 a	2.8 a	0 a
UTC	- - - -	32 a	10.8a	2.8 a	0 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 9. Total number of beet armyworms per acre (x1000). Shallowater, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	5	9	12
Tracer (2)	1.0	192 a [1/]	18.8a	0c	2.8a
Tracer (2)	1.5	101.2a	18.8a	0c	0 a
Tracer (1)	2.14	138.8a	13.2a	10.8ab	0 a
Tracer (2)	2.14	157.2a	26.8a	10.8ab	0 a
Tracer (1)	2.9	114.8 a	24 a	2.8 bc	0 a
Lorsban (1)	32	229.2a	61.2a	8 abc	2.8a
Lepinox (1)	2	122.8a	37.2a	8 abc	2.8a
UTC	- - - -	122.8a	26.8a	16 a	0 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 10. Percent control [1/] of total beet armyworms. Shallowater, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 5	9
Tracer (2)	1.0	55.1	100
Tracer (2)	1.5	14.9	100
Tracer (1)	2.14	56.4	40.3
Tracer (2)	2.14	21.9	47.3
Tracer (1)	2.9	4.2	81.3
Lorsban (1)	32	-22.4	73.2
Lepinox (1)	2	-38.8	50

1/ As calculated using Henderson's formula.

Table 11. Total number of cabbage loopers per acre (x1000). Shallowater, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	5	9	12
Tracer (2)	1.0	120 a [1/]	16 b	0 c	2.8a
Tracer (2)	1.5	101.2ab	0 b	0 c	0a
Tracer (1)	2.14	48 d	8 b	0 c	0a
Tracer (2)	2.14	85.2bc	5.2 b	5.2bc	0a
Tracer (1)	2.9	82.8bc	16 b	13.2ab	5.2a
Lorsban (1)	32	85.2bc	44 a	16ab	5.2a
Lepinox (1)	2	106.8ab	40 a	13.2ab	0a
UTC	- - - -	72 cd	40 a	18.8a	2.8a

1/ Means in the same column followed by the same letter are not significantly different at P=0.10 level (LSD).

Table 12. Percent control [1/] of cabbage loopers. Shallowater, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 5	9
Tracer (2)	1.0	77.6	100
Tracer (2)	1.5	100	100
Tracer (1)	2.14	72	100
Tracer (2)	2.14	89.7	76.6
Tracer (1)	2.9	67.5	39
Lorsban (1)	32	10.8	28.1
Lepinox (1)	2	37	52.7

1/ As calculated using Henderson's formula.

Table 13. Total number of small beet armyworms per acre (x1000). Kress, Texas 2000.

Treatment	**Rate**	**Days after treatment**		
(# applications)	**(oz./ A)**	**0**	**7**	**14**
Confirm (1)	6	21.1 ab [1/]	4.9 ab	4.9 b
Denim (1)	6	6.5 b	0 b	0 b
Steward (1)	7	11.4 b	0 b	13 b
Intrepid (1)	2	1.6 b	0 b	0 b
Tracer (2)	1.0	3.3 b	0 b	0 b
Tracer (1)	1.5	6.5 b	3.3 ab	32.5 b
Tracer (2)	2.0	35.8 a	8.1 a	0 b
Tracer (1)	2.14	8.1 b	3.3 ab	0 b
Tracer (1)	2.9	8.1 b	0 b	4.9 b
Untreated	- - - -	14.6 ab	.8 b	65 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (DMRT).

Table 14. Total number of medium beet armyworms per acre (x1000). Kress, Texas 2000.

Treatment	**Rate**	**Days after treatment**		
(# applications)	**(oz./ A)**	**0**	**7**	**14**
Confirm (1)	6	11.4 b [1/]	3.3 ab	0 c
Denim (1)	6	27.6 ab	4.9 ab	0 c
Steward (1)	7	11.4 b	0 b	0 c
Intrepid (1)	2	6.5 b	0 b	0 c
Tracer (2)	1.0	6.5 b	8.1 ab	1.6 bc
Tracer (1)	1.5	35.8 a	11.4 ab	0 c
Tracer (2)	2.0	14.6 ab	14.6 a	4.9 ab
Tracer (1)	2.14	8.1 b	9.8 ab	0 c
Tracer (1)	2.9	16.3 ab	0 b	1.6 bc
Untreated	- - - -	13 ab	10.6 ab	6.5 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (DMRT).

Table 15. Total number of large beet armyworms per acre (x1000). Kress, Texas 2000.

Treatment	**Rate**	**Days after treatment**		
(# applications)	**(oz./ A)**	**0**	**7**	**14**
Confirm (1)	6	13.0 a [1/]	3.3 ab	0 b
Denim (1)	6	13.0 a	3.3 ab	0 b
Steward (1)	7	9.8 a	1.6 ab	0 b
Intrepid (1)	2	8.1 a	0 b	0 b
Tracer (2)	1.0	6.5 a	0 b	1.6 b
Tracer (1)	1.5	27.6 a	9.8 a	0 b
Tracer (2)	2.0	9.8 a	8.1 ab	4.9 a
Tracer (1)	2.14	17.9 a	6.5 ab	0 b
Tracer (1)	2.9	9.8 a	4.9 ab	0 b
Untreated	- - - -	13.0 a	4.9 ab	1.6 b

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (DMRT).

Table 16. Total number of beet armyworms per acre (x1000). Kress, Texas 2000.

Treatment	**Rate**	**Days after treatment**		
(# applications)	**(oz./ A)**	**0**	**7**	**14**
Confirm (1)	6	45.5 ab [1/]	11.4 ab	4.9 b
Denim (1)	6	47.1 ab	8.1 ab	0 b
Steward (1)	7	32.5 ab	1.6 b	13.0 b
Intrepid (1)	2	16.3 b	0 b	0 b
Tracer (2)	1.0	16.3 b	8.1 ab	3.3 b
Tracer (1)	1.5	69.9 a	24.4 ab	32.5 ab
Tracer (2)	2.0	60.1 ab	30.9 a	9.8 b
Tracer (1)	2.14	34.1 ab	19.5 ab	0 b
Tracer (1)	2.9	34.1 ab	4.9 ab	6.5 b
Untreated	- - - -	40.6 ab	16.3 ab	73.1 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (DMRT).

Table 17. Percent control [1/] of total armyworms. Kress, Texas 2000.

Treatment	**Rate**	**Days after treatment**	
(# applications)	**(oz./ A)**	**7**	**14**
Confirm (1)	6	37.6	94.0
Denim (1)	6	57.2	100
Steward (1)	7	87.7	77.8
Intrepid (1)	2	100	100
Tracer (2)	1.0	-23.8	88.8
Tracer (1)	1.5	13.1	74.2
Tracer (2)	2.0	-28.1	90.9
Tracer (1)	2.14	-42.4	100
Tracer (1)	2.9	64.2	89.4

1/ As calculated using Henderson's formula.

Table 18. Total number of cabbage loopers per acre (x1000). Kress, Texas 2000.

Treatment	**Rate**	**Days after treatment**		
(# applications)	**(oz./ A)**	**0**	**7**	**14**
Confirm (1)	6	78.0 a [1/]	6.5 bc	0 b
Denim (1)	6	55.3 a	3.3 bc	4.9 b
Steward (1)	7	79.6 a	4.9 bc	1.6 b
Intrepid (1)	2	65.0 a	0 c	0 b
Tracer (2)	1.0	63.4 a	11.4 b	0 b
Tracer (1)	1.5	63.4 a	9.8 bc	0 b
Tracer (2)	2.0	63.4 a	6.5 bc	0 b
Tracer (1)	2.14	48.8 a	3.3 bc	0 b
Tracer (1)	2.9	68.3 a	4.9 bc	1.6 b
Untreated	- - - -	68.3 a	66.6 a	24.4 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (DMRT).

Table 19. Percent control [1/] of total cabbage loopers. Kress, Texas 2000.

Treatment	**Rate**	**Days after treatment**	
(# applications)	**(oz./ A)**	**7**	**14**
Confirm (1)	6	91.5	100
Denim (1)	6	93.9	75.2
Steward (1)	7	93.7	94.4
Intrepid (1)	2	100	100
Tracer (2)	1.0	81.6	100
Tracer (1)	1.5	84.1	100
Tracer (2)	2.0	89.5	100
Tracer (1)	2.14	93.1	100
Tracer (1)	2.9	92.6	93.4

1/ As calculated using Henderson's formula.

Table 20. Total number of small beet armyworms per acre (x1000). Brownfield, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	7	14
Karate Z	15.4	10 a [1/]	0 a	0 a	0 a
Decis	1.0	4 a	0 a	0 a	0 a
Tracer	2.0	2 a	0 a	0 a	0 a
Tracer	3.0	16 a	0 a	0 a	0 a
S-1812	4.6	2 a	0 a	0 a	2 a
Steward	11.0	4 a	0 a	0 a	0 a
Steward + Asana	6.6 + 6.2	14 a	0 a	0 a	0 a
Steward + Asana	9.2 + 6.2	0 a	0 a	0 a	0 a
Intrepid	4.0	6 a	0 a	0 a	0 a
Intrepid	8.0	6 a	0 a	0 a	0 a
Confirm	8.0	12 a	0 a	0 a	0 a
Denim	6.0	14 a	0 a	0 a	0 a
Denim	8.0	6 a	0 a	0 a	0 a
Denim + Curacron	8.0 + 4.0	16 a	0 a	14 a	0 a
Untreated	- - - -	10 a	0 a	22 a	2 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (LSD).

Table 21. Total number of medium beet armyworms per acre (x1000). Brownfield, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	7	14
Karate Z	15.4	30 a [1/]	4 a	6 a	0 a
Decis	1.0	28 a	4 a	0 a	0 a
Tracer	2.0	18 a	6 a	2 a	0 a
Tracer	3.0	16 a	0 a	0 a	0 a
S-1812	4.6	28 a	8 a	2 a	2 a
Steward	11.0	12 a	0 a	0 a	0 a
Steward + Asana	6.6 + 6.2	48 a	8 a	2 a	0 a
Steward + Asana	9.2 + 6.2	20 a	4 a	0 a	0 a
Intrepid	4.0	16 a	2 a	0 a	0 a
Intrepid	8.0	22 a	0 a	4 a	0 a
Confirm	8.0	18 a	10 a	2 a	0 a
Denim	6.0	24 a	4 a	4 a	0 a
Denim	8.0	18 a	6 a	6 a	0 a
Denim + Curacron	8.0 + 4.0	42 a	4 a	2 a	0 a
Untreated	- - - -	12 a	6 a	4 a	4 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (LSD).

Table 22. Total number of large beet armyworms per acre (x1000). Brownfield, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	7	14
Karate Z	15.4	16 a [1/]	2 bc	4 a	0 a
Decis	1.0	18 a	6 bc	14 a	0 a
Tracer	2.0	16 a	0 c	4 a	0 a
Tracer	3.0	8 a	8 bc	4 a	2 a
S-1812	4.6	18 a	0 c	2 a	2 a
Steward	11.0	6 a	2 bc	0 a	0 a
Steward + Asana	6.6 + 6.2	12 a	2 bc	4 a	0 a
Steward + Asana	9.2 + 6.2	16 a	2 bc	4 a	0 a
Intrepid	4.0	8 a	4 bc	2 a	0 a
Intrepid	8.0	10 a	2 bc	2 a	0 a
Confirm	8.0	8 a	12 ab	4 a	0 a
Denim	6.0	8 a	0 c	0 a	0 a
Denim	8.0	18 a	4 bc	2 a	0 a
Denim + Curacron	8.0 + 4.0	22 a	12 ab	6 a	0 a
Untreated	- - - -	6 a	20 a	4 a	2 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (LSD).

Table 23. Total number of beet armyworms per acre (x1000). Brownfield, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	7	14
Karate Z	15.4	56 a [1/]	6 a	10 a	0 a
Decis	1.0	50 a	10 a	14 a	0 a
Tracer	2.0	36 a	6 a	6 a	0 a
Tracer	3.0	40 a	8 a	4 a	2 a
S-1812	4.6	48 a	8 a	4 a	6 a
Steward	11.0	22 a	2 a	0 a	0 a
Steward + Asana	6.6 + 6.2	74 a	10 a	6 a	0 a
Steward + Asana	9.2 + 6.2	36 a	6 a	4 a	0 a
Intrepid	4.0	30 a	6 a	2 a	0 a
Intrepid	8.0	38 a	2 a	6 a	0 a
Confirm	8.0	38 a	22 a	6 a	0 a
Denim	6.0	46 a	4 a	4 a	0 a
Denim	8.0	42 a	10 a	8 a	0 a
Denim + Curacron	8.0 + 4.0	80 a	16 a	22 a	0 a
Untreated	- - - -	28 a	26 a	30 a	8 a

1/ Means in the same column followed by the same letter are not significantly different at P=0.05 level (LSD).

Table 24. Percent control [1/] of total beet armyworms. Brownfield, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 4	7
Karate Z	15.4	86.1	84.5
Decis	1.0	74.0	75.7
Tracer	2.0	88.0	85.6
Tracer	3.0	72.9	91.3
S-1812	4.6	90.2	92.1
Steward	11.0	80.3	100
Steward + Asana	6.6 + 6.2	85.4	93.0
Steward + Asana	9.2 + 6.2	88.0	90.4
Intrepid	4.0	63.9	94.2
Intrepid	8.0	94.3	86.3
Confirm	8.0	43.0	86.3
Denim	6.0	85.9	92.5
Denim	8.0	74.2	83.5
Denim + Curacron	8.0 + 4.0	78.3	76.2

1/ As calculated using Henderson's formula.

Table 25. Total number of small beet armyworms per acre (x1000) in a chemigation test. Sunnyside, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	12	18
Lorsban	32.0	16.7	160.0	73.3	83.3
Tracer	1.44	93.3	23.3	0	40.0
Tracer	2.14	196.7	346.7	43.3	13.3
Untreated	- - - -	23.3	250.0	46.7	0

Table 26. Total number of large beet armyworms per acre (x1000) in a chemigation test. Sunnyside, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	12	18
Lorsban	32.0	73.3	66.7	0	6.7
Tracer	1.44	130.0	83.3	10.0	6.7
Tracer	2.14	16.7	33.3	13.3	20.0
Untreated	- - - -	63.3	46.7	23.3	6.7

Table 27. Total number of beet armyworms per acre (x1000) in a chemigation test. Sunnyside, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	12	18
Lorsban	32.0	90.0	226.7	73.3	90.0
Tracer	1.44	223.3	106.7	10.0	46.7
Tracer	2.14	213.3	380.0	56.7	33.3
Untreated	- - - -	86.7	296.7	70.0	6.7

Table 28. Percent control 1/ of total beet armyworms in a chemigation test. Sunnyside, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 4	12
Lorsban	32.0	26.4	-0.9
Tracer	1.44	86.0	94.4
Tracer	2.14	47.9	67.1

1/ As calculated using Henderson's formula.

Table 29. Total number of cabbage loopers per acre (x1000) in a chemigation test. Sunnyside, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 0	4	12	18
Lorsban	32.0	63.3	70.0	6.7	0
Tracer	1.44	66.7	43.3	3.3	0
Tracer	2.14	0	0	0	0
Untreated	- - - -	53.3	76.7	20.0	0

Table 30. Percent control 1/ of total cabbage loopers in a chemigation test. Sunnyside, Texas 2000.

Treatment	Rate (oz./ A)	Days after treatment 4	12
Lorsban	32.0	23.2	71.8
Tracer	1.44	54.9	86.8
Tracer	2.14	--	--

1/ As calculated using Henderson's formula.

Table 31. Total number of small beet armyworms per acre (x1000) in a chemigation test. Edmonson, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	6	13	21
Tracer (2)	1.4	92.3	32.5	0	32.5
Tracer (2)	2.14	3.9	1.1	1.1	19.5
Confirm	8	0	3.3	0	9.8
Confirm	16	2.6	2.2	2.1	9.8
Untreated	- - - -	5.2	91	34.6	8.1

Table 32. Total number of medium beet armyworms per acre (x1000) in a chemigation test. Edmonson, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	6	13	21
Tracer (2)	1.4	23.4	33.6	7.6	3.3
Tracer (2)	2.14	33.8	3.3	2.1	0
Confirm	8	9.1	3.3	0	0
Confirm	16	3.9	3.3	2.1	0
Untreated	- - - -	45.5	30.3	31.4	13

Table 33. Total number of large beet armyworms per acre (x1000) in a chemigation test. Edmonson, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	6	13	21
Tracer (2)	1.4	7.8	7.6	3.3	0
Tracer (2)	2.14	14.3	11.9	1.1	0
Confirm	8	31.2	0	0	0
Confirm	16	20.8	2.2	0	0
Untreated	- - - -	52	15.2	4.3	6.5

Table 34. Total number of beet armyworms per acre (x1000) in a chemigation test. Edmonson, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	6	13	21
Tracer (2)	1.4	123.5	73.7	10.9	35.8
Tracer (2)	2.14	52	16.3	4.3	19.5
Confirm	8	40.3	6.6	0	9.8
Confirm	16	27.3	7.7	4.2	9.8
Untreated	- - - -	102.7	136.5	70.3	27.6

Table 35. Percent Control 1/ of total beet armyworms in a chemigation test. Edmonson, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 6	13
Tracer (2)	1.4	55.1	87.1
Tracer (2)	2.14	76.4	89.9
Confirm	8	87.7	100
Confirm	16	78.7	77.5

1/ As calculated using Henderson's formula.

Table 36. Total number of cabbage loopers per acre (x1000) in a chemigation test. Edmonson, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 0	6	13	21
Tracer (2)	1.4	22.1	13	13	0
Tracer (2)	2.14	11.7	17.3	4.3	0
Confirm	8	2.6	7.6	0	1.6
Confirm	16	5.2	3.3	0	0
Untreated	- - - -	13	36.8	27.1	8.1

Table 37. Percent Control 1/ of total cabbage loopers in a chemigation test. Edmonson, Texas 2000.

Treatment (# applications)	Rate (oz./ A)	Days after treatment 6	13
Tracer (2)	1.4	79.2	71.8
Tracer (2)	2.14	47.8	82.4
Confirm	8	-3.3	100
Confirm	16	77.6	100

1/ As calculated using Henderson's formula.