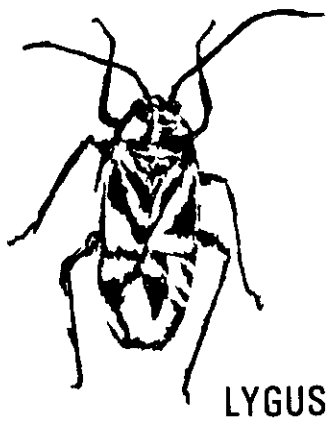
A PROGRESS REPORT OF

INSECT STUDY RESULTS



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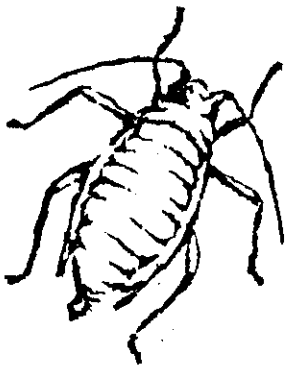

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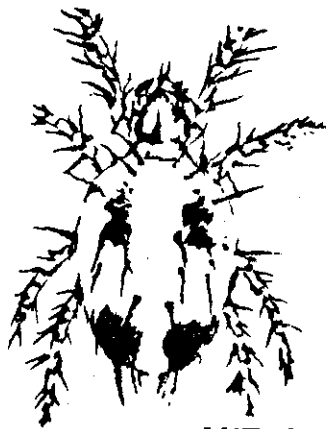

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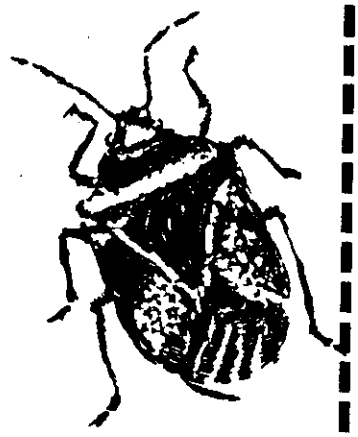
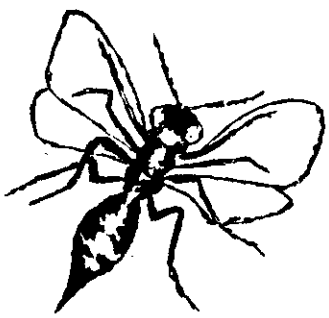


STINKBUGS

IN SEED ALFALFA

1980



CHALCID

PREDATORS
&
PARASITES

Acknowledgements

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The assistance of grower cooperators and insecticide applicators who donated their time, equipment and fields to conduct these experiments is also deeply appreciated. Special thanks are due Bob and Ed Vance of Vance Ag Craft Inc. and Don Darnell for their interest and many hours of work with these and past experiments concerning insect control in seed alfalfa. This years experiments were conducted in alfalfa seed fields of Mike Perez and Echeveste and Elizalde. We are greatful for the interest and contributions of these cooperators in making it possible to conduct the experiments.

The assistance of Raimundo Charlin and students Tom Babb, Allan Showler, Mike Pettigrew and the assistance of Brad Bell, Field Assistant, and the art work of Gwen Okamoto, Cooperative Extension Service, Fresno County is sincerely appreciated.

Research on Insects Affecting Seed Alfalfa 1980

O. G. Bacon[1], R. H. James[2], L. R. Teuber[3] and W. R. Sheesley[4]

Introduction

Research objectives for 1980 were to 1) evaluate alfalfa introductions for potential resistance to lygus bugs. 2) Investigate cultural practices (clipping dates and clipping combined with early insecticide applications) for control of lygus bugs. 3) Investigate why certain alfalfas, supposedly resistant to the spotted alfalfa aphid when grown for hay appear susceptible to the aphid when grown for seed. 4) Obtain insecticide residue data on harvested seed, chaff and straw and on sprouts from seeds and on green regrowth following harvest. 5) Evaluate new insecticides, acaricides and combinations of these materials for control of lygus bugs, aphids and spider mites.

Progress has been made on each of the above objectives.

General Observations

Insect populations in seed alfalfa were generally low during 1980. Blue alfalfa aphid populations were not monitored this year. Previous studies have shown that populations of this species generally decline to sub-economic levels in the San Joaquin Valley by the beginning of the seed production season in late April and May.

Populations of the spotted alfalfa aphid were generally lower in 1980 than in 1979, although SAA continued to appear in damaging numbers in fields planted to certain varieties that were reported to be resistant to SAA attack.

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4. Farm Advisor, University of California, Cooperative Extension, Service, Fresno County.

Lygus bug populations were low. The western yellow stripped armyworm and the beet armyworm were not prevalent in seed fields on the west side of the San Joaquin Valley. Stink bug populations were assessed in 15 fields in the Firebaugh, Five Points and San Joaquin areas. Populations were very low and consisted almost entirely of Say stink bug. Seed samples were hand stripped from 21 alfalfa seed fields on the west side of Fresno County for analysis of damage by the alfalfa seed chalcid. Although generally very low chalcid damage was higher than in recent years. In one of the fields included in the survey 14.7% of the seeds were infested with the seed Chalcid. Spider mite populations were generally low.

The omnivorous leaf roller was not monitored with pheromone traps in 1980 but seed fields in west Fresno County were examined for the presence of larvae. Very few OLR larvae were observed and they did not constitute a problem.

Evaluation of alfalfa introductions for potential resistance to lygus bugs.

An evaluation was made on July 18 thru 23 of a world collection of 1050 alfalfa introductions in agronomy plantings on the Davis Campus for potential resistance to lygus bugs. Each introduction was planted in a single row 27 feet long. Fourteen of these plots, separated by 36" spaces, extended the length of the field. Rows were spaced 30 inches apart. Single row plantings of each of 3 commercial varieties, Vernal, Lahontan and CUF 101 also extended the length of the field and were located between every 10 rows of the introductions.

Each introduction was sampled for lygus bugs by beating the top portion of plants over a white plastic pan 11"x13" (28x34cm). Four such subsamples were taken in each 27' row. Adults and nymphs were jarred into the pan but only the nymphs were counted. Adult lygus bugs are strong fliers and move readily from plant to plant. Nymphs are confined to the plants and it was believed that by considering only the nymph population a gross determination could be made of lygus bug populations actually developing on the various introductions. Those introductions showing very low nymph populations would be further evaluated in 1981.

The results of this study are shown in Table 1. Five of the introductions had very low lygus bug populations with totals of 0 to 2 nymphs in the 4 subsamples from each introduction. Six additional

Table 1. Lygus bug populations on various alfalfa introductions. Davis, Calif. 1980.

Accession No. or Variety [1]	Origin	Lygus bug nymphs per subsample[2]				Lygus bug nymphs per 4 subsamples Total
		1	2	3	4	
73729	Turkey	0	1	0	-	1
286360	Czechoslovakia	1	1	0	0	2
311455	Spain	0	1	0	1	2
172987	Turkey	0	0	0	-	0
399551	Ethiopia	0	0	0	0	0
399552	Ethiopia	1	0	0	3	4
79-IN-00-1078	Argentina	0	1	2	1	4
79-IN-00-1079	Argentina	1	1	3	0	5
233199	USSR	1	1	2	0	4
314279	USSR	2	1	0	1	4
287887	Spain	3	0	0	1	4
Vernal[3]	USA	5	6	7	8	26
Lahontan[3]	USA	7	7	9	7	30
CUF 101[3]	USA	8	9	13	7	37

1 Plot size: Each accession number or plot was 27 ft. long.

2 Each subsample represents one 11"x13" beating pan sample (approximately one linear foot of alfalfa tops). Samples were taken on July 18, 21 and 23 between 8:00AM-11:00AM.

3 Each subsample represents the mean of 7 beating pan samples.

introductions also had low nymph populations totalling 4 to 5 nymphs per 4 subsamples. These populations were in contrast to nymph populations ranging from 24 to 37 nymphs per 4 subsamples for the commercial varieties, Vernal, Lahontan and CUF 101. These results are preliminary and we are not certain that the observations indicate actual preference or resistance. These introductions and perhaps others will be further evaluated.

Early clipping and clipping combined with early insecticide applications for control of lygus bugs.

An experiment was conducted at the West Side Field Station in which 3 dates of clipping and clipping accompanied with an early insecticide application were compared with unclipped treated and untreated alfalfa for control of lygus bugs. A paired plot design was used involving 16 treatments. The individual plots were 6 rows wide and 20 feet long. Depending upon the treatment, plots were clipped on March 17, March 31 and April 14. Half the plots of each treatment were caged with walk in cages covered with plastic screen. The objective of the screening was to exclude lygus bugs following treatment to facilitate detection of lygus bug movements in the area and to determine how long treatments would be effective in preventing the reestablishment of lygus bug populations. Where clipping occurred the plant material was removed from the plots immediately following clipping. Where an insecticide was used dimethoate was applied with a CO_2 powered hand sprayer at 0.5 pound AI/acre and where combined clipping and spray treatments were used the spray was applied to the stubble immediately following clipping.

Lygus bug populations were monitored each week in all treatments by taking 4 one square foot D-vac samples from each treatment. Each sample was examined and lygus bug adults and nymphs were recorded separately.

The results of this experiment, shown in Table 2, do not indicate any advantages from the standpoint of lygus bug control resulting from the early clipping and spray treatments. As expected, as the season advanced significant differences were observed in lygus bug populations between the caged and uncaged plots. Lygus bug populations began to increase in the uncaged plots by May 12 and by May 27 nymph populations in excess of 50 per 4 square feet were found in half of the uncaged treatments. The highest nymph populations were found in uncaged plots that were clipped and sprayed on March 17 and March 31. The lowest populations, although still higher than those of the caged plots, occurred

Table 2. Populations of lygus bug nymphs in seed alfalfa resulting from early clipping and clipping combined with insecticide treatment for control of lygus bugs. Five Points, Calif., 1980.

Date clipped and/or caged	Sampling Dates*										
	3/17	3/24	3/31	4/7	4/14	4/21	4/28	5/5	5/12	5/19	5/27
					Sprayed, Clipped, Caged						
3/17	9**	0	0	0	1	1	0	0	2	0	1
3/31			7**	0	0	0	0	0	1	0	1
4/14					10**	0	0	1	0	0	1
					Sprayed, Clipped, No Cage						
3/17	9**	0	1	0	1	1	2	7	7	27	53
3/31			6**	0	1	0	0	0	6	5	54
4/14					8**	0	0	4	0	3	31
					Sprayed, Unclipped, Caged						
3/17	6	5	8	9	10**	0	0	0	0	1	6
					Sprayed, Unclipped, No Cage						
3/17	10	3	0	3	5**	0	1	0	4	4	25
					No Spray, Clipped, Caged						
3/17	11	2	5	1	4	5	-	0	0	0	1
3/31			5	1	4	3	-	0	2	0	3
4/14					7	0	-	2	0	0	1
					No Spray, Clipped, No Cage						
3/17	6	3	4	10	3	1	-	7	4	11	40
3/31			1	0	0	3	-	1	12	6	52
4/14					3	0	-	2	4	10	8
					No Spray, Unclipped, Caged						
3/17	7	4	4	8	4	1	-	1	1	2	14
					No Spray, Unclipped, No Cage						
3/17	9	4	4	0	0	0	-	2	1	2	46

* Four one square foot D-vac samples from each treatment on each sampling date.

** Pretreatment count and date spray applied. Insecticide used, dimethoate 0.5 lb. AI/acre.

in plots clipped or clipped and sprayed on April 14 which approximates the normal clipping date in commercial fields. There were no indications that the early spray applications provided any significant degree of protection after mid-May when lygus bug populations normally begin to increase in alfalfa seed fields.

Insecticide Residue Study

Field plots were established to obtain data on insecticide residues that might be found at harvest on seed, chaff and straw resulting from control programs on seed alfalfa. Insecticide residues are also to be determined on alfalfa sprouts from treated seed and on the green regrowth after harvest. These data are being obtained through the cooperation of the Pesticide Impact Assessment Program, Western Region and the Department of Environmental Toxicology, U.C. Davis. Data are being obtained on 1x and 2x rates of Monitor, Carzol, Lorsban and Comite. The treatments were applied to individual plots 5 acres in size by fixed wing aircraft. Each treatment was applied 3 times during the season. The samples for the residue studies were frozen and are currently being held awaiting analytical procedures.

Insecticide evaluation experiments

During 1980, 4 separate experiments were conducted in which 12 insecticides and 11 insecticide-acaricide combinations were evaluated for control of lygus bugs, the spotted alfalfa aphid and the pea aphid. Data were obtained on the effects of the materials on spider mite populations but no specific acaricide trials were conducted. As in previous years, although data were obtained on several insect species in each of the experiments and surveys, the results are categorized and reported according to species rather than by individual experiment.

Lygus bugs

The results of the lygus bug studies are presented in Tables 3 through 10. The following insecticides and combinations were evaluated for control of lygus bugs; Monitor®, Carzol®, Lorsban®, Pydrin®, Pounce®, Mavrik®, Temik®, Thiodan®, Monitor + Comite®, Carzol + Lorsban + Comite, Pydrin + Comite, Pounce + Comite, Cymbush + Comite, Thiodan + Phosdrin, Thiodan + Nudrin®, Nudrin + Phosdrin. Comite was included in the combinations to control spider mites. The materials were all applied as foliar sprays by aircraft in early morning prior to 5:00 AM.

The experiment shown in Tables 3 and 4 was primarily for the purpose of obtaining pesticide residue information mentioned earlier in this report. It will be seen that the insecticides were combined with the acaricide Comite and all materials were applied at a normal 1x rate and a 2x rate as required for pesticide residue information. Lorsban was included in the Carzol treatment as a standard aphicide eventhough the alfalfa variety used in this experiment (CW-8) was resistant to the spotted alfalfa aphid. Each insecticide combination was applied 3 times in what would represent season long programs with these materials to control lygus bugs, spider mites and aphids in seed alfalfa.

Considering 8-10 lygus bugs per sweep as the recommended treatment level, the first applications of Monitor (6-11) at 0.5 and 1.0 lb AI/acre each controlled lygus bugs for 34 days. The second application (7-16) resulted in control for 20 days at the 1.0 lb AI/acre dosage and for 13 days at the 0.5 lb AI/A rate. The third application at 0.5 lb AI/acre controlled lygus for approximately 14 days, while the 1.0 lb rate resulted in control for 21 days.

In this experiment the first application of Carzol + Lorsban (6-11) at both the 1x and 2x rates controlled lygus bugs for 34 to 41 days with slightly better control resulting from the 2x rate which consisted of Carzol 1.5 lb AI/acre + Lorsban 1.0 lb AI/acre. The second application resulted in control for 20 days while the third application gave control for approximately 14 days. The differences in results with the two dosage rates would probably not justify the cost of the double dosage plus the possibility that the double rates would more seriously affect the pollinators and other beneficial species. From the standpoint of control there was little interest in the double dosage rates except that residue data from such treatments are needed to establish official tolerance levels for pesticides.

In the second experiment, Table 5, Pydrin and Pounce, two synthetic pyrethroid compounds, were each applied at the rate of 0.2 lb AI/acre + Comite 1.69 lb AI/acre. Initial applications of these materials (6-11) resulted in population reductions of approximately 98% and controlled lygus bugs for 34 days after application. There did not appear to be any significant difference between Pydrin and Pounce with respect to lygus bug

control. Subsequent applications (7-23) and (8-6) of Pydrin or Pounce in combination with Comite resulted in lygus bug control for about 13 days. Two other experimental synthetic pyrethroids, Cymbush (cypermethrin) and Mavrik (fluvalinate), were also evaluated for control of lygus bugs. Cymbush at 0.12 lb AI/acre in combination with Comite 1.69 lb AI/acre resulted in control of lygus bugs equivalent to that obtained with Pydrin or Pounce. Mavrick applied at 0.15 lb AI/acre was not as effective as the other pyrethroids. Initial reduction of the lygus population 6 days after application of Mavrik varied from approximately 30 to 65 per cent and within 13 days after treatment, populations equalled or exceeded pretreatment levels.

Aphids

Data on control of aphids were obtained for all materials evaluated for lygus bug control. In two of the lygus bug experiments, Tables 11 and 12, the variety of alfalfa involved was CW-8, highly resistant to the spotted alfalfa aphid. Thus although data are recorded, spotted alfalfa aphids were so few that little information was obtained concerning the effects of the insecticides on SAA populations in these trials. The insecticides Monitor and Carzol used in the experiment shown in Table 11, which was designed for insecticide residue studies, are not effective in controlling SAA.

Data for the experiments conducted to specifically evaluate aphicides are presented in Tables 13 and 14. The alfalfa varieties used in these experiments were CW-2 and Luna, both susceptible to the spotted alfalfa aphid.

Of the insecticides evaluated in the experiment shown in Table 13 those most effective in controlling the spotted alfalfa aphid were Pounce, Pydrin and combinations of Thiodan + Nudrin and Phosdrin + Nudrin. Percent population reductions over pretreatment counts 6 days after treatment were Pounce 99.1, Pydrin 98.2, Thiodan + Nudrin 98.1 and Phosdrin + Nudrin 95.5. Lorsban, the standard against which these materials were compared, resulted in population reductions 6 days after application of 37.3% and 68.3%. Thirteen days after application SAA populations had increased in the Lorsban plots to more than double those of the pretreatment levels. During this same period SAA populations increased in the other treatments but where Pounce had been applied SAA populations were still 98.5% below pretreatment levels. Populations in plots treated with Pydrin, Thiodan + Nudrin and Phosdrin + Nudrin were 86.4, 89.3 and 83.8 percent under pretreatment levels respectively.

At 20 days after application the SAA population in the Thiodan + Nudrin treatment was equal to the pretreatment level and the population in the Phosdrin + Nudrin treatment exceeded the pretreatment level. The SAA population at this time in the area treated with Pounce was still 93.4% below the pretreatment level. Twenty seven days after the application of Pounce the SAA population in this treatment was still 89.4% under the pretreatment level, however the experiment was terminated because SAA populations had increased in the other treatments and it was necessary to treat the field.

An experiment was conducted to obtain additional information on the effectiveness of Temik in controlling aphids, especially the SAA. Temik 15% granules were sidedressed on either side of the row with ground equipment on May 26 at the rate of 3.0 lb AI/acre. Irrigation water was applied on May 29. Other treatments in this experiment included foliar sprays of Lorsban 1.0 lb AI/acre and Thiodan 2.0 lb AI/acre, both applied on May 28 with a commercial ground sprayer at the rate of 40 gpa. Also included was a 5 acre untreated check plot. The populations were sampled with a D-vac suction machine taking 2-25 suck D-vac samples per treatment on each sampling date. The results are shown in Table 14.

Aphid populations were low in all treatments in this experiment until August 5 when populations of both the SAA and pea aphid began to increase. SAA populations were lower in the Temik treatment than in the check and other treatments until August 12 when populations began to increase. There did not appear to be any significant differences between the Temik and check after this date, although on September 2, 97 days after application, SAA populations in the check had increased to 34,863 per 50 D-vac samples compared with 4999 per 50 D-vac samples where Temik had been applied. However, it is doubtful if the population differences at this time were due to the treatments. Lorsban and Thiodan in this experiment did not appear to be highly effective in controlling the SAA even though populations were reduced under pretreatment levels since populations also declined in the untreated check. Lorsban and Thiodan plots were terminated on July 15 (48 days after the insecticides were applied). When compared with the untreated check Lorsban and Thiodan may have resulted in some control of the pea aphid although pea aphid populations were very low in the check area for approximately 5 weeks from June 17 through July 15.

Effect of Monitor on resistance of alfalfas to the spotted alfalfa aphid.

A special project was initiated by Mr. Curtis Powell, a graduate student in Entomology, to study the effects of Monitor on spotted alfalfa aphid populations in seed alfalfa varieties supposedly resistant to SAA. The results of this work will be the subject of a thesis for the Master of Science Degree and will be reported upon in detail at a later date by Mr. Powell. However, experiments have been conducted in the field and in the greenhouse and data obtained thus far have shown that SAA populations are higher and aphid survival is greater on resistant alfalfas treated with Monitor than on the same alfalfas that are untreated. The mechanisms of the observed effects of Monitor on resistance of the alfalfas to SAA are presently unknown and are the subject of continuing studies.

Spider Mites

No specific experiments were conducted in 1980 to evaluate acaricides but the effects of insecticide applications on spider mite populations were evaluated in all experiments. In two experiments, Tables 15 and 16, Comite was combined with most of the insecticides. The experiment shown in Table 15 was designed to obtain pesticide residue information and Comite was included to control spider mites as well as for residue analyses. The first application of Comite (6-11) did not appear to significantly reduce spider mite populations. The populations of mites and eggs remained rather stable for 34 to 40 days following the first treatment. Mite and egg populations following the second application (7-16) were significantly reduced and remained low for the remainder of the season. There did not appear to be any differences in control between the 1x (1.69 lb AI/A) and the 2x (3.38 lb AI/A) dosage rates of Comite.

It has been observed in past work that where synthetic pyrethroid compounds are applied, spider mite populations often develop more rapidly than in the absence of the pyrethroids. In the experiment shown in Table 16, the combinations of Comite at the standard rate (1.69 lb AI/acre) effectively prevented mite populations from increasing where Pydrin, Pounce and Cymbush were applied.

Mavrik, which was used alone did not control spider mites but populations did not reach damaging numbers during the period of the test which covered 26 days and included two applications.

Monitor in this experiment, also applied alone, resulted in mite population increases 20-27 days after application.

Spider mite populations were so low in the experiments shown in Tables 17 and 18 that few conclusions can be drawn regarding the effects of the materials on the mites. The field utilized in the experiment shown in Table 17 had received an early application of Comite by the grower which appeared to prevent any further development of mite populations. Spider mite populations remained low in the untreated check in the experiment shown in Table 18. Spider mite populations in this experiment were lowest in the plot treated with Temik. Spider mites were present but remained at a rather stable, low level in plots receiving treatments of Lorsban 1.0 lb AI/acre and Thiodan 2.0 lb AI/acre.

Effects of insecticides on beneficial insect species.

Data were obtained in all experiments on the effects of the various insecticides on the following group of predatory and parasitic organisms, Orius (minute pirate bugs) Geocoris, (big-eyed bugs), Nabis (damsel bugs), lacewings, syrphid flies, coccinellid beetles (lady beetles), collops beetles, parasitic wasps and spiders.

Populations of the predatory and parasitic species were moderately low in pretreatment samples taken in the various experiments, but in certain treatments some of the species survived initial insecticide applications and populations showed significant increases. Of the predatory insect species, the minute pirate bug, Orius was the most abundant, although Geocoris and Nabis were also numerous. Those insecticides that appeared to exert the least adverse effects on these three species were Carzol + Lorsban + Comite, Pydrin + Comite, Pounce + Comite, Cymbush + Comite, Mavrik, Temik, Lorsban and Thiodan. Parasitic wasps were most abundant in plots treated with Temik, Lorsban, Thiodan and Mavrik. Spider populations were highest in plots treated with Monitor, Temik, Lorsban and Thiodan. Lacewings were generally present in small numbers but were most abundant in plots treated with Monitor, Lorsban, and Thiodan. The results of these analyses are shown in Tables 19, 20, 21 and 22.

Stink Bug

Stink bug populations were measured on July 15 and July 21 in 5 alfalfa seed fields near Firebaugh, in 5 fields in the Five Points area and in 5 fields near San Joaquin. Thus a total of 15 fields were surveyed in 1980. The stink bug populations were sampled using the "beating pan" technique whereby 25 feet of row were examined in each field on each sampling date. The results are shown in Table 23. The populations were extremely low. No

consperse stink bugs were found. The Say stink bug was present in 6 fields but a total of only 43 of this species was found in the survey of which 42 were nymphs. Populations in the infested fields numbered 15,4,21,1,1 and 1 per 25 feet of row.

Seed samples were hand stirpped from 11 of the fields included in the stink bug survey. Four of the fields were harvested before samples could be taken. The results of this survey are shown in Table 24. The percentages of good seeds in these fields ranged from 85.3 to 96.6. The percentages of seeds with damage attributed to stink bug ranged from 0.0 to 0.4 and averaged 0.2 for the three areas.

The Alfalfa Seed Chalcid

A survey was conducted in the Firebaugh, Five Points and San Joaquin areas to evaluate alfalfa seed chalcid infestations. Samples of seed pods were hand stripped, before commercial harvest from 21 fields, 5 in the Firebaugh area, 6 from the Five Points area and 10 from near San Joaquin. Four two-quart samples of seed pods were taken from each field. The seeds were hand threshed and lightly cleaned with a Clipper seed cleaner. An average of approximately 2,800 seeds were examined from each field for seed chalcid damage. In addition, the seeds were examined for lygus bug and stink bug injury and for water damaged, green and shriveled seeds. The results are shown in Table 25. The quality of the seed was generally high, (92.9% good seed) and seed chalcid injury was generally low, but over all was higher than in recent years. The percentages of chalcid damaged seeds in individual fields ranged from 0.1 to 14.7. One field sustained 7.0% injury and three fields had over 3%, ranging from 3.3 to 3.9%. Overall, seed chalcid damage for the Firebaugh area averaged 2.0%, for Five Points 0.5% and for San Joaquin 3.3%. Seed chalcid damage for the 3 areas averaged 1.9%.

Seeds showing lygus bug injury ranged from 1.0 to 7.1% and averaged 3.6 for the 21 fields. The percentages of seeds showing damage attributed to stink bug feeding ranged from 0 to 0.4 and averaged 0.1.

Summary and Conclusions

Pest insect populations in seed alfalfa were generally low during 1980. Populations of the spotted alfalfa aphid appeared to be lower than in 1979 although SAA continued to appear in damaging numbers in fields planted to certain varieties that were reported to be resistant to SAA attack.

An evaluation was made of a world collection of 1050 alfalfa introductions in agronomy plantings on the Davis Campus for potential resistance to lygus bugs. Evaluations were based on the number of nymphs present in 4 subsamples, each comprising one foot of row, taken from single row plots 27 feet long. Five of the introductions had lygus nymph populations of from 0 to 2 nymphs for the 4 subsamples. Six introductions had nymph populations totalling 4 to 5 nymphs per 4 subsamples. These populations were in contrast to populations ranging from 24 to 37 nymphs per 4 subsamples for the commercial varieties, Vernal, Lahontan and CUF 101. These results are very preliminary, we are not certain that the observations indicate actual preference or resistance. These introductions and perhaps others will be further evaluated.

An experiment was conducted using caged and uncaged plots in which 3 dates of clipping and clipping accompanied with an insecticide application were compared with unclipped untreated and treated alfalfa for control of lygus bugs. The clipping and removal of plant material reduced lygus bug populations as did insecticide treatments. Populations in caged treatments remained low but by May 12 populations began to increase in the uncaged treatments and by May 27 there were no differences among the uncaged treatments due to dates of clipping and with and without application of insecticide. Thus there were no indications that the early clipping and spray applications provided any significant degree of protection after mid-May when lygus bug populations normally begin to increase in alfalfa seed fields.

Field plots were established to obtain data on insecticide residues that might be found at harvest on seed, chaff and straw, on alfalfa aprouts from treated seed,, and on green regrowth after harvest. Insecticides included in this study were Monitor, Carzol, Lorsban and Comite. Samples for the residue studies were frozen and are currently being held awaiting analytical procedures.

During 1980 4 separate experiments were conducted in which 12 insecticides and 11 insecticide acaricide combinations were evaluated for control of lygus bugs the spotted alfalfa aphid and the pea aphid. Data were obtained on the effects of some of the materials on spider mite populations but no specific acaricide trials were conducted. Those materials that resulted in the most effective control of lygus bugs were Monitor, Carzol + Lorsban, Pydrin, Pounce and Cymbush. Initial applications of these materials controlled lygus bugs for approximately 34 days. However, succeeding

applications of the pyrethroids, Pydrin, Pounce and Cymbush resulted in control for approximately 13 days. Monitor, and Carzol + Lorsban provided control in succeeding applications that varied from 14 to 20 days.

Of the insecticides evaluated specifically for aphid control those most effective in controlling the spotted alfalfa aphid were Pounce, Pydrin and combinations of Thiodan + Nudrin and Phosdrin + Nudrin. Of these, Pounce appeared to be the most effective, resulting in SAA control for 27 + days. Lorsban, the standard against which these materials were compared, resulted in population reductions of SAA that varied from 37 to 68% under pretreatment levels and within 13 days after application, populations were more than double those of the pretreatment levels.

Temik applied to the soil as granules at 3.0 lb AI/acre was difficult to assess for control of aphids. Populations of both pea aphid and SAA remained low in the untreated check as well as the Temik treatment for 69 days after treating. Thereafter, populations increased rapidly in both Temik and check plots although at 97 days after application, SAA populations were lower in the Temik treatment than in the untreated check. The reverse was true with the pea aphid.

A special project, to be the subject of a M.S. thesis, was initiated by Mr. Curtis Powell, a graduate student in Entomology, to study the effects of Monitor on populations of SAA on aphid resistant alfalfa varieties. Preliminary results of field and greenhouse experiments show that SAA populations are higher and aphid survival is greater on resistant alfalfas treated with Monitor than on the same alfalfas that are untreated. The mechanisms of the observed effects of Monitor on resistance of the alfalfas to SAA are presently unknown and are the subject of continuing studies.

Stink bug populations were measured in 15 west Fresno County seed fields. Stink bugs were found in only six fields. Populations were very low and consisted almost entirely of Say stink bug. Nymph populations ranged from 1 to 21 per 25 feet of row. Percentages of seeds with damage attributed to stink bugs averaged 0.2.

Damage by seed chalcid was assessed in 21 fields in west Fresno County. Seeds damaged by the seed chalcid were generally low but the amount of damage was higher than in recent years. The percentages of chalcid damaged seeds in individual fields ranged from 0.1 to 14.7. One field sustained 7.0% injury and three fields had damage ranging from 3.3 to 3.9%. Overall seed chalcid damage for the Firebaugh area averaged 2.0% for Five Points 0.5% and for San Joaquin 3.3. Seed chalcid damage for the 3 areas averaged 1.9%

Table 3 - Lygus bug populations in seed alfalfa plots treated by aircraft for lygus bug control. Firebaugh, California, 1980.

Treatment[1]			Number of lygus bugs per sweep[3]					
			Adults	Nymphs				Adults + Nymphs
Insecticides Dates	AI/Acre lb.	Days after treatment[2]		Small	Medium	Large	Total	
		Pre	0.5	0.5	0.3	0.0	0.8	1.3
		Pre	0.2	0.8	4.5	1.0	6.3	6.5
		Pre	0.4	0.7	2.9	2.8	6.4	6.8
Monitor + (6-11) Comite	1.00 + 1.69							
		6	0.2	0.0	0.0	0.0	0.0	0.2
		13	0.2	0.1	0.1	0.0	0.2	0.4
		20	0.1	0.2	0.7	0.1	1.0	1.1
		27	0.6	0.8	0.6	0.7	2.1	2.7
		34	0.6	1.0	1.3	1.5	3.8	4.4
Monitor + (7-16) Comite	1.00 + 1.69							
		6	0.2	0.1	0.0	0.1	0.2	0.4
		13	0.0	0.3	0.7	0.0	1.0	1.0
		20	1.0	1.3	1.7	1.4	4.4	5.4
		27	2.9	4.3	11.3	5.2	20.8	23.7
Monitor + (8-12) Comite	1.00 + 1.69							
		7	0.6	0.0	0.0	0.0	0.0	0.1
		14	1.2	2.3	1.7	0.0	4.0	5.2
		Pre	0.5	0.2	1.1	0.2	1.4	1.9
		Pre	0.2	2.0	3.5	1.0	6.5	6.7
		Pre	0.3	1.6	2.9	2.3	6.8	7.1
Monitor + (6-11) Comite	0.50 + 1.69							
		6	0.1	0.0	0.0	0.0	0.0	0.1
		13	0.3	0.1	0.1	0.0	0.2	0.5
		20	0.1	0.1	0.9	0.7	1.7	1.8
		27	1.2	0.7	0.5	0.5	1.7	2.9
		34	1.4	2.3	3.4	3.2	8.9	10.3
Monitor + (7-16) Comite	0.50 + 1.69							
		6	1.8	0.4	0.4	1.2	2.0	3.8
		13	0.6	1.8	2.6	1.8	6.2	6.8

Table 3 - (continued)

Treatment[1] Insecticides Dates	AI/Acre lb.	Days after treatment[2]	Number of lygus bugs per sweep[3] Adults	Nymphs				Adults + Nymphs
				Small	Medium	Large	Total	
Monitor + (7-29) + Comite	0.50 + 1.69							
		7	0.4	0.1	0.0	0.1	0.2	0.6
		14	1.4	1.4	4.7	0.4	6.5	7.9
		21	1.1	0.2	4.1	5.3	9.6	10.7
		28	2.0	21.5	17.6	10.0	49.1	51.1
		Pre	0.2	0.5	0.0	0.0	0.5	0.7
		Pre	0.3	0.6	1.8	0.3	2.7	3.0
		Pre	0.1	0.9	2.3	1.0	4.2	4.3
Carzol Lorsban (6-11) Comite	1.50 1.00 3.38							
		6	0.1	0.0	0.0	0.2	0.2	0.3
		13	0.1	0.0	0.0	0.1	0.1	0.2
		20	0.1	0.1	0.2	0.1	0.4	0.5
		27	0.7	0.3	0.5	0.3	1.1	1.8
		34	0.8	0.3	0.3	0.3	0.9	1.7
		41	1.7	0.8	1.5	1.7	4.0	5.7
Carzol Lorsban (7-23) Comite	0.75 1.00 3.38							
		6	0.2	0.0	0.1	0.2	0.3	0.5
		13	0.1	0.6	0.8	0.8	2.2	2.3
		20	2.7	1.2	4.2	1.7	7.1	9.8
Carzol Lorsban (8-12) Comite	1.50 1.00 3.38							
		7	1.5	0.0	0.3	1.0	1.3	2.8
		14	1.8	3.0	3.6	0.2	6.8	8.6
		Pre	0.3	0.4	0.9	0.0	1.3	1.6
		Pre	0.2	1.5	2.7	0.3	4.5	4.7
		Pre	0.4	1.0	2.4	1.0	4.4	4.8
Carzol Lorsban (6-11) Comite	0.75 0.50 1.69							
		6	1.0	0.0	0.1	0.2	0.3	0.4
		13	0.3	0.2	0.0	0.1	0.3	0.6
		20	0.1	0.1	0.6	0.7	1.2	2.3
		27	1.1	0.4	0.4	0.4	1.2	2.3
		34	1.3	1.0	0.9	1.2	3.1	4.4

Table 3 - (continued)

Treatment[1]			Number of lygus bugs per sweep[3]					
			Adults	Nymphs				Adults + Nymphs
Insecticides Dates	AI/Acre lb.	Days after treatment[2]		Small	Medium	Large	Total	
Carzol	0.75							
Lorsban (7-16)	0.50							
Comite	1.69							
		6	1.1	0.2	0.6	1.0	1.8	2.9
		13	0.2	0.5	1.3	1.3	3.1	3.3
		20	2.0	3.6	4.1	4.9	12.6	14.6
Carzol	0.75							
Lorsban (8-6)	0.50							
Comite	1.69							
		7	1.6	0.1	0.5	1.1	1.7	3.3
		14	1.6	1.5	6.7	1.3	9.5	11.1

[1] Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM on the dates indicated in parenthesis.

[2] Pretreatment counts were made on May 21, June 4 and June 10.

[3] Average of 20 sweeps (10-2 sweep samples) per treatment on each sampling date.

Table 4 - Lygus bug populations in seed alfalfa plots treated by aircraft for lygus bug, spider mite and aphid control. Firebaugh, California. 1980.

Treatment[1] Insecticides Dates	AI/Acre lb.	Days after treatment[2]	Number per 50 D-Vac Sample[3] Adults			Nymphal Instars						Adults + Nymphs
					Total	1	2	3	4	5	Total	
		Pre	1	0	1	13	13	8	6	5	45	46
		Pre	0	5	5	7	3	1	8	4	23	28
Monitor + (6-11) Comite	1.00 + 1.69											
		6	1	1	2	1	0	0	0	0	1	3
		13	0	0	0	5	2	1	3	1	12	12
		20	8	2	10	6	2	4	6	4	22	32
		27	10	5	15	17	10	5	3	3	38	53
		34	24	7	31	29	11	6	18	18	82	113
Monitor + (7-16) Comite	1.00 + 1.69											
		6	6	7	13	6	1	1	2	0	10	23
		13	12	16	28	18	29	20	3	1	71	99
		20	8	5	13	52	73	66	22	15	228	241
		27	23	11	34	26	68	70	46	38	248	282
Monitor + (8-12) Comite	1.00 + 1.69											
		7	1	2	3	0	0	0	1	0	1	4
		14	1	0	1	7	9	3	1	1	21	22
		Pre	4	2	6	12	14	2	13	6	47	53
		Pre	0	1	1	5	3	1	4	9	22	23
Monitor + (6-11) Comite	0.50 + 1.69											
		6	2	3	5	1	0	0	0	0	1	6
		13	0	0	0	1	0	0	0	0	1	1
		20	5	4	9	6	2	5	21	7	41	50
		27	6	3	9	18	19	13	12	3	65	74
		34	9	6	15	21	11	7	16	10	65	80
Monitor + (7-16) Comite	0.50 + 1.69											
		6	10	12	22	46	15	3	0	7	71	93
		13	20	11	31	64	43	41	8	13	169	200
Monitor + (7-29) Comite	0.50 + 1.69											
		7	4	2	6	17	7	0	2	2	28	34
		14	4	3	7	16	12	10	10	3	51	58
		21	9	1	10	14	5	6	10	19	54	64
		28	16	7	23	11	8	14	7	9	49	72

Table 4 - (continued)

Treatment[1] Insecticides Dates	AI/Acre lb.	Days after treatment[2]	Number per 50 D-Vac Sample[3] Adults			Nymphal Instars						Adults + Nymphs
					Total	1	2	3	4	5	Total	
		Pre	1	2	3	9	7	3	4	2	25	28
		Pre	2	2	4	4	4	4	4	1	17	21
Carzol	1.50											
Lorsban (6-11)	1.00											
Comite	3.38											
		6	0	0	0	0	0	0	0	1	1	1
		13	0	0	0	0	0	0	0	0	0	0
		20	0	0	0	1	0	1	1	4	7	7
		27	2	3	5	2	0	0	1	0	3	8
		34	5	8	13	8	8	5	5	3	29	44
		41	14	9	23	46	15	6	8	15	90	113
Carzol	0.75											
Lorsban (7-23)	1.00											
Comite	3.38											
		6	7	7	14	5	3	0	0	1	9	18
		13	3	1	4	1	4	1	4	2	12	16
		20	1	1	2	1	0	1	1	1	4	6
Carzol	1.50											
Lorsban (8-12)	1.00											
Comite	3.38											
		7	1	2	3	1	0	0	1	3	5	8
		14	3	1	4	4	15	8	2	1	30	34
		Pre	0	1	1	6	6	5	10	6	33	34
		Pre	2	1	3	5	3	3	3	1	15	18
Carzol	0.75											
Lorsban (6-11)	0.50											
Comite	1.69											
		6	0	1	1	0	0	0	1	0	1	2
		13	1	1	2	1	1	1	0	0	3	5
		20	3	4	7	5	1	3	4	5	18	25
		27	12	3	15	37	14	4	5	4	59	74
		34	17	12	29	35	19	9	12	26	101	130
Carzol	0.75											
Lorsban (7-16)	0.50											
Comite	1.69											
		6	11	9	20	35	10	3	3	7	58	78
		13	5	6	11	15	16	8	15	18	72	83
		20	20	15	35	11	33	32	27	37	140	175
Carzol	0.75											
Lorsban (8-6)	0.50											
Comite	1.69											
		6	9	3	12	4	0	1	1	3	9	21
		13	10	8	18	16	14	10	18	3	61	79
		20	6	4	10	16	16	12	7	10	61	71

Table 4 - (continued)

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1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder, while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM on the dates indicated in parenthesis.

2 Pretreatment counts were made June 4 and June 10.

3 2-25 suck D-Vac samples per treatment on each sampling date.

Table 5 - Lygus bug populations in seed alfalfa plots treated by aircraft for lygus bug and spider mite control. Firebaugh, California, 1980.

Treatment[1] Insecticides	Dates	AI/Acre lb.	Days after treatment[2]	Number of lygus bugs per sweep[3] Adults	Nymphs Small	Nymphs Medium	Nymphs Large	Nymphs Total	Adults + Nymphs
			Pre	0.2	0.3	0.0	0.0	0.3	0.5
			Pre	0.1	1.3	2.6	0.5	4.4	4.5
			Pre	0.5	1.0	2.2	1.6	4.8	5.3
Pydrin + Comite	(6-11)	0.20 + 1.69							
			6	0.0	0.0	0.0	0.0	0.0	0.0
			13	0.1	0.1	0.1	0.1	0.3	0.4
			20	0.2	0.2	0.9	0.7	1.8	2.0
			27	1.6	0.5	0.3	1.1	1.9	3.5
			34	1.3	0.9	0.6	0.5	2.0	3.3
			41	1.3	3.1	5.1	3.0	11.2	12.5
Pydrin + Comite	(7-23)	0.20 + 1.69							
			6	0.1	0.8	0.4	1.0	2.2	2.3
			13	0.7	4.3	5.9	6.0	16.2	16.9
Pydrin	(8-6)	0.20							
			6	0.8	0.5	1.4	3.5	5.4	6.2
			13	1.6	1.5	9.0	1.6	12.1	13.7
			20	0.9	1.8	13.6	13.6	29.0	29.9
			Pre	0.1	0.3	0.1	0.0	0.4	0.5
			Pre	0.2	1.3	2.5	0.5	4.3	4.5
			Pre	0.5	0.9	2.5	1.5	4.9	5.4
Pounce + Comite	(6-11)	0.20 + 1.69							
			6	0.0	0.0	0.1	0.0	0.1	0.1
			13	0.0	0.2	0.1	0.1	0.4	0.4
			20	0.1	0.1	0.9	0.8	1.8	1.9
			27	0.8	0.4	0.2	0.7	1.3	2.1
			34	1.1	0.4	0.5	0.6	1.5	2.6
			41	1.0	3.7	5.9	2.1	11.7	12.7
Pounce + Comite	(7-23)	0.20 + 1.69							
			6	0.1	0.1	0.2	0.1	0.4	0.5
			13	0.7	4.2	5.7	4.9	9.8	10.5
Pounce	(8-6)	0.20							
			6	1.3	0.4	1.3	3.8	5.5	6.8
			13	1.5	1.5	5.2	2.0	8.7	10.2
			20	0.9	1.8	13.6	13.6	29.0	29.9

Table 5 - (continued)

Treatment[1] Insecticides	Dates	AI/Acre lb.	Days after treatment[2]	Number of lygus bugs per sweep[3] Adults	Nymphs				Adults + Nymphs
					Small	Medium	Large	Total	
			Pre	0.3	0.8	0.1	0.0	0.9	1.2
			Pre	0.2	1.3	2.6	0.8	4.7	4.9
			Pre	0.3	1.0	2.3	1.5	4.8	5.1
Cymbush + Comite	(6-11)	0.12 + 1.69							
			6	0.0	0.0	0.0	0.1	0.1	0.1
			13	0.1	0.1	0.1	0.0	0.2	0.3
			20	0.1	0.1	0.3	0.4	0.8	0.9
			27	0.3	0.1	0.1	0.2	0.4	0.7
			34	0.8	0.3	0.3	0.6	1.2	2.0
			41	0.7	1.7	2.1	0.7	4.5	5.2
Cymbush + Comite	(7-23)	0.12 + 1.69							
			6	0.0	0.1	0.0	0.1	0.2	0.2
			13	0.3	2.4	4.0	3.9	10.3	10.6
			Pre	0.2	0.3	0.1	0.0	0.4	0.6
			Pre	0.4	1.2	2.0	0.9	4.1	4.5
			Pre	0.3	1.3	2.0	1.0	4.3	4.6
Mavrik	(6-11)	0.15							
			6	0.7	0.5	1.0	1.0	2.5	3.2
			13	2.5	2.0	1.0	2.0	5.0	7.5
Mavrik	(6-25)	0.15							
			6	0.6	0.5	0.5	1.0	2.0	2.6
			13	1.4	2.6	1.0	1.4	5.0	6.4
Carzol + Comite	(7-9)	0.75 + 1.69							
			6	0.9	0.2	0.5	0.7	1.4	2.3
			13	1.9	3.1	5.5	1.8	10.4	12.3
Carzol	(7-23)	0.75							
			6	0.2	0.5	0.7	0.7	1.9	2.1
			13	1.7	1.9	3.2	1.9	7.0	8.7

Table 5 (continued)

Treatment[1]			Number of lygus bugs per sweep[3]					
			Adults	Nymphs				Adults +
Insecticides Dates	AI/Acre lb.	Days after treatment[2]		Small	Medium	Large	Total	Nymphs
Monitor (6-3)	0.50	Pre	0.2	0.6	0.1	0.0	0.7	0.9
		1	0.1	0.1	0.2	0.1	0.4	0.5
		6	0.2	0.0	0.0	0.1	0.1	0.3
		13	0.2	0.8	0.8	0.0	1.6	1.8
		20	0.5	0.7	0.9	0.5	2.1	2.6
		27	1.0	3.5	1.8	1.5	6.8	7.8
Carzol + Comite (7-7)	0.75 + 1.69							
		1	0.4	0.8	0.5	0.5	1.8	2.2
		8	0.6	0.3	0.3	0.5	1.1	1.7
		15	1.7	3.5	4.6	1.0	9.1	10.8
Monitor (7-24)	0.50							
		5	1.2	0.4	0.0	0.6	1.0	2.2
		12	2.1	1.4	7.4	1.3	10.1	12.2

1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder, while the others were emulsifiable concentrates. Sprays were applied at 10 GPA Plots were treated before 5:00 AM on the dates indicated in parenthesis.

2 Pretreatment counts were made on May 28, June 4 and June 10.

3 Average of 20 sweeps (10-2 sweep samples) per treatment on each sampling date.

Table 6 - Lygus bug populations in seed alfalfa plots treated by aircraft for lygus bug and spider mite control. Firebaugh, California. 1980.

Treatment[1] Insecticides	Dates	AI/Acre lb.	Days after treatment[2]	Number per 50 D-Vac Sample[3] Adults			Nymphal Instars						Adults + Nymphs
						Total	1	2	3	4	5	Total	
			Pre	1	0	1	8	6	5	5	2	26	27
			Pre	1	0	1	0	1	0	1	1	3	4
Pydrin + Comite	(6-11)	0.20 + 1.69	6	0	0	0	1	0	0	0	0	1	1
			13	0	0	0	1	2	1	0	1	5	5
			20	10	0	10	6	1	3	17	15	42	52
			27	11	4	15	6	5	0	0	3	14	29
			34	20	8	28	14	8	3	6	1	32	60
			41	5	10	15	68	45	19	22	14	183	168
Pydrin + Comite	(7-23)	0.20 + 1.69	6	4	2	6	19	18	6	4	5	52	58
			13	11	5	16	9	12	15	19	28	83	99
Pydrin	(8-6)	0.20	6	0	1	1	0	0	0	0	5	5	6
			13	15	11	26	42	44	26	24	14	150	176
			20	11	5	16	29	20	15	49	65	178	194
			Pre	1	1	2	9	13	4	3	3	32	34
			Pre	1	0	1	1	6	1	12	8	27	29
Pounce + Comite	(6-11)	0.20 + 1.69	6	0	0	0	1	0	0	0	0	1	1
			13	0	0	0	7	2	1	0	0	10	10
			20	2	2	4	8	2	1	12	11	34	38
			27	6	3	9	1	2	1	0	2	6	15
			34	20	13	33	18	14	4	2	3	41	74
			41	11	11	22	57	31	22	17	23	150	172
Pounce + Comite	(7-23)	0.20 + 1.69	6	0	0	0	24	12	12	5	6	59	59
			13	6	4	10	1	9	14	7	4	35	45
Pounce	(8-6)	0.20	6	4	10	14	2	1	0	1	11	15	29
			13	14	9	23	13	12	8	8	3	44	69
			20	1	1	2	2	8	8	4	8	30	32

Table 6 - (continued)

Treatment[1] Insecticides	Dates	AI/Acre lb.	Days after treatment[2]	Number per 50 D-Vac Sample[3] Adults			Nymphal Instars						Adults + Nymphs
						Total	1	2	3	4	5	Total	
			Pre	0	1	1	4	12	6	9	3	34	35
			Pre	4	3	7	0	3	3	6	4	16	23
Cymbush + Comite	(6-11)	0.12 + 1.69											
			6	0	0	0	0	0	0	0	0	0	0
			13	0	0	0	0	0	0	0	1	1	1
			20	2	1	3	2	0	4	7	3	16	19
			27	1	0	1	13	7	0	0	1	21	22
			34	11	15	26	5	0	0	1	3	9	35
			41	8	12	20	26	15	20	6	4	71	91
Cymbush + Comite	(7-23)	0.12 + 1.69											
			6	0	0	0	3	0	0	1	0	4	4
			13	1	1	2	2	15	17	18	12	64	66
			Pre	0	0	0	14	18	7	8	4	51	51
			Pre	1	2	3	2	6	2	5	3	18	21
Mavrik	(6-11)	0.15											
			6	2	2	4	7	8	6	9	10	40	44
			13	9	5	14	13	6	5	5	7	36	50
Mavrik	(6-25)	0.15											
			6	10	7	17	23	10	14	11	8	66	83
			13	9	4	13	33	33	7	5	4	82	95
Carzol + Comite	(7-9)	0.75 + 1.69											
			6	11	6	17	6	2	9	16	10	43	60
			13	23	21	44	64	62	36	14	12	188	232
Carzol	(7-23)	0.75											
			6	7	3	10	11	2	3	1	9	26	36
			13	21	5	26	18	26	29	23	14	110	136

Table 6 - (continued)

Treatment[1] Insecticides Dates		AI/Acre lb.	Days after treatment[2]	Number per 50 D-Vac Sample[3] Adults			Nymphal Instars						Adults + Nymphs
						Total	1	2	3	4	5	Total	
			Pre	-	-	-	-	-	-	-	-	-	-
Monitor	(6-3)	0.50											
			1	0	2	2	3	5	3	7	3	21	23
			6	0	1	1	0	0	0	0	0	0	1
			13	0	3	3	6	7	0	0	1	13	16
			20	2	0	2	5	0	0	1	1	7	9
			27	8	13	21	24	20	8	13	7	72	87
Carzol + Comite	(7-7)	0.75 + 1.69											
			1	0	0	0	20	7	6	4	4	41	41
			8	8	8	16	10	0	2	2	8	22	38
			15	24	11	35	33	42	26	15	3	141	176
Monitor	(7-24)	0.50											
			5	10	5	15	13	6	0	2	9	30	45
			12	8	10	18	10	42	37	15	2	106	124

1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM on the dates indicated in parenthesis.

2 Pretreatment counts were made on June 4 and June 10.

3 2-25 suck D-Vac samples per treatment on each sampling date.

Table 7 - Lygus bug populations in seed alfalfa plots treated by aircraft for aphid control. Firebaugh, California, 1980.

Treatment[1]			Number of lygus bugs per sweep[3]					
			Adults	Nymphs				Adults + Nymphs
Insecticides Dates	AI/Acre lb.	Days after treatment[2]		Small	Medium	Large	Total	
Lorsban (8-11)	0.50	Pre	0.1	0.2	1.4	0.1	1.7	1.8
		1	0.1	0.0	0.1	0.1	0.2	0.3
		8	0.0	0.0	0.0	0.0	0.0	0.0
Pydrin (8-6)	0.20	Pre	0.3	0.5	1.2	0.1	1.8	2.1
		6	0.0	0.0	0.0	0.1	0.1	0.1
		13	0.2	0.0	0.2	0.3	0.5	0.7
Lorsban (8-6)	0.50	Pre	0.4	1.0	1.8	0.1	2.9	3.3
		6	0.2	0.0	0.0	0.3	0.3	0.5
		13	0.2	0.0	0.0	0.0	0.0	0.2
Thiodan (8-6) Phosdrin	1.00 0.25	Pre	0.4	1.0	2.2	0.4	3.6	4.0
		6	0.2	0.0	0.0	0.3	0.3	0.3
		13	0.3	0.0	0.0	0.1	0.1	0.4
Thiodan (8-6) Nudrin	1.00 0.50	Pre	0.6	1.0	2.9	0.1	4.0	4.6
		6	0.0	0.0	0.1	0.1	0.2	0.2
		13	0.1	0.0	0.0	0.0	0.0	0.1
		20	0.0	0.3	0.4	0.5	1.2	1.2
Nudrin (8-6) Phosdrin	0.50 0.25	Pre	0.4	0.7	4.4	0.4	5.5	5.9
		6	0.0	0.0	0.1	0.3	0.4	0.4
		13	0.5	0.0	0.1	0.0	0.1	0.6
		20	0.0	0.1	0.4	0.5	1.0	1.0

Table 7 (continued)

Treatment[1]			Number of lygus bugs per sweep[3]					
			Adults	Nymphs				Adults + Nymphs
Insecticides Dates	AI/Acre lb.	Days after treatment[2]		Small	Medium	Large	Total	
Pounce (8-6)	0.20	Pre	0.3	0.1	3.0	0.1	3.2	3.5
		6	0.0	0.0	0.0	0.0	0.0	0.0
		13	0.0	0.0	0.0	0.1	0.1	0.1
		20	0.1	0.0	0.1	0.1	0.2	0.3

1 Plot size: Each treatment 5 acres (165'x1320'). All insecticides were emulsifiable concentrates and applied at 10 GPA. Plots were treated prior to 5:00 AM.

2 Pretreatment counts were made August 5.

3 Average of 20 sweeps (10-2 sweep samples) per treatment on each sampling date.

Table 8 - Lygus bug populations in seed alfalfa plots treated by aircraft for aphid control. Firebaugh, California. 1980.

Treatment[1] Insecticides Dates	AI/Acre lb.	Days after treatment[2]	Number per 50 D-Vac Sample[3] Adults			Nymphal Instars						Adults + Nymphs
					Total	1	2	3	4	5	Total	
Lorsban (8-11)	0.50	Pre	3	4	7	5	12	4	5	0	26	33
		1	0	0	0	1	0	0	0	0	1	1
		8	0	0	0	0	0	0	0	0	0	0
Pydrin (8-6)	0.20	Pre	2	6	8	1	6	12	0	0	19	27
		6	0	0	0	0	0	0	0	0	0	0
		13	1	2	3	5	2	2	1	1	11	14
Lorsban (8-6)	0.50	Pre	2	3	5	3	10	5	3	0	21	26
		6	0	1	1	2	2	0	0	1	5	6
		13	2	4	6	3	1	0	0	0	4	10
Thiodan + Phosdrin (8-6)	1.00 + 0.25	Pre	7	1	8	4	12	7	3	0	26	34
		6	1	0	1	0	1	0	0	0	1	2
		13	3	1	4	0	2	0	0	0	2	6
Thiodan + Nudrin (8-6)	1.00 + 0.50	Pre	6	2	8	6	17	9	9	1	42	50
		6	0	0	0	0	0	0	0	0	0	0
		13	3	1	4	4	6	1	0	0	11	15
		20	0	0	0	0	0	7	9	4	20	20
Nudrin + Phosdrin (8-6)	0.50 + 0.25	Pre	17	2	19	5	30	27	11	1	74	93
		6	0	0	0	0	2	0	0	5	7	7
		13	5	2	7	7	3	0	1	0	11	18
		20	0	0	0	0	0	1	18	1	20	20

Table 8 (continued)

Treatment[1]				Number per 50 D-Vac Sample[3]								
				Adults			Nymphal Instars						Adults +
Insecticides	Dates	AI/Acre lb.	Days after treatment[2]			Total	1	2	3	4	5	Total	Nymphs
Pounce	(8-6)	0.20	Pre	1	1	2	1	1	2	3	0	7	9
			6	0	0	0	0	0	0	0	0	0	0
			13	0	1	1	1	2	0	0	0	3	4
			20	0	0	0	0	0	0	0	0	0	0
			27	0	1	1	0	0	0	0	0	0	1

1 Plot size: Each treatment 5 acres (165x1320'). All insecticides were emulsifiable concentrates and applied at 10 GPA. Plots were treated prior to 5:00 AM.

2 Pretreatment counts were made August 5.

3 2-25 suck D-vac samples per treatment on each sampling date.

Table 9 - Lygus bug populations in seed alfalfa plots treated by ground application equipment for aphid control. Firebaugh, California, 1980.

Treatment[1]			Number of lygus bugs per sweep[2]					
			Adults	Nymphs				Adults + Nymphs
Insecticides Dates	AI/Acre lb.	Days after treatment[2]		Small	Medium	Large	Total	
		Pre	-	-	-	-	-	-
Temik (5-26) Irrigated (5-29)	3.0							
		7	0.3	0.4	1.2	0.6	2.2	2.5
		13	0.1	0.1	0.3	0.7	1.1	1.2
		20	0.4	0.1	0.0	0.1	0.2	0.6
		27	0.3	0.1	0.0	0.1	0.2	0.5
		34	0.1	0.1	0.1	0.0	0.2	0.3
		41	0.2	0.1	0.0	0.4	0.5	0.7
		48	0.5	0.4	0.3	0.6	1.3	1.8
		55	0.5	0.4	0.6	0.2	1.2	1.7
		62	1.6	3.2	3.0	0.4	6.6	8.2
		Pre	-	-	-	-	-	-
Lorsban (5-28)	1.0							
		7	0.1	0.0	0.0	0.1	0.1	0.2
		13	0.1	0.5	0.2	0.1	0.8	0.9
		20	0.3	0.9	0.8	0.2	1.9	2.2
		27	0.7	0.1	1.0	2.0	3.1	3.8
		34	2.7	2.3	0.8	0.1	3.2	5.9
		41	1.5	2.8	2.0	1.6	6.4	7.9
		48	1.3	1.8	1.0	1.5	4.3	5.6
		Pre	-	-	-	-	-	-
Thiodan (5-28)	2.0							
		17	0.1	0.2	0.2	0.2	0.6	0.7
		13	0.7	0.4	0.5	0.4	1.3	2.0
		20	0.6	0.8	1.2	0.3	2.3	2.9
		27	0.2	0.2	0.6	0.7	1.5	1.7
		34	1.5	1.9	0.6	0.2	2.7	4.2
		41	1.0	1.7	1.5	1.2	4.4	5.4
		48	0.9	1.2	1.0	1.5	3.7	4.6
		Pre	-	-	-	-	-	-
Check								
		7	0.3	1.5	4.0	0.6	6.1	6.4
		13	0.8	2.1	2.4	1.8	6.3	7.1
		20	0.9	1.0	2.0	1.0	4.0	4.9
		27	1.6	1.0	1.5	1.3	3.8	5.4
		34	1.4	3.1	0.8	0.6	4.5	5.9
		41	2.3	3.0	3.0	2.0	8.0	10.3
		48	1.4	3.1	2.2	2.2	7.5	8.9
Carzol (7-19)	0.75							
		3	1.8	1.1	1.4	1.0	3.5	5.3
		10	0.3	2.4	2.5	0.4	5.3	5.6

Table 9 (continued)

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1 Plot size: Each treatment 5 acres (165'x1320'). Temik was applied on 5-26 with a commercial granular applicator. The field was irrigated on 5-29. Thiodan and Lorsban were emulsifiable concentrates. Sprays were applied at 40 GPA on the dates indicated in parenthesis by commercial ground sprayer.

2 Average of 20 sweeps (10-2 sweep samples) per treatment on each sampling date.

Table 10 - Lygus bug populations in seed alfalfa plots treated for aphid control. Firebaugh, California. 1980.

Treatment[1]			Number per 50 D-Vac Sample[3]									
			Adults			Nymphal Instars						Adults +
Insecticides Dates	AI/Acre lb.	Days after treatment[2]			Total	1	2	3	4	5	Total	Nymphs
		Pre	3	0	3	4	2	3	2	0	11	14
Temik (5-26) Irrigated (5-29)	3.0	7	0	0	0	6	3	2	5	3	19	19
		13	2	2	4	0	1	1	1	3	6	10
		20	5	1	6	0	0	0	0	0	0	6
		27	0	1	1	0	0	0	0	0	0	1
		34	3	3	6	2	3	1	2	0	8	4
		41	3	1	4	5	5	3	2	2	17	21
		48	5	6	11	10	5	1	5	1	22	33
		55	2	6	8	0	6	2	1	3	12	20
		62	15	9	24	9	9	2	8	4	32	56
		69	17	12	29	18	15	4	7	4	48	77
		76	9	13	22	44	22	39	39	26	160	182
		83	18	17	35	71	40	25	10	37	183	218
		90	6	8	14	7	9	20	26	52	114	128
		97	93	61	154	6	10	11	29	119	175	329
		Pre	2	4	6	20	17	7	3	5	52	58
Lorsban (5-28)	1.0	7	0	1	1	1	1	0	0	0	2	3
		13	1	3	4	6	3	0	0	0	9	13
		20	4	4	8	0	3	10	12	3	28	36
		27	4	0	4	0	2	0	0	2	4	8
		34	19	8	27	17	11	5	5	1	39	66
		41	9	11	20	21	14	7	5	6	53	73
		48	13	5	18	32	27	23	18	13	113	131
		Pre	2	0	2	6	2	1	3	3	15	17
Thiodan (5-28)	2.0	7	4	0	4	1	0	0	1	1	3	7
		13	1	1	2	10	3	0	0	3	16	18
		20	3	3	6	1	1	4	6	4	16	22
		27	0	2	2	4	4	2	0	0	10	12
		34	21	4	25	9	10	4	4	2	29	54
		41	9	9	18	16	16	10	13	9	64	82
		48	4	6	10	31	24	15	11	10	91	101

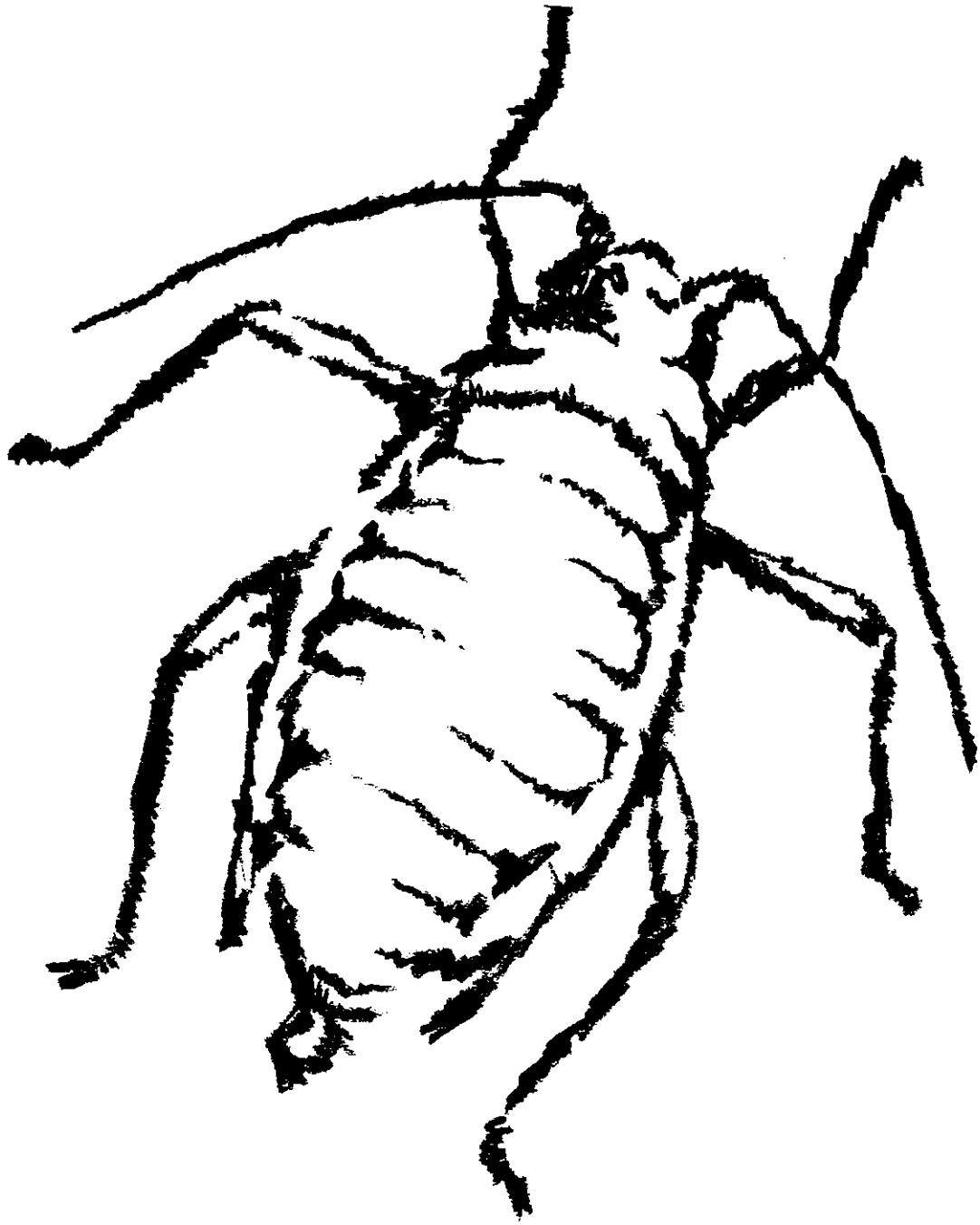
Table 10 - (continued)

Treatment[1] Insecticides Dates	AI/Acre lb.	Days after treatment[2]	Number per 50 D-Vac Sample[3] Adults			Nymphal Instars						Adults + Nymphs
					Total	1	2	3	4	5	Total	
		Pre	2	2	4	17	1	2	2	0	22	26
Check												
		7	4	2	6	22	5	8	9	2	46	52
		13	5	5	10	29	24	22	22	4	101	111
		20	8	8	16	1	5	5	11	11	33	49
		27	2	0	2	0	2	0	0	0	2	4
		34	28	17	45	12	14	6	3	3	38	83
		41	13	2	15	46	28	17	13	15	120	135
		48	32	13	45	41	34	26	44	41	186	231
Carzol	(7-19)	0.75										
		3	17	16	33	15	16	16	12	11	80	113
		10	39	18	57	26	15	13	32	21	107	164
		17	33	9	42	46	42	18	25	34	165	207
		24	22	7	29	2	1	1	3	9	16	45
		31	11	4	15	23	17	10	5	7	62	77
		38	7	8	15	5	29	52	51	21	158	173
		45	32	25	57	14	10	7	15	47	93	150

1 Plot size: Each treatment 5 acres (165'x1320'). Temik 15G was side dressed with a commercial applicator. Thiodan and Lorsban were applied at 40 GPA with a commercial ground sprayer. Carzol a 92% soluble powder was applied by aircraft at 10 GPA.

2 Pretreatment counts were made on May 27.

3 2-25 suck D-Vac samples per treatment on each sampling date.



APHIDS

Table 11 - Aphid populations in seed alfalfa plots treated by aircraft for lygus bug control. Firebaugh, California, 1980.

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per 50 D-Vac samples[3] Spotted alfalfa aphid[4]	Pea aphid
			Pre	0.0	4.0
			Pre	0.0	2.0
Monitor	1.00				
+	+	June 11			
Comite	1.69				
			6	1.0	0.0
			13	0.0	0.0
			20	0.0	12.0
			27	3.0	58.0
			34	0.0	93.0
Monitor	1.00				
+		July 16			
Comite	1.69				
			6	0.0	7.0
			13	0.0	0.0
			20	1.0	20.0
			27	6.0	66.0
Monitor	1.00				
+	+	August 12			
Comite	1.69				
			7	4.0	0.0
			14	5.0	2.0
			Pre	0.0	4.0
			Pre	0.0	0.0
Monitor	0.50				
+	+	June 11			
Comite	1.69				
			6	0.0	1.0
			13	1.0	2.0
			20	0.0	9.0
			27	1.0	82.0
			34	0.0	75.0
Monitor	0.50				
+	+	July 16			
Comite	1.69				
			6	0.0	20.0
			13	0.0	0.0
Monitor	0.50				
+	+	July 29			
Comite	1.69				
			7	0.0	0.0
			14	13.0	5.0
			21	1.0	7.0
			28	2.0	20.0

Table 11 - (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per 50 D-Vac samples[3] Spotted alfalfa aphid[4]	Pea aphid
			Pre	14.0	13.0
			Pre	0.0	6.0
Carzol	1.50				
Lorsban	1.00	June 11			
Comite	3.38				
			6	0.0	0.0
			13	0.0	1.0
			20	0.0	1.0
			27	0.0	8.0
			34	0.0	28.0
			41	0.0	9.0
Carzol	0.75				
Lorsban	1.00	July 23			
Comite	3.38				
			6	0.0	0.0
			13	0.0	0.0
			20	8.0	0.0
Carzol	1.50				
Lorsban	1.00	August 12			
Comite	3.38				
			7	2.0	0.0
			14	2.0	0.0
			Pre	0.0	11.0
			Pre	0.0	2.3
Carzol	0.75				
Lorsban	0.50	June 11			
Comite	1.69				
			6	0.0	0.0
			13	1.0	0.0
			20	0.0	1.0
			27	0.0	8.0
			34	3.0	27.0
Carzol	0.75				
Lorsban	0.50	July 16			
Comite	1.69				
			6	0.0	5.0
			13	0.0	0.0
			20	1.0	0.0
Carzol	0.75				
Lorsban	0.50	August 8			
Comite	1.69				
			6	18.0	2.0
			13	4.0	0.0
			20	3.0	0.0

TABLE 11 - (Cont.)

1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM.

2 Pretreatment counts were made June 4 and June 10.

3 2-25 suck D-Vac samples per treatment on each sampling date.

4 Alfalfa variety CW-8 resistant to spotted alfalfa aphid.

Table 12 - Aphid populations in seed alfalfa plots treated by aircraft for lygus bug and spider mite control. Firebaugh, California, 1980.

Treatment[1]				Number per 50 D-Vac samples[3]	
Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Spotted alfalfa aphid[4]	Pea aphid
			Pre	0.0	9.0
			Pre	2.0	2.0
Pydrin + Comite	0.20 + 1.69	June 11			
			6	0.0	0.0
			13	0.0	0.0
			20	0.0	0.0
			27	0.0	1.0
			34	0.0	3.0
			41	0.0	7.0
Pydrin + Comite	0.20 + 1.69	July 23			
			6	0.0	0.0
			13	0.0	0.0
Pydrin	0.20	Aug. 6			
			6	22.0	1.0
			13	0.0	0.0
			20	0.0	0.0
			Pre	0.0	10.0
			Pre	2.0	4.0
Pounce + Comite	0.20 + 1.69	June 11			
			6	0.0	0.0
			13	2.0	0.0
			20	0.0	0.0
			27	0.0	3.0
			34	0.0	3.0
			41	0.0	14.0
Pounce + Comite	0.20 + 1.69	July 23			
			6	12.0	0.0
			13	0.0	0.0
Pounce	0.20	Aug. 6			
			6	6.0	0.0
			13	5.0	0.0
			20	4.0	0.0

Table 12 - (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per 50 D-Vac samples[3] Spotted alfalfa aphid[4]	Pea aphid
			Pre	0.0	2.0
			Pre	0.0	8.0
Cymbush + Comite	0.12 + 1.69	June 11			
			6	0.0	1.0
			13	0.0	1.0
			20	0.0	3.0
			27	0.0	5.0
			34	0.0	14.0
			41	0.0	31.0
Cymbush + Comite	0.12 + 1.69	July 23			
			6	0.0	2.4
			13	0.0	1.3
			Pre	1.0	5.0
			Pre	0.0	3.0
Mavrik	0.15	June 11			
			6	0.0	0.0
			13	0.0	0.0
Mavrik	0.15	June 25			
			6	0.0	0.0
			13	0.0	1.0
Carzol + Comite	0.75 + 1.69	July 9			
			6	0.0	7.0
			13	0.0	14.0
Carzol	0.75	Aug. 23			
			6	1.0	1.0
			13	0.0	3.0

Table 12 - (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per 50 D-Vac samples[3] Spotted alfalfa aphid[4]	Pea aphid
Monitor	0.50	June 3			
			1	2.0	1.0
			6	0.0	0.0
			13	1.0	1.0
			20	0.0	0.0
			27	1.0	6.0
Carzol + Comite	0.75 + 1.69	July 7			
			1	0.0	14.0
			8	2.0	30.0
			15	0.0	58.0
Monitor	0.50	July 24			
			5	1.0	2.0
			12	0.0	0.0

1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder, while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM on the dates indicated.

2 Pretreatment counts were made on June 4 and 10.

3 2-25 suck D-Vac samples per treatment on each sampling date.

4 Alfalfa variety CW-8 resistant to spotted alfalfa aphid.

Table 13 - Aphid populations in seed alfalfa plots treated by aircraft for aphid control. Firebaugh, California. 1980

Treatment[1]				Number per 50 D-vac samples[3]	
Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Spotted alfalfa aphid[4]	Pea aphid
Lorsban	0.50	August 11	Pre	6,178	0.0
			1	3,872	1.0
			8	31,836	0.0
Pydrin	0.20	August 6	Pre	44,968	0.0
			6	766	1.0
			13	6,096	0.0
Lorsban	0.50	August 6	Pre	100,876	0.0
			6	31,952	0.0
			13	218,496	0.0
Thiodan Phosdrin	1.00 0.25	August 6	Pre	30,284	0.0
			6	6,126	1.0
			13	97,256	0.0
Thiodan Nudrin	1.00 0.50	August 6	Pre	38,584	27
			6	699	0.0
			13	4,128	0.0
			20	38,205	0.0
Nudrin Phosdrin	0.50 0.25	August 6	Pre	30,284	5.0
			6	1,374	0.0
			13	4,899	0.0
			20	51,655	0.0
Pounce	0.20	August 6	Pre	6,394	0.0
			6	52	0.0
			13	95	0.0
			20	425	0.0
			27	675	2.0

Table 13 (continued)

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1 Plot size: Each treatment 5 acres (165'x1320). All insecticides were emulsifiable concentrates and applied at 10 GPA. Plots were treated prior to 5:00 AM.

2 Pretreatment counts were made on August 5.

3 2-25 suck D-vac samples per treatment on each sampling date.

4 Alfalfa variety CW-2 susceptible to spotted alfalfa aphid.

Table 14 - Aphid populations in seed alfalfa plots treated for aphid control. Firebaugh, California. 1980

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per 50 D-vac samples[3] Spotted alfalfa aphid[4]	Pea aphid
Temik 15G Irrigated	3.0	May 26 May 29	Pre	165	33
			7	107	3
			13	7	3
			20	0	1
			27	0	1
			34	4	0
			41	1	1
			48	1	1
			55	2	1
			62	2	2
			69	53	23
			76	427	41
			83	1403	123
			90	1219	655
			97	4999	1090
Lorsban	1.0	May 28	Pre	157	45
			7	63	2
			13	25	1
			20	25	4
			27	6	2
			34	1	1
			41	23	1
			48	7	0
Thiodan	2.0	May 28	Pre	226	42
			7	31	2
			13	39	8
			20	13	6
			27	4	0
			34	20	1
			41	41	1
			48	12	1

Table 14 (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per 50 D-vac samples: Spotted alfalfa aphid	Number per 50 D-vac samples: Pea aphid
			Pre	75	71
Check	-	-			
			7	94	81
			13	91	48
			20	22	7
			27	16	0
			34	12	4
			41	35	3
			48	7	4
Carzol	0.75	July 19			
			3	8	41
			10	8	38
			17	111	66
			24	375	119
			31	1392	468
			38	609	196
			45	34863	684

1 Plot size: Each treatment 5 acres (165'x1320'). Temik 15G was side dressed with a commercial applicator. Thiodan and Lorsban were applied at 40 GPA with a commercial ground sprayer. Carzol a 92% soluble powder was applied by aircraft at 10 GPA.

2 Pretreatment counts were made on May 27.

3 2-25 suck D-vac samples per treatment on each sampling date.

4 Alfalfa variety Luna susceptible to spotted alfalfa aphid.

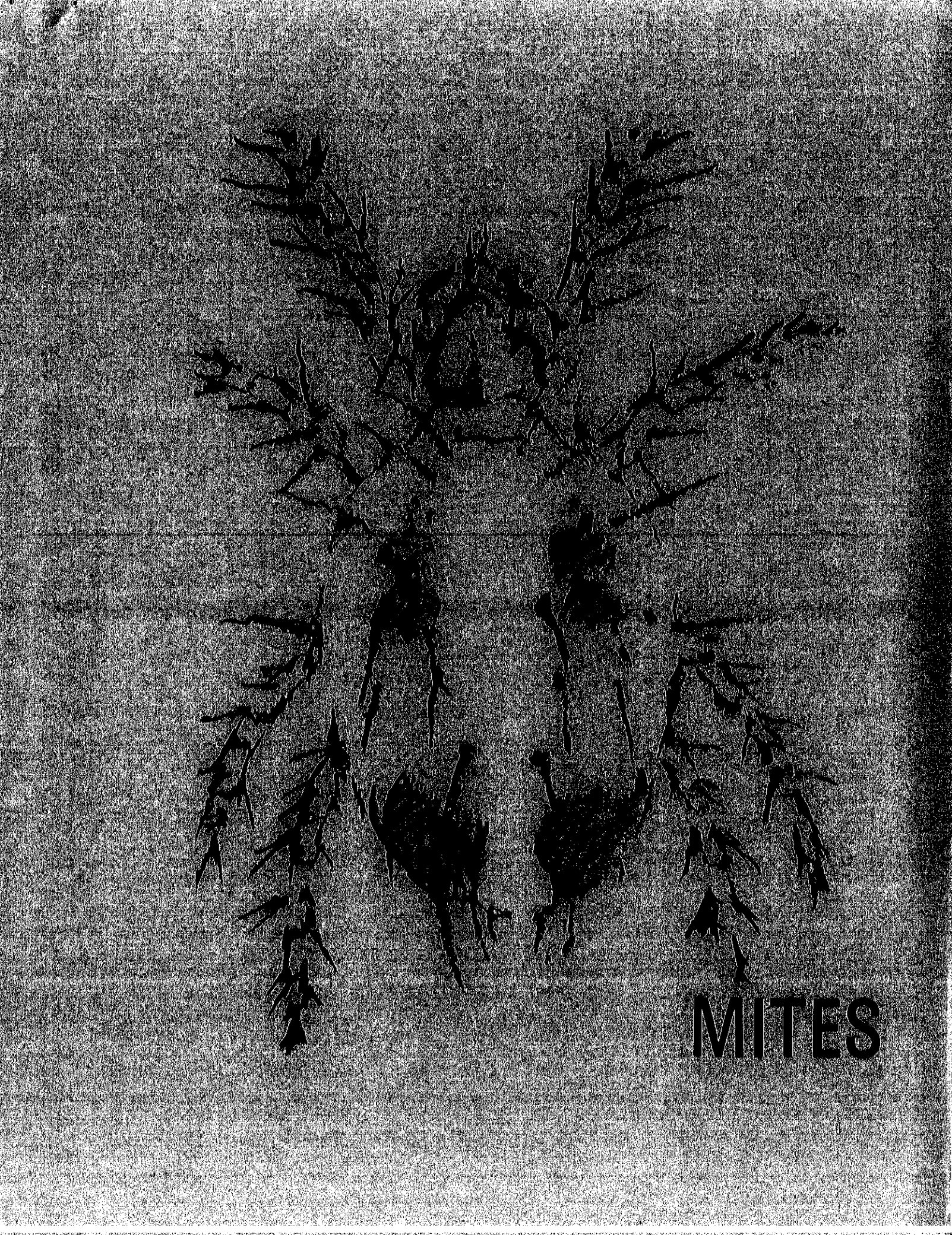
MITES

Table 15 - Spider mite populations in seed alfalfa plots treated by aircraft for lygus bug control. Firebaugh, California, 1980.

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per leaf[3] Mites	Eggs
			Pre	3.2	13.2
			Pre	2.2	19.7
Monitor + Comite	1.00 + 1.69	June 11			
			6	3.7	9.6
			13	4.8	8.0
			20	6.4	13.1
			27	8.6	9.2
			34	7.0	14.2
Monitor + Comite	1.00 + 1.69	July 16			
			6	1.2	1.5
			13	0.2	0.0
			20	0.1	0.1
			27	0.4	0.9
Monitor + Comite	1.00 + 1.69	August 12			
			7	0.7	0.6
			14	0.0	0.0
			Pre	1.1	12.3
			Pre	2.3	15.8
Monitor + Comite	0.50 + 1.69	June 11			
			6	5.2	17.2
			13	6.6	7.1
			20	3.0	6.6
			27	2.0	4.1
			34	6.7	12.1
Monitor + Comite	0.50 + 1.69	July 16			
			6	3.9	3.3
			13	0.0	0.2
Monitor + Comite	0.50 + 1.69	July 29			
			7	0.2	0.4
			14	0.0	0.0
			21	0.1	0.6
			28	0.0	0.0

Table 15 - (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per leaf[3] Mites	Eggs
			Pre	0.8	10.6
			Pre	1.7	14.8
Carzol	1.50				
Lorsban	1.00	June 11			
Comite	3.38				
			6	5.4	18.5
			13	5.4	6.6
			20	3.1	6.9
			27	4.2	4.7
			34	5.4	8.2
			41	3.3	7.1
Carzol	0.75				
Lorsban	1.00	July 23			
Comite	3.38				
			6	0.2	0.1
			13	0.1	0.2
			20	0.2	0.2
Carzol	1.50				
Lorsban	1.00	August 12			
Comite	3.38				
			7	0.0	0.1
			14	0.1	0.1
			Pre	0.8	10.6
			Pre	2.3	20.4
Carzol	0.75				
Lorsban	0.50	June 11			
Comite	1.69				
			6	4.7	9.1
			13	7.4	12.3
			20	5.4	3.9
			27	6.0	4.7
			34	5.6	7.0
Carzol	0.75				
Lorsban	0.50	July 16			
Comite	1.69				
			6	2.2	8.5
			13	0.5	0.1
			20	0.2	0.4
Carzol	0.75				
Lorsban	0.50	August 6			
Comite	1.69				
			6	1.0	0.2
			13	0.4	0.3
			20	0.2	0.5

Table 15 (Cont.)

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1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM.

2 Pretreatment counts were made on June 4 and June 10.

3 50 trifoliate leaves showing mite damage were examined from each treatment on each sampling date.

Table 16- Spider mite populations in seed alfalfa plots treated by aircraft for lygus and spider mite control. Firebaugh, California, 1980.

Treatment[1]				Number per leaf[3]	
Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Mites	Eggs
			Pre	1.8	16.3
			Pre	3.2	20.6
Pydrin	0.20				
+	+	June 6			
Comite	1.69				
			6	12.0	15.6
			13	3.8	5.8
			20	5.6	5.7
			27	2.9	3.0
			34	2.7	6.6
			41	4.8	10.7
Pydrin	0.20				
+	+	July 23			
Comite	1.69				
			6	0.4	0.4
			13	0.0	0.2
Pydrin	0.20	August 6			
			6	0.1	0.1
			13	0.2	0.2
			20	0.3	3.6
			Pre	0.6	10.9
			Pre	2.3	22.1
Pounce	0.20				
+	+	June 11			
Comite	1.69				
			6	6.0	15.2
			13	4.7	4.9
			20	4.8	6.6
			27	4.6	2.8
			34	5.0	8.8
			41	5.9	10.4
Pounce	0.20				
+	+	July 23			
Comite	1.69				
			6	0.7	0.2
			13	0.1	0.1
Pounce	0.20	August 6			
			6	0.1	0.1
			13	0.8	0.2
			20	3.5	18.9

Table 16 - (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per leaf[3] Mites	Eggs
			Pre	1.3	18.0
			Pre	6.7	23.6
Cymbush + Comite	0.12 + 1.69	June 11			
			6	5.3	17.6
			13	6.9	8.8
			20	7.9	6.8
			27	2.7	2.2
			34	6.3	8.0
			41	6.7	15.0
Cymbush + Comite	0.12 + 1.69	July 23			
			6	2.4	2.0
			13	1.3	1.3
			Pre	0.7	9.5
			Pre	9.6	23.8
Mavrik	0.15	June 11			
			6	7.1	12.5
			13	11.8	17.2
Mavrik	0.15	June 25			
			6	14.2	7.3
			13	8.5	4.2
Carzol + Comite	0.75 + 1.69	July 9			
			6	3.3	7.1
			13	2.2	2.9
Carzol	0.75	July 23			
			6	1.2	1.5
			13	1.6	1.9

Table 16 - (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per leaf[3] Mites	Eggs
			Pre	-	-
Monitor	0.50	June 3			
			1	9.1	20.8
			6	6.2	14.4
			13	6.5	23.5
			20	13.4	18.0
			27	20.1	18.1
Carzol	0.75				
+	+	July 7			
Comite	1.69				
			1	4.1	6.2
			8	1.6	2.0
			15	1.2	4.1
Monitor	0.50	July 24			
			5	1.6	2.3
			12	3.4	7.3

1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder, while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM.

2 Pretreatment counts were made on June 4 and June 10.

3 50 trifoliate leaves showing mite damage were examined from each treatment on each sampling date.

Table 17- Spider mite populations in seed alfalfa plots treated by aircraft for aphid control. Firebaugh, California, 1980.

Treatment[1]				Number per leaf[3]	
Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Mites	Eggs
Lorsban	0.50	August 11	Pre	0.0	0.0
			1	0.1	0.0
			8	0.1	0.1
Pydrin	0.20	August 6	Pre	0.0	0.1
			6	0.1	0.0
			13	0.1	0.1
Lorsban	0.50	August 6	Pre	0.0	0.1
			6	0.0	0.0
			13	0.1	0.2
Thiodan + Phosdrin	1.00 + 0.25	August 6	Pre	0.0	0.0
			6	0.1	0.0
			13	0.1	0.1
Thiodan + Nudrin	1.00 + 0.50	August 6	Pre	0.0	0.0
			6	0.0	0.0
			13	0.0	0.1
			20	0.0	0.0
Nudrin + Phosdrin	0.50 + 0.25	August 6	Pre	0.2	0.1
			6	0.0	0.0
			13	0.0	0.0
			20	0.1	0.3

Table 17 - (continued)

Treatment[1] Insecticides	AI/Acre lb.	Dates of application	Days after treatment[2]	Number per leaf[3] Mites	Eggs
Pounce	0.20	August 6	Pre	0.0	0.0
			6	0.0	0.0
			13	0.0	0.1
			20	0.0	0.0

1 Plot size: Each treatment 5 acres (165'x1320'). All insecticides were were emulsifiable concentrates and applied at 10 GPA. Plot were treated prior to 5:00 AM.

2 Pretreatment counts were made August 5.

3 50 trifoliate leaves showing mite damage were examined from each treatment on each sampling date.

Table 18 - Spider mite populations in seed alfalfa plots treated for aphid control. Firebaugh, California. 1980

Treatment[1]				Number per leaf[2]	
Insecticides	AI/Acre lb.	Dates of application	Days after treatment	Mites	Eggs
			Pre	-	-
Temik 15G Irrigated	3.0	May 26 May 29			
			7	0.9	36.0
			13	0.2	1.3
			20	0.1	0.3
			27	0.0	0.3
			34	1.1	0.5
			41	0.1	0.1
			48	0.3	0.3
			55	0.1	0.5
			62	0.1	0.1
			Pre	-	-
Lorsban	1.0	May 28			
			7	0.1	0.1
			13	0.2	1.4
			20	0.5	2.2
			27	2.2	2.2
			34	2.5	6.7
			41	2.6	5.8
			48	1.5	2.7
			Pre	-	-
Thiodan	2.0	May 28			
			7	0.1	0.9
			13	1.0	6.3
			20	1.5	1.8
			27	1.3	2.3
			34	0.6	0.6
			41	0.6	2.1
			48	2.2	5.2
			Pre	-	-
Check	-	-			
			7	0.1	0.7
			13	0.1	0.4
			20	0.7	0.7
			27	2.5	7.5
			34	1.8	4.3
			41	1.5	2.5
			48	1.9	5.6
Carzol	0.75	July 19			
			3	1.1	7.3
			10	1.8	4.7

Table 18 (continued)

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1 Plot size: Each treatment 5 acres (165'x1320'). Temik 15G was side dressed with a commercial applicator. Thiodan and Lorsban were applied at 40 GPA with a commercial ground sprayer. Carzol a 92% soluble powder was applied by aircraft at 10 GPA.

2 50 trifoliate leaves showing mite damage were examined from each treatment on each sampling date.

PREDATORS & PARASITES

Table 19 - Predator and parasite populations in seed alfalfa plots treated by aircraft for lygus bug control. Firebaugh, California, 1980.

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treat-ment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
Monitor + (6-11) + Comite	1.0 + 1.69	Pre	7	9	15	25	13	26	23	0	0	0	6	2	0	0	313	136
		Pre	2	20	3	89	37	36	4	0	0	0	3	1	0	0	204	112
		6	2	9	1	14	18	10	5	2	0	0	0	0	0	0	67	112
		13	0	0	0	9	3	5	3	7	0	0	2	0	1	0	85	67
		20	10	4	2	1	82	15	2	14	0	0	0	0	1	0	137	400
		27	3	2	1	6	96	41	10	22	0	0	0	0	0	0	56	140
		34	3	3	4	10	136	100	6	16	0	0	0	1	0	0	56	92
Monitor + (7-16) + Comite	1.0 + 1.69	6	2	1	1	16	28	4	2	10	0	0	0	0	0	1	33	41
		13	3	3	2	4	53	5	5	6	0	0	0	0	0	1	47	84
		20	2	1	0	0	15	27	4	2	1	0	0	0	0	1	36	87
		27	2	6	0	0	17	56	2	0	0	0	0	0	0	0	28	33
Monitor + (8-12) + Comite	1.0 + 1.69	7	0	1	0	3	6	0	0	3	0	0	0	0	0	0	6	22
		14	0	0	0	0	0	0	0	1	0	0	0	0	0	0	24	3
Monitor + (6-11) + Comite	0.50 + 1.69	Pre	7	12	7	38	9	50	30	1	0	0	7	1	2	0	240	113
		Pre	2	10	12	147	55	93	7	1	0	0	3	0	0	0	335	72
		6	6	4	1	17	31	8	4	6	0	0	0	0	1	0	33	53
		13	0	5	0	11	4	2	0	0	0	0	0	0	0	0	33	8
		20	12	7	3	7	115	48	4	29	0	0	0	0	1	0	97	154
		27	8	5	2	7	130	139	10	18	0	0	1	0	0	1	67	182
		34	6	9	3	5	112	103	4	4	0	0	1	0	0	1	90	52

Table 19 - (continued)

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treatment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
Monitor + (7-16) + Comite	0.50 + 1.69																	
		6	4	8	3	7	111	93	0	8	0	0	0	0	3	2	40	53
		13	3	3	0	2	210	38	0	4	0	0	0	0	4	1	44	87
Monitor + (7-29) + Comite	0.50 + 1.69																	
		7	0	0	0	0	23	37	0	1	0	0	0	0	0	1	34	40
		14	4	0	0	0	24	20	5	1	0	0	0	0	1	0	25	16
		21	2	0	0	1	43	22	2	0	0	0	0	0	1	0	11	21
		28	0	2	0	0	17	21	2	1	0	0	0	0	0	0	25	3
		Pre	6	20	5	52	20	76	20	1	0	0	4	0	0	0	176	105
		Pre	1	17	13	169	42	77	4	2	0	0	1	2	1	0	165	44
Carzol Lorsban (6-11) Comite	1.50 1.00 3.38																	
		6	0	2	1	16	38	23	3	1	0	0	1	0	1	0	15	33
		13	0	0	0	3	3	0		2	0	0	0	0	0	0	19	5
		20	2	5	2	9	77	51	1	17	0	0	0	0	0	0	58	113
		27	35	83	3	8	87	160	0	8	0	0	0	0	1	1	98	33
		34	8	4	6	9	273	187	2	9	0	0	1	1	1	0	45	108
		41	3	4	0	17	173	75	4	2	0	0	0	0	3	0	16	17
Carzol Lorsban (7-16) Comite	0.75 1.00 1.69																	
		6	0	0	0	1	81	12	0	4	0	0	0	0	3	0	9	18
		13	0	1	0	0	46	28	0	3	0	0	0	0	0	0	21	14
		20	1	0	0	0	12	5	0	0	0	0	0	0	0	0	5	1
Carzol Lorsban (8-8) Comite	1.50 1.00 3.38																	
		7	0	0	0	0	12	5	0	0	0	0	0	0	1	0	2	5
		14	1	0	0	0	25	10	0	1	0	0	0	0	5	0	4	7

Table 19 - (continued)

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treatment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
		Pre	10	26	9	63	34	94	18	0	0	0	4	2	1	0	201	98
		Pre	3	7	5	129	81	50	1	0	0	0	1	1	0	0	149	44
Carzol	0.75																	
Lorsban (6-11)	0.50																	
Comite	1.69																	
		6	2	0	1	15	84	13	1	1	0	0	0	0	0	0	36	7
		13	1	9	0	19	72	26	0	5	0	0	0	0	0	0	69	13
		20	7	27	2	38	196	208	0	11	0	0	0	0	0	1	71	108
		27	24	20	3	16	201	577	7	18	0	0	0	0	0	0	37	151
		34	26	29	14	25	508	255	1	3	0	0	0	1	1	0	54	89
Carzol	0.75																	
Lorsban (7-16)	0.50																	
Comite	1.69																	
		6	2	1	3	4	119	43	3	7	0	0	0	0	0	0	19	72
		13	4	10	0	9	173	117	2	2	0	0	0	0	1	0	25	37
		20	0	4	0	1	59	83	0	2	0	0	0	0	4	0	20	54
Carzol	0.75																	
Lorsban (8-6)	0.50																	
Comite	1.69																	
		6	1	0	0	0	36	11	0	2	0	0	0	0	2	0	8	5
		13	0	0	0	0	50	6	1	2	0	0	0	0	1	0	5	12
		20	0	0	0	0	26	15	0	0	0	0	0	0	1	0	10	5

1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM on the dates indicated in parenthesis.

2 Pretreatment counts were made June 4 and June 10.

3 2-25 suck D-Vac samples per treatment on each sampling date.

Table 20 - Predator and parasite populations in seed alfalfa plots treated by aircraft for lygus bug and spider mite control. Firebaugh, California, 1980.

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treatment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
		Pre	3	10	9	71	22	69	10	1	0	0	4	0	0	0	217	58
		Pre	0	9	5	73	18	32	0	0	0	0	0	0	0	0	65	8
Pydrin + Comite	0.20 + 1.69	(6-11)																
		6	2	4	2	10	12	12	0	0	0	0	0	0	0	0	23	4
		13	19	30	7	24	115	13	0	2	0	0	0	0	0	0	64	39
		20	34	184	2	87	236	205	0	2	0	0	0	0	0	0	93	63
		27	63	135	1	52	186	463	1	4	0	0	0	0	0	0	85	68
		34	103	104	17	31	516	200	0	1	0	0	1	0	1	0	105	43
		41	74	168	20	47	162	170	1	0	0	0	0	0	0	0	192	72
Pydrin + Comite	0.20 + 1.69	(7-23)																
		6	26	236	0	5	107	66	0	1	0	0	0	0	0	0	101	9
		13	27	156	0	1	63	15	1	0	0	0	0	0	0	0	190	31
Pydrin	0.20	(8-6)																
		6	7	51	0	0	12	7	0	0	0	0	0	0	0	0	17	1
		13	26	74	0	2	21	20	0	1	0	0	0	0	0	0	15	81
		20	34	14	0	0	29	15	0	0	0	0	0	0	0	0	4	8
		Pre	6	16	4	82	59	123	11	0	0	0	0	0	0	0	230	84
		Pre	1	3	11	101	53	62	0	0	0	0	1	0	0	0	93	12
Pounce + Comite	0.20 + 1.69	(6-11)																
		6	8	27	1	15	43	25	1	1	0	0	0	0	0	0	15	3
		13	6	75	0	34	152	35	0	8	0	0	0	0	0	0	68	51
		20	48	218	0	63	174	123	0	4	0	0	0	0	0	0	79	71

Table 20 - (continued)

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treat-ment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
Pounce + (7-23) Comite	0.20 + 1.69	27	88	145	1	38	79	386	1	2	0	0	0	0	0	0	67	74
		34	149	155	17	38	410	192	0	2	0	0	0	0	1	0	86	95
		41	127	264	33	61	95	79	2	0	0	0	0	0	3	0	189	45
Pounce (8-6)	0.20	6	31	370	0	5	65	35	0	3	0	0	0	0	0	0	34	18
		13	23	143	1	1	61	6	0	1	0	0	0	0	0	0	74	40
		6	31	170	0	0	16	2	0	1	0	0	0	0	1	0	13	14
		13	8	49	0	1	17	13	0	0	0	0	0	0	0	0	10	22
		20	26	24	0	0	44	21	0	0	0	0	0	0	0	0	14	9
Cymbush + (6-11) Comite	0.12 + 1.69	Pre	6	3	4	67	45	120	7	0	0	0	1	1	0	0	220	52
		Pre	1	4	7	81	68	39	6	3	0	0	3	0	0	0	91	48
		6	5	16	0	1	7	4	1	2	0	0	0	0	0	0	37	11
		13	7	33	0	3	20	7	1	1	0	0	0	0	0	0	43	30
		20	30	178	1	3	224	12	0	5	0	0	0	0	1	1	71	70
		27	22	67	1	11	114	285	3	8	0	0	0	0	0	2	39	38
		34	69	70	5	10	235	471	0	5	0	0	0	0	1	0	83	25
		41	78	117	7	15	263	376	3	4	0	0	0	0	2	1	67	77
Cymbush + (7-23) Comite	0.12 + 1.69	6	8	88	0	0	27	5	0	8	0	0	0	0	0	0	34	18
		13	12	98	0	0	70	5	0	0	0	0	0	0	0	0	119	37

Table 20 - (continued)

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treatment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
		Pre	5	34	11	103	86	298	35	2	0	0	5	3	0	0	242	139
		Pre	1	8	7	86	36	68	0	0	0	0	4	0	0	0	131	26
Mavrik (6-11)	0.15																	
		6	13	35	6	248	204	110	13	3	0	0	2	0	0	0	147	36
		13	9	11	6	153	126	60	5	6	0	0	0	0	0	0	101	34
Mavrik (6-25)	0.15																	
		6	17	75	17	139	219	118	0	23	0	1	0	0	0	0	80	46
		13	11	93	14	124	159	365	4	8	0	0	0	0	4	0	102	66
Carzol + Comite (7-9)	0.75 + 1.69																	
		6	13	13	10	20	158	134	1	6	0	0	0	0	0	2	58	23
		13	5	40	12	21	191	390	4	7	0	0	0	0	1	1	48	76
Carzol (7-23)	0.75																	
		6	0	4	0	7	52	39	1	10	0	0	0	0	4	0	18	37
		13	0	1	0	0	45	34	0	10	0	0	0	0	1	0	9	77
		Pre	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monitor (6-3)	0.50																	
		1	12	40	4	67	57	209	23	1	0	0	1	0	0	0	67	36
		6	1	4	1	32	6	15	2	2	0	0	1	0	0	0	45	28
		13	2	4	4	23	27	2	17	2	0	0	0	0	0	0	142	254
		20	0	3	1	2	15	0	0	0	0	1	0	0	0	0	89	152
		27	8	17	5	13	106	15	5	50	0	0	0	0	0	0	64	354
Carzol + Comite (7-7)	0.75 + 1.69																	
		1	5	12	2	11	31	164	0	55	0	0	0	0	0	1	68	152
		8	2	2	0	14	31	31	3	20	0	0	0	0	0	1	74	169

Table 20 (continued)

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treat-ment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
Monitor (7-24)	0.50	15	3	10	0	6	68	54	9	2	0	0	0	0	2	1	38	195
		5	1	0	0	0	23	1	13	11	0	0	0	0	0	0	18	235
		12	0	0	0	1	18	4	4	13	0	0	0	0	0	0	58	160

1 Plot size: Each treatment 5 acres (165'x1320'). Carzol was a 92% soluble powder while the others were emulsifiable concentrates. Sprays were applied at 10 GPA. Plots were treated before 5:00 AM on the dates indicated in parenthesis.

2 Pretreatment counts were made June 4 and June 10.

3 2-25 suck D-Vac samples per treatment on each sampling date.

Table 21 - Predator and parasite populations in seed alfalfa plots treated by aircraft for aphid control. Firebaugh, California. 1980.

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treatment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
Lorsban (8-11)	0.50	Pre	2	0	0	1	7	2	6	9	0	0	0	0	0	0	21	78
		1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
		8	0	0	0	0	1	1	3	0	0	0	0	1	0	0	5	3
Pydrin (8-6)	0.20	Pre	0	0	0	2	6	2	4	8	1	0	0	0	1	1	16	81
		6	1	0	0	0	3	1	1	1	0	0	0	0	0	0	1	9
		13	2	0	0	0	2	0	6	11	0	0	0	0	0	0	6	12
Lorsban 8-6)	0.50	Pre	1	0	0	0	10	0	5	1	0	0	0	0	0	0	3	14
		6	3	2	0	0	2	0	0	10	0	0	0	2	10	0	1	0
		13	0	0	0	0	1	0	9	13	0	0	0	2	0	0	4	3
Thiodan + Phosdrin	1.00 + 0.25 (8-6)	Pre	2	0	0	0	10	1	1	3	1	0	0	0	0	0	13	38
		6	2	0	0	0	0	1	1	10	0	0	0	1	0	0	1	8
		13	2	0	0	0	9	0	11	27	0	0	0	0	0	0	7	9

Table 21 (continued)

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treatment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
Thiodan + Nudrin (8-6)	1.00 + 0.50	Pre	2	0	0	0	8	3	0	6	0	0	0	0	0	1	10	52
		6	2	0	0	0	1	0	0	26	0	0	0	0	0	0	3	4
		13	3	0	0	0	0	0	10	22	0	0	0	0	0	0	3	21
		20	2	0	0	0	1	0	4	4	0	0	0	0	0	0	0	5
Nudrin + Phosdrin (8-6)	0.50 + 0.25	Pre	0	0	0	1	7	3	7	2	0	0	0	0	0	2	13	86
		6	0	0	0	0	0	0	0	24	0	0	0	0	0	0	1	13
		13	2	1	1	1	1	6	14	29	0	0	0	0	1	0	1	40
		20	3	0	0	0	18	0	1	3	0	0	0	0	1	0	4	7
Pounce (8-6)	0.20	Pre	0	0	0	0	4	0	0	0	0	0	0	0	0	0	10	56
		6	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	7
		13	0	0	0	0	7	0	3	16	0	0	0	0	0	0	2	26
		20	0	1	0	0	8	0	4	6	0	0	0	0	0	0	13	11
		27	2	0	0	0	2	0	1	0	0	0	0	0	0	0	5	2

1 Plot size: Each treatment 5 acres (165'x1320'). All insecticides were emulsifiable concentrates and applied at 10 GPA. Plots were treated prior to 5:00 AM.

2 Pretreatment counts were made on August 5.

3 2-25 suck D-vac samples per treatment on each sampling date.

Table 22- Predator and parasite populations in seed alfalfa plots treated for aphid control. Firebaugh, California 1980.

Treatment[1] Insecticide Dates	AI/ Acre lb.	Days after treatment[2]	Number Per 50 D-Vac Samples[3]															
			Geocoris		Nabis		Orius		Lacewings		Syrphids		Cocci-nellidae		Collops		Parasitic Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L	A	L		
Temik (5-26) Irrigated (5-29)	3.0	Pre	2	30	2	47	81	159	5	0	3	0	9	3	0	0	142	19
		7	9	58	7	71	110	77	18	2	0	0	9	4	0	0	392	78
		13	11	22	4	25	69	22	8	0	0	0	4	1	0	0	352	53
		20	10	11	4	12	33	3	35	3	1	0	1	0	0	0	339	84
		27	5	0	2	1	8	5	1	1	0	0	2	0	0	1	203	10
		34	5	14	2	9	127	152	2	6	0	0	0	0	0	1	151	193
		41	4	15	1	7	190	139	2	2	0	0	1	0	0	0	189	367
		48	3	22	8	12	196	130	0	3	0	0	0	0	0	0	133	505
		55	2	14	7	7	76	110	0	2	0	0	0	0	3	2	118	437
		62	0	4	2	8	58	44	0	5	0	0	0	0	0	2	126	357
		69	0	2	2	0	33	15	1	1	0	0	0	0	3	0	46	311
		76	4	3	3	4	14	75	1	11	0	0	0	0	1	0	81	91
		83	2	2	1	8	26	46	4	14	0	0	0	0	1	9	101	204
		90	3	2	4	21	31	30	4	4	0	0	0	3	1	0	143	29
		97	6	8	0	33	25	14	29	16	0	0	0	33	4	0	49	26
Lorsban (5-28)	1.0	Pre	6	26	10	61	87	287	16	3	0	0	7	3	1	0	229	24
		7	1	6	0	32	32	5	13	0	0	0	3	0	0	0	191	67
		13	6	13	7	264	65	1	11	2	0	0	4	0	0	0	535	85
		20	13	3	10	300	45	1	28	2	0	0	3	0	3	0	661	77
		27	8	2	6	168	8	62	4	0	0	0	0	0	0	0	424	20
		34	13	20	46	289	257	327	10	1	0	0	1	0	1	0	386	199
		41	17	18	91	249	293	174	5	1	0	0	1	0	0	3	311	298
		48	22	36	60	136	255	85	0	1	0	0	1	0	0	0	177	580

Table 22 (continued)

Thiodan (5-28) 2.0	Pre	2	12	6	47	52	191	2	0	2	0	3	2	1	0	228	11
	7	1	8	2	27	67	16	17	0	0	0	5	0	0	0	272	56
	13	3	15	8	313	99	6	18	3	0	0	5	1	0	0	727	70
	20	7	6	17	264	64	5	6	2	0	0	7	0	0	0	856	96
	27	4	2	10	158	18	66	4	0	0	0	2	0	0	0	678	18
	34	10	19	29	325	214	246	10	3	0	0	2	0	0	0	397	218
	41	15	20	79	204	314	221	4	2	0	0	1	0	1	0	252	394
	48	16	23	63	152	250	74	1	1	0	0	0	0	0	0	220	182
Check	Pre	2	8	8	29	52	65	3	0	1	0	9	1	0	0	184	32
	7	3	15	7	71	42	17	24	0	0	0	12	0	1	0	354	50
	13	9	7	18	207	90	11	8	0	1	0	12	0	0	0	1264	92
	20	15	17	24	334	122	9	46	2	0	0	7	0	2	0	1687	124
	27	4	2	14	81	20	22	0	0	0	0	0	0	2	0	888	6
	34	49	28	44	318	275	380	15	5	0	0	1	0	0	0	893	176
	41	15	33	40	162	329	346	4	1	1	0	1	0	0	1	787	417
	48	17	35	172	142	255	158	2	2	0	0	1	0	0	0	389	434
Carzol (7-19) 0.75	3	10	21	14	18	109	119	1	1	0	0	0	0	1	3	162	381
	10	1	5	5	16	64	39	1	1	0	0	0	0	2	1	487	681
	17	3	4	5	15	54	22	2	0	0	0	0	0	0	3	42	637
	24	1	0	0	1	10	7	0	11	0	0	0	1	0	2	18	236
	31	2	1	2	19	24	5	7	3	0	0	0	2	3	1	29	296
	38	4	1	25	10	96	25	20	8	0	0	0	0	3	1	113	189
	45	14	4	5	29	72	34	50	20	0	0	1	17	6	0	83	61

[1] Each treatment 5 acres (165'x1320'). Temik 15G was side dressed with a commercial applicator. Thiodan and Lorsban were applied at 40 GPA with a commercial ground sprayer. Carzol a 92% soluble powder was applied by aircraft at 10 GPA.

[2] Pretreatment counts made May 27.

[3] 2-25 suck D-vac samples per treatment on each sampling date.

Table 23 - Stink bug populatins in 15 seed alfalfa fields. Fresno, County, California. 1980.

Field Number and Location		Variety	Number per 25 ft of row[1]					
			Consperse stink bug			Say stink bug		
			Adults	Nymphs	Total	Adults	Nymphs	Total
1	Firebaugh[2]	Peak	0	0	0	0	0	0
2	Firebaugh[2]	DeKalb 167	0	0	0	0	15	15
3	Firebaugh[2]	CW-8	0	0	0	0	4	4
4	Firebaugh[2]	CW-2	0	0	0	0	21	21
5	Firebaugh[2]	Luna	0	0	0	0	1	1
6	Five Points[3]	CUF 101	0	0	0	0	1	1
7	Five Points[3]	DeKalb 123	0	0	0	0	0	0
8	Five Points[3]	532	0	0	0	0	0	0
9	Five Points[3]	CW-9	0	0	0	0	0	0
10	Five Points[3]	Moapa 69	0	0	0	1	0	1
11	San Joaquin[3]	524	0	0	0	0	0	0
12	San Joaquin[3]	Apollo	0	0	0	0	0	0
13	San Joaquin[3]	CW-9	0	0	0	0	0	0
14	San Joaquin[3]	Riley	0	0	0	0	0	0
15	San Joaquin[3]	CW-5	0	0	0	0	0	0
	Total		0	0	0	1	42	43

1 Five beating pan samples from each field. Samples were examined in laboratory after 24-hour berlese funnel separation.

2 Samples collected July 15, 1980.

3 Samples collected July 21, 1980.

Table 24 - Percentages of good and defective seeds in samples from 15 commercial seed alfalfa fields surveyed for stink bug damaged seed. Fresno County. 1980.

Field Number and Location	Variety	Seeds Examined[1]	Good Seed	Defective Seeds					
				Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green
2 Firebaugh	DeKalb 167	2409	96.6	0.1	2.4	0.0	0.1	0.0	0.8
3 Firebaugh	CW-8	2407	91.1	3.7	3.5	0.1	0.1	0.1	0.5
4 Firebaugh	CW-2	2421	91.0	0.1	5.4	0.0	0.1	0.0	3.4
5 Firebaugh	Luna	4783	87.7	3.3	6.2	0.2	0.1	0.2	2.3
-------Average-----		3005	91.6	1.8	4.5	0.1	0.1	0.1	1.8
8 Five Points	532	2650	95.4	0.6	3.5	0.1	0.1	0.1	0.2
10 Five Points	Moapa 69	2751	93.0	0.7	4.6	0.4	0.1	0.1	0.2
-------Average-----		2700	94.2	0.7	4.0	0.3	0.1	0.2	0.5
11 San Joaquin	524	3118	95.5	1.1	2.5	0.1	0.1	0.1	0.6
12 San Joaquin	Apollo	2570	76.0	14.7	5.6	1.0	0.0	0.6	2.1
13 San Joaquin	CW-9	2849	92.1	3.9	2.6	0.2	0.0	0.2	1.0
14 San Joaquin	Riley	2534	94.2	1.5	3.8	0.1	0.0	0.2	0.2
15 San Joaquin	CW-5	2331	85.3	7.0	6.4	0.2	0.0	0.1	1.0
-------Average-----		2680	88.6	5.6	4.2	0.3	0.1	0.2	1.0
3 Area Average		2795	91.5	2.7	4.2	0.2	0.1	0.2	1.1

[1] Four 2-quart samples of pods were hand stripped from plants prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts are based on four subsamples from each of the threshed 2-quart samples.

Table 25 - Percentages of good and defective seeds in samples from 21 commercial seed alfalfa fields surveyed for chalcid damaged seed. Fresno County. 1980.

Field Number and Location	Variety	Seeds Examined[1]	Good Seed	Defective Seeds					
				Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green
2 Firebaugh	DeKalb 167	2409	96.6	0.1	2.4	0.0	0.1	0.0	0.8
3 Firebaugh	CW-8	2407	91.1	3.7	3.5	0.1	0.1	0.1	1.4
4 Firebaugh	CW-2	2421	91.0	0.1	5.4	0.0	0.1	0.0	3.4
5 Firebaugh	Luna	4783	87.7	3.3	6.2	0.2	0.1	0.2	2.3
6 Firebaugh	Peak	2368	92.9	2.6	2.9	0.1	0.2	0.2	1.1
-------Average-----		2877	91.9	2.0	4.0	0.1	0.1	1.1	1.8
8 Five Points	CW-67	2650	95.4	0.6	3.5	0.1	0.1	0.1	0.2
10 Five Points	Moapa 69	2751	93.0	0.7	4.6	0.4	0.0	0.3	1.0
11 Five Points	572	3354	91.0	0.2	7.1	0.2	0.0	0.1	1.4
12 Five Points	581	3022	97.9	0.5	1.0	0.0	0.0	0.0	0.6
13 Five Points	DeKalb 123	2904	96.9	0.7	1.9	0.1	0.0	0.1	0.3
14 Five Points	Weevlchek	3147	96.4	0.0	2.9	0.0	0.1	0.1	0.5
-------Average-----		2971	95.1	0.5	3.5	0.1	0.1	0.1	0.6
11 San Joaquin	524	3118	95.5	1.1	2.5	0.1	0.1	0.1	0.6
12 San Joaquin	Apollo	2570	76.0	14.7	5.6	1.0	0.0	0.6	2.1
13 San Joaquin	CW-9	2849	92.1	3.9	2.6	0.2	0.0	0.2	1.0
14 San Joaquin	Riley	2534	94.2	1.5	3.8	0.1	0.0	0.2	0.2
15 San Joaquin	CW-5	2331	85.3	7.0	6.4	0.2	0.0	0.1	1.0
16 San Joaquin	N.A.P.B. 74	2722	93.4	1.4	2.8	0.2	0.2	0.1	1.9
17 San Joaquin	K3-650	3068	94.6	1.3	3.2	0.1	0.0	0.1	0.7
18 San Joaquin	CUF 101	2762	95.3	1.4	2.1	0.1	0.0	0.5	0.6
19 San Joaquin	DeKalb 123	2795	97.1	0.3	2.2	0.0	0.0	0.1	0.3
20 San Joaquin	Florida 77	2708	94.7	0.6	3.8	0.1	0.1	0.3	0.4
-------Average-----		2745	91.8	3.3	3.5	0.2	0.1	0.2	0.9
3 Area Average		2864	92.9	1.9	3.6	0.1	0.1	0.4	1.0

1 Four 2-quart samples of pods were hand stripped from plants prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts are based on four subsamples from each of the threshed 2-quart samples.

The contents of this report should not be interpreted as recommendations of the University of California. Insect control recommendations are published by the University of California and can be obtained free of charge from any Cooperative Extension Office.

Common and/or manufacturer's names of insecticides are used in this report instead of the less familiar chemical terms, but no endorsement of products mentioned is intended. The rates of insecticides applied per acre are all expressed as active material per treated acre. Some of the chemicals included in the experiments reported are not registered for commercial use on seed alfalfa at this time.

The common and/or manufacturer's names of insecticides mentioned in this report are as follows:

Carzol®	Nudrin®
Comite®	Phosdrin®
Cymbush®	Pounce®
Lorsban®	Pydrin®
Mavrik®	Thiodan®
Monitor®	Temik®

These experiments were conducted in the San Joaquin Valley where the honeybee is the principal pollinator. We have no information concerning the effects of these insecticides and programs on leafcutting or alkali bees.