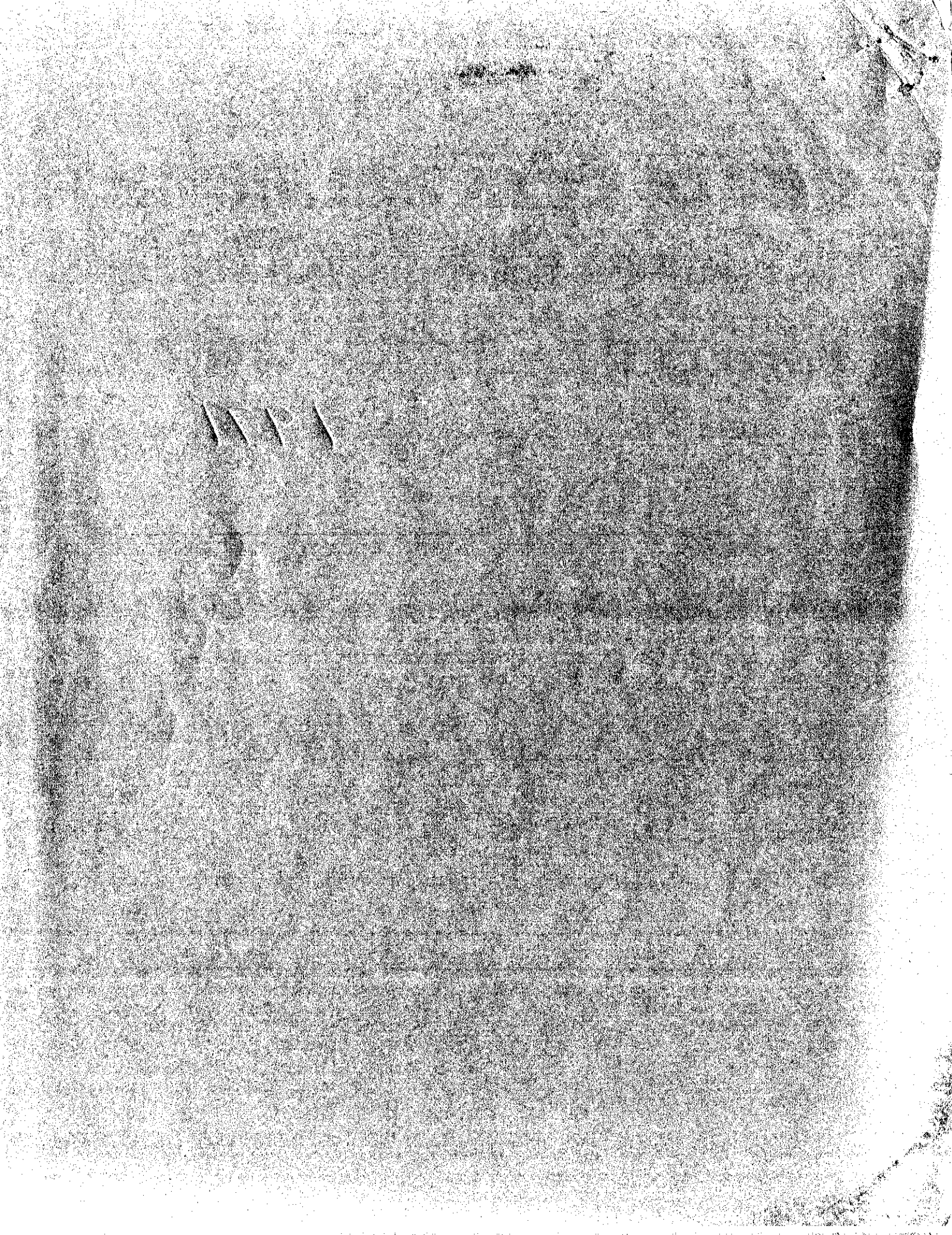
Sharon C. Mueller

a progress report on

INSECT CONTROL RESULTS IN SELECTED STRIKE FORCE AREAS

STRIKE FORCE



ACKNOWLEDGEMENTS

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The trials and surveys in Fresno County this year were conducted in alfalfa seed fields of the following growers: John Nakamura, Joe Echeveste, Paul Crevelin, Frank Motte, Anderson Clayton Company, Jim and John Diedrich, John Maitia, Dominic and John Enrico, Harnish-Brinker, and Giffen Ranches, Inc. We are grateful for their interest and cooperation.

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RESEARCH ON INSECTS AFFECTING SEED ALFALFA - 1971.

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Introduction

This is a progress report summarizing research on insects affecting seed alfalfa conducted in Fresno County during 1971. Its purpose is to inform seed growers and agribusiness cooperators of the research conducted with their generous support.

The contents of this summary 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 the Farm and Home Advisors Office.

Common and/or manufacturers 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.

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The common and/or manufacturers names of insecticides mentioned in this report are as follow:

Azodrin ®	DDT	Kelthane ®	TEPP
Baygon ®	DuPont 1410	Lannate ®	Thimet 600 ®
Carzol ®	Dylox ®	Meta-Systox-R ®	Thiodan ®
Dibrom ®	Galecron ®	methyl parathion	toxaphene
dimethoate (Cygon ®)	Fundal ®	Supracide ®	
	Furadan ®	Temik ®	

Summary and Discussion of 1971 Research Results

1. Numerous new and old insecticides and insecticide combinations, applied as sprays or as granules incorporated into the soil, were evaluated for control of lygus bugs, spider mites, aphids and the consperse stink bug in Fresno County alfalfa seed fields. The various treatments and results obtained are found in the tables and graphs accompanying this report.

The non-registered compounds, Furadan, Supracide, Baygon, and DuPont 1410 compared favorably with DDT-toxaphene, Thiodan-toxaphene, Meta-Systox-R, and dimethoate as early season spray treatments for lygus bug control. Several of the experimental compounds are known to be toxic to honey bees and their use, if registration is obtained, should be restricted to early season applications prior to bloom and before bees are placed in the field. Some of the materials might serve as alternatives to dimethoate (Cygon) where insecticide resistance occurs. Two additional non-registered materials, Carzol and Lannate, effectively controlled lygus bugs in

experiments that were continued throughout the season during the period of bloom and seed set. In addition to controlling lygus bugs, Carzol also effectively controlled spider mites and stink bugs. Carzol is of special interest because of its reported moderate to low toxicity to honey bees. There is hope that these materials may be registered in the near future for use on seed alfalfa.

Of the systemic insecticides incorporated into the soil, only Temik effectively controlled lygus bugs. Lygus bug populations were controlled for four to five weeks after the first irrigation following the incorporation of the granules into the soil. Control programs involving insecticide sprays in conjunction with relatively late applications of granular Temik should be investigated. Temik appeared to have little adverse effect on predator and parasite populations in the plots. More information should be obtained concerning its effects on bees.

Galecron and Carzol were highly effective in controlling spider mite infestations on seed alfalfa. A single application of Galecron in late June at 1.0 lb. per acre controlled mite populations for virtually the remainder of the season. Three applications of Carzol at 0.5 lb. per acre per application applied for lygus bug control reduced and held spider mite and egg populations to extremely low levels throughout the season.

Repeated use of Carzol stimulated population increases of the spotted alfalfa aphid and the pea aphid. Its use on varieties highly susceptible to aphid attack will require careful monitoring and perhaps the addition of suitable aphicides.

2. Surveys to ascertain and monitor stink bug populations in alfalfa seed fields were conducted at bi-weekly, and later at weekly intervals from

November 10, 1970 through August, 1971. Crown and root (whole plant) samples were taken during the late fall, winter, and early spring while the adult consperse stink bugs were dormant and deep in the crowns of the alfalfa plants. A standard of 10 samples, each consisting of root crowns from 10 inches of row (100 row inches per field), was taken from each of seven survey fields on each sampling date. Stink bug populations were expressed as numbers of bugs per 100 inches of row. As shown in tables and graphs accompanying this report, populations declined steadily throughout the winter. This sampling technique became ineffective when the stink bugs resumed activity and left the plant crowns in the spring.

Sprays of Azodrin, methyl parathion, and Dibrom applied during the winter and burning and clipping of alfalfa were not effective in controlling overwintering stink bug populations. Clipping resulted in lower stink bug populations in plant crowns during the winter. The reasons for this are unknown although predation by starlings and blackbirds were observed. It is also believed that on warm days the stink bugs moved from clipped areas to areas of more plant growth, perhaps seeking better shelter.

3. A "beating pan" method was developed and used to follow the life cycle and population trends of the consperse stink bug in alfalfa seed fields during the late spring and summer. Weekly population surveys were continued in the seven fields that were monitored during the winter and two additional fields were added to the summer survey. Two generations of the consperse stink bug were observed to occur. Eggs laid by the overwintering generation began hatching in the Firebaugh area as early as May 25 although in the majority of the fields nymphs were first detected on June 8. Adults of this generation matured about the end of June and

nymphs of the second generation were found beginning on July 6. The second generation was from 15 to 35 times greater than the first generation and generally reached population peaks between August 3 and 17.

Use of the "beating pan" sampling method enabled the growers to be aware of the increasing stink bug populations in their fields. Armed with this knowledge, they were able to coordinate insecticide applications with the life cycle and population trends of the stink bug. It was thus possible to remove honey bees from large areas and treat the seed alfalfa and some cotton fields with methyl parathion to control the stink bugs before major crop damage occurred. Yields of alfalfa seed in areas where stink bugs were controlled at the correct time were excellent.

Seed samples were hand harvested from each of the survey fields and from one field to which experimental insecticides were applied (Diedrich field). The samples were taken from restricted locations in the fields where the stink bug counts had actually been made during the season. The damage counts recorded in the tables are not indicative of the seed quality of the entire field because in several of the fields the survey locations were purposely not treated so that seasonal population trends of the stink bug and resulting seed damage could be studied.

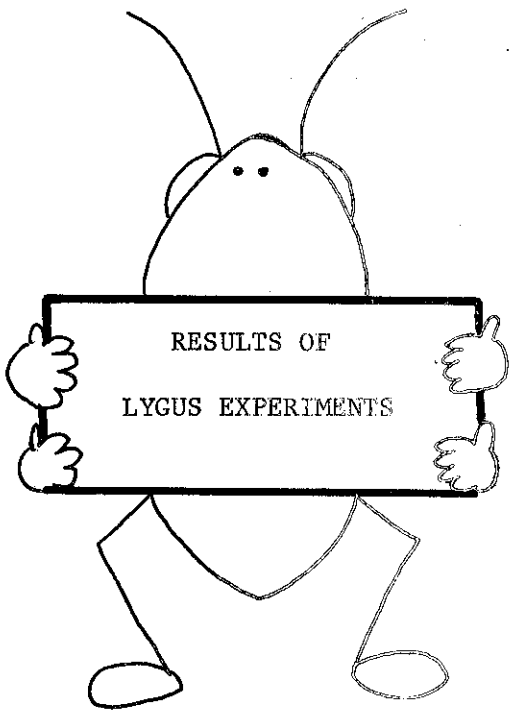
Seeds from these samples were examined for sucking insect damage and other injuries. Damage attributable to the consperse stink bug correlated well with stink bug populations observed in the sampling areas. Although injured seeds were obvious they probably do not represent the total damage caused by the stink bugs. Little is known concerning the losses that may result from stink bug feeding in the buds, flower racemes and newly formed pods. Seeds may be prevented from forming or developing under these conditions, which would result in overall reductions in seed yields.

4. Several experiments were conducted during the summer to evaluate insecticides for control of the consperse stink bug. The various insecticides investigated andthe results obtained are shown in tables which follow in this report. Of the materials tested only methyl parathion and Carzol were highly effective in controlling the stink bug. The results with Carzol were especially encouraging because, as stated previously, this material is reported to have a moderate to low toxicity to honey bees. It also effectively controls spider mites and lygus bugs.

5. Stink bug populations were observed in crops and areas bordering alfalfa seed fields. Early in the spring adult populations were observed on mustard, london rocket, and other roadside weeds. In several localities large stink bug populations were observed in the spring and early summer in sugar beet fields. Stink bugs in all stages of development were present on the beet plants. A large and early hatch of stink bugs occurred in one sugar beet field in the Five Points area which migrated as adults to neighboring alfalfa seed fields in late May and early June. When the sugar beets were harvested in early July a very large population of adults moved to the adjacent alfalfa seed fields. Adults and some fifth instar stink bug nymphs also migrated from a sugar beet field inthe Cantua area to an adjacent alfalfa seed field in mid-July when the beets were harvested.

6. Although much progress has been made in research on sucking insects affecting seed alfalfa, especially the stink bug problem, much work remains to be done. Data already obtained on sampling and on population dynamics of the stink bug should be augmented with additional studies to confirm annual population trends and to determine economically.

damaging population levels. The effects of cultural practices within the alfalfa seed fields and in neighboring host crops, such as sugar beets, on stink bug populations require further studies. Additional information is needed concerning preferred host plants and breeding areas outside of alfalfa fields. As yet we know little concerning the effects of parasites and predators on stink bug populations. Undoubtedly, these are key factors, the absence of which result in stink bug outbreaks. Evaluation of insecticides should be continued. Methyl parathion is effective and can currently be used in alfalfa seed fields but its use requires the removal of honey bees from the fields. An effective insecticide that will not harm bees is desired. At least one new insecticide, Carzol, is promising, and others should be sought.


RESULTS OF
LYGUS EXPERIMENTS

Lygus bug populations in seed alfalfa plots treated with insecticide sprays applied by aircraft. Vista del Llano Ranch, Cantua Creek, California, 1971.

Treatment 1/			Number of Lygus Bugs		
Insecticide 2/	AI/ Acre Lb.	Days After Application 3/	Per Sweep 4/ Adults	Nymphs	Total
		Pre	1.0	3.3	4.3
		1	0.2	0.4	0.6
Meta Systox R +	0.375	3	0.3	0.3	0.6
Dylox	1.0	7	0.1	0.6	0.7
		14	0.8	1.9	2.7
		21	0.8	4.7	5.6
		Pre	1.6	6.4	8.0
		1	0.3	2.3	2.6
Furadam	1.0	3	0.4	0.7	1.2
		7	0.8	0.6	1.4
		14	1.2	0.4	1.6
		21	0.8	6.0	6.8
		Pre	1.5	4.3	5.8
		1	0.0	1.2	1.2
DDT +	2.0	3	0.5	0.9	1.4
Toxaphene	4.0	7	0.9	0.3	1.2
		14	1.4	1.5	2.9
		21	1.1	9.6	10.7
		Pre	1.7	4.7	6.4
		1	0.0	0.1	0.1
Supracide	1.0	3	0.0	0.0	0.0
		7	0.2	0.0	0.2
		14	0.8	0.8	1.6
		21	0.5	4.4	4.9
		Pre	1.2	4.2	5.4
		1	0.1	0.2	0.3
Dimethoate	0.5	3	0.2	0.1	0.3
(Cygon)		7	0.2	0.1	0.3
		14	0.7	1.9	2.6
		21	0.8	2.5	3.3

Treatment 1/		Days After Application 3/	Number of Lygus Bugs Per Sweep 4/		
Insecticide 2/	Al/ Acre Lb.		Adults	Nymphs	Total
Baygon	1.4	Pre	1.4	4.9	6.3
		1	0.1	0.7	0.8
		3	0.3	0.7	1.0
		7	0.2	0.1	0.3
		14	0.8	0.8	1.6
		21	1.2	5.3	6.6
Thiodan + Toxaphene + oil (cotton seed oil)	1.0 3.0	Pre	1.2	3.1	4.3
		1	0.2	0.4	0.6
		3	0.5	0.5	1.0
		7	0.3	0.2	0.5
		14	0.6	1.3	1.9
		21	0.8	6.7	7.0
Thiodan + Toxaphene (no oil)	1.0 3.0	Pre	1.4	3.4	4.8
		1	0.3	0.8	1.1
		3	0.5	0.4	0.9
		7	0.4	0.0	0.4
		14	0.6	1.3	1.9
		21	1.4	7.9	9.3
DuPont 1410	1.0	Pre	1.1	3.8	4.9
		1	0.0	0.1	0.1
		3	0.1	0.0	0.1
		7	0.5	0.2	0.7
		14	0.5	1.0	1.5
		21	0.7	3.7	4.4

1/ Plot size: each treatment 5 acres (165' x 1320').

2/ Sprays applied 4:00 to 6:00 AM on June 8 with Snow aircraft at 10 GPA. Furadan was a 4 lb. per gallon flowable paste, Baygon was a 70% wettable powder, Dylox was an 80% soluble powder. The remaining insecticides were emulsifiable concentrates.

3/ Pretreatment counts were made June 7.

4/ Average of 18 sweeps per treatment on each sampling date.

5/ 2-25 D-Vac samples per treatment on each sampling date. (Data is not recorded here, but is available upon request.)

LYGUS EXPERIMENT #1

Spotted alfalfa aphid and pea aphid populations in seed alfalfa plots treated with insecticide sprays applied by aircraft to control lygus bugs.

Vista del Llano Ranch, Cantua Creek, California, 1971.

Treatment 1/		Days after application 3/	Number of aphids per 50 D-Vac samples 4/	
Insecticide 2/	AI/acre lb.		S.A.A.	P.A.
Meta-Systox-R + Dylox	0.375 1.0	Pre	8	2
		1	50	0
		3	50	0
		7	22	0
		14	46	0
		21	76	0
Furadan	1.0	Pre	22	14
		1	52	1
		3	45	0
		7	8	0
		14	11	0
		21	46	0
DDT + Toxaphene	2.0 4.0	Pre	13	3
		1	68	5
		3	30	10
		7	14	8
		14	36	11
		21	210	25
Supracide	1.0	Pre	1	8
		1	45	0
		3	45	2
		7	8	0
		14	21	0
		21	197	0
Dimethoate	1.0	Pre	7	4
		1	40	3
		3	39	0
		7	12	0
		14	66	0
		21	86	0

Treatment 1/		Days after application 3/	Number of aphids per 50 D-Vac samples 4/	
Insecticide 2/	AI/acre lb.		S.A.A.	P.A.
Baygon	1.4	Pre	7	3
		1	31	2
		3	33	0
		7	8	2
		14	21	1
		21	93	8
Thiodan + Toxaphene + oil (cotton seed oil)	1.0 + 3.0	Pre	8	3
		1	10	1
		3	6	0
		7	16	0
		14	17	0
		21	75	0
Thiodan + Toxaphene (no oil)	1.0 + 3.0	Pre	6	5
		1	24	1
		3	8	0
		7	6	0
		14	12	0
		21	125	0
DuPont 1410	1.0	Pre	25	4
		1	28	3
		3	11	0
		7	4	0
		14	17	15
		21	113	9

1/ Plot size: each treatment 5 acres (165' x 1320')

2/ Sprays applied at 10 GPA by Snow aircraft from 4:00 to 6:00 AM on June 8. Furadam was a 4 lb. per gallon flowable paste, Baygon was a 70% wettable powder, Dylox was an 80% soluble powder. The remaining insecticides were emulsifiable concentrates.

3/ Pretreatment counts were made June 7.

4/ Two 25 D-Vac samples per treatment on each sampling date.

LYGUS EXPERIMENT #1

Predator and parasite populations in seed alfalfa plots treated with insecticide sprays applied by aircraft to control lygus bugs. Vista del Llano Ranch, Cantua Creek, California, 1971

Treatment 1/			Number of Predators and Parasites per 50 D-Vac samples 4/													
Insecticide 2/	AI/ Acre Lb.	Days after application 3/	Orius		Geocoris		Nabis		Collops		Lace-wing		Cocci-nellid		Par Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L		
Meta Systox R + Dylox	0.375 1.0	Pre	39	12	15	0	1	2	2	0	4	2	14	0	150	5
		1	5	10	12	5	0	3	1	1	3	0	6	0	65	7
		3	13	3	24	10	7	0	1	0	7	7	6	0	84	4
		7	28	20	5	1	10	10	1	0	6	4	15	0	157	6
		14	99	104	14	11	23	31	1	0	17	5	1	0	128	7
		21	178	35	18	1	19	26	8	0	1	2	6	0	113	16
Furadan	1.0	Pre	38	5	13	1	6	3	1	0	4	0	13	0	220	8
		1	2	4	10	0	2	1	2	0	0	2	3	0	15	4
		3	3	6	16	14	9	3	1	0	0	4	2	0	25	6
		7	8	1	8	0	3	1	2	0	0	2	2	0	14	12
		14	33	10	27	3	14	14	2	0	2	6	6	0	28	8
		21	75	43	22	2	14	21	5	0	2	3	2	0	20	41
DDT Toxaphene	2.0 4.0	Pre	20	4	4	2	8	0	4	0	3	1	15	0	198	3
		1	11	10	8	0	3	2	0	0	2	2	10	0	51	3
		3	17	10	3	0	4	0	1	0	0	3	2	0	44	9
		7	36	14	4	0	6	0	1	0	2	6	4	0	87	5
		14	59	24	14	6	10	12	1	0	2	7	8	0	33	11
		21	103	32	7	2	15	21	8	0	4	1	8	0	54	16
Supracide	1.0	Pre	33	0	6	0	13	0	2	0	0	0	8	0	147	6
		1	1	1	4	0	3	1	0	0	0	1	5	0	9	5
		3	7	0	4	0	2	0	0	0	2	3	1	0	35	2
		7	15	5	9	1	8	5	1	0	0	10	2	0	36	3
		14	74	30	16	4	6	14	1	0	1	11	1	0	65	14
		21	139	97	15	7	16	37	5	0	5	1	1	0	54	18

(Continued on next page)

Treatment 1/		Days after application 3/	Number of Predators and Parasites per 50 D-Vac samples 4/													
Insecticide 2/	AI/ Acre Lb.		Orius		Geocoris		Nabis		Collops		Lace-wing		Cocci-nellid		Bar Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L		
Dimethoate	0.5	Pre	55	5	4	0	8	2	0	0	3	0	9	0	222	6
		1	4	8	9	2	2	1	1	0	5	1	5	0	28	11
		3	22	3	7	1	9	5	0	0	3	6	3	0	70	8
		7	30	4	8	2	11	7	0	0	2	4	6	0	66	3
		14	64	34	17	4	11	18	0	0	2	6	1	0	75	4
		21	206	72	17	10	21	14	3	0	5	1	0	0	20	0
Baygon	1.0	Pre	29	3	4	1	3	0	0	0	2	2	18	0	129	12
		1	1	0	7	1	5	1	2	0	1	2	3	0	36	8
		3	13	3	5	2	7	0	2	0	4	0	3	0	78	9
		7	29	2	8	2	10	12	1	0	4	5	12	0	74	9
		14	44	33	18	8	5	45	1	0	1	12	3	0	44	8
		21	139	79	18	8	14	38	2	0	0	1	2	0	40	19
Thiodan + Toxaphene + oil (cotton seed oil)	1.0 3.0	Pre	43	3	6	2	11	3	2	0	4	0	17	0	316	3
		1	6	1	3	0	6	0	1	0	1	0	3	0	19	2
		3	11	1	1	0	6	0	0	0	1	0	4	0	31	6
		7	17	3	0	0	19	1	1	0	4	7	13	0	83	3
		14	51	25	14	1	7	11	2	0	0	12	9	0	23	14
		21	136	92	5	9	19	18	2	0	3	6	7	0	47	17
Thiodan + Toxaphene (no oil)	1.0 3.0	Pre	29	2	15	1	3	3	1	0	0	1	17	0	223	2
		1	11	3	2	0	7	1	1	0	3	0	4	0	37	8
		3	21	9	2	1	5	0	3	0	6	3	4	0	47	3
		7	22	10	2	0	11	2	1	0	6	7	9	0	49	5
		14	46	27	6	1	11	6	0	1	2	6	8	0	45	9
		21	199	64	3	1	14	16	6	0	1	2	4	0	57	19
DuPont 1410	1.0	Pre	29	10	11	2	6	3	2	1	9	1	12	0	234	3
		1	7	6	4	0	0	1	3	0	4	0	1	0	31	3
		3	6	5	5	1	1	1	3	0	1	5	5	0	25	5
		7	20	3	6	2	7	0	1	1	0	3	9	0	30	5
		14	48	30	12	0	9	10	1	0	1	7	2	0	36	4
		21	146	50	8	2	5	9	6	0	2	2	0	0	17	25

1/ Plot size 5 acres (165' x 1320') per treatment.

2/ Sprays applied 4:00 to 6:00 AM on June 8 with Snow aircraft at 10 GPA. Furadan was 4#/gal. flowable paste, Baygon was a 70% wettable powder, Dylox was an 80% soluble powder. The remaining insecticides were emulsifiable concentrates.

3/ Pretreatment counts were made June 7.

4/ 2-25 D-Vac samples per treatment on each sampling date.

LYGUS EXPERIMENT #2

Lygus bug populations in seed alfalfa plots treated for lygus bug control as shown by two methods of sampling. Diedrich Ranch, Firebaugh, California, 1971 1/.

Date of Application 2/	Days after Application 3/	Number of Lygus Bugs Per Sweep 4/								
		Treatment A			Treatment B			Treatment C		
		A	N	T	A	N	T	A	N	T
Pretreatment		4.2	3.0	7.2	1.7	2.6	4.3	1.1	1.5	2.6
June 23										
	6	0.6	1.4	2.1	0.1	0.6	0.7	0.3	0.7	1.0
	14	0.6	6.8	7.5	0.3	5.7	6.0	0.4	5.0	5.6
July 8										
	6	0.3	0.3	0.7	0.1	0.5	0.6	0.1	2.2	2.3
	14	0.7	0.9	1.6	1.0	0.8	1.8	1.9	0.4	2.3
	19	0.3	1.2	1.5	0.4	1.6	2.0	0.6	2.7	3.3
	27	1.0	12.4	13.4	1.8	28.4	30.3	1.2	40.1	41.3
August 5										
	5	0.2	0.3	0.4	1.0	2.3	3.3	1.7	12.7	14.4
	13	1.6	4.1	5.6	2.1	14.2	16.3	7.0	6.6	13.6
	19	2.1	16.5	18.6	1.3	71.3	72.6	1.3	46.2	47.5

1/ Plot size: each treatment 10 acres--non replicated.

2/ Insecticides were applied as sprays by aircraft at 15 GPA on June 23 and at 10 GPA on July 8 and August 5 as follows:
- TreatmentA. Carzol 0.5 lb. per acre.
- TreatmentB. Lannate 1.0 lb. + Galecron 1.0 lb. per acre on June 23. Lannate 1.0 lb. per acre on July 8 and August 5.
- TreatmentC. Dimethoate 0.5 lb. + Galecron 1.0 lb. per acre on June 23. DDT 2.0 lb. + Toxaphene 4 lb. per acre on July 8 and August 5.

3/ Pretreatment counts made June 22.

4/ Average of 18 sweeps per treatment on each sampling date.

5/ 2-25 D-Vac samples per treatment on each sampling date. (Data not recorded here, but is available upon request.)

NOTE: Galecron was added where indicated to the June 23 treatments to control a heavy infestation of two spotted spider mite.

LYGUS EXPERIMENT #2

Predator and parasite populations in a seed alfalfa plot treated with a standard treatment for lygus bug control. Diedrich Ranch, Firebaugh, California, 1971 1/.

Date of Application 2/	Days after Application 3/	Number of Predators and Parasites per 50 D-Vac Samples 4/													
		Orius		Geocoris		Nabis		Collops		Lacewing		Cocci-nellid		Par Wasps	Spiders
		A	N	A	N	A	N	A	L	A	L	A	L		
	Pre	94	20	16	43	13	55	0	0	5	2	4	0	82	9
June 23															
	6	15	18	7	38	15	72	1	0	19	5	1	0	112	64
	14	44	42	17	29	18	2	1	0	1	4	1	0	71	77
July 8															
	6	103	14	16	0	2	0	2	0	0	1	1	0	0	16
	14	129	114	3	0	3	3	8	2	0	0	0	0	9	38
	19	116	387	3	1	2	1	3	0	1	0	0	0	11	9
	27	210	29	5	1	0	14	8	5	3	16	0	0	7	79
August 5															
	5	6	16	2	0	0	0	1	1	0	9	0	0	0	202
	13	34	14	2	0	0	1	7	0	0	18	0	0	7	90
	19	22	143	0	4	0	1	9	7	3	23	0	0	11	244

1/ Plot size: 10 acres--non replicated.

2/ Dimethoate 0.5 lb. + Galecron 1.0 lb. per acre was applied by aircraft at rate of 15 GPA on June 23. DDT 2.0 lb. + Toxaphene 4.0 lb. per acre was applied on July 8 and August 5 by aircraft at 10 GPA.

3/ Pretreatment counts were made June 22.

4/ 2-25 D-Vac samples on each sampling date.

NOTE: Galecron was added to the June 23 treatment to control a heavy infestation of two-spotted spider mite.

LYGUS EXPERIMENT #2

Predator and parasite populations in a seed alfalfa plot treated with Lannate for lygus bug control. Diedrich Ranch, Firebaugh, California, 1971 1/.

Date of Application 2/	Days after Application 3/	Number of Predators and Parasites per 50 D-Vac Samples 4/													
		Orius		Greocoris		Nabis		Collops		Lacewing		Coccinellid		Par Wasps	Spiders
		A	N	A	N	A	N	A	L	A	L	A	L		
	Pre	117	34	84	68	21	102	1	0	7	5	12	2	77	41
June 23															
	6	10	3	4	77	5	8	1	0	1	4	2	0	69	75
	14	57	68	6	67	4	30	0	0	0	0	1	0	57	88
July 8															
	6	5	6	128	27	0	0	1	0	0	2	0	0	7	35
	14	24	0	144	23	1	1	1	1	0	3	0	0	34	39
	19	26	5	61	30	2	0	0	2	2	2	0	3	41	74
	27	63	4	48	19	2	17	13	8	4	13	0	24	63	87
August 5															
	5	3	3	5	0	1	0	2	0	0	6	0	0	3	112
	13	28	1	17	1	0	7	7	0	1	6	0	0	21	66
	19	6	2	10	4	0	21	5	0	1	46	0	0	8	97

1/ Plot size: 10 acres--non replicated.

2/ Lannate 1.0 lb. + Galecron 1.0 lb. per acre was applied by aircraft at rate of 15 GPA on June 23. Only Lannate at 1.0 lb. per acre was applied on July 8 and August 5 by aircraft at 10 GPA.

3/ Pretreatment counts were made June 22.

4/ 2-25 D-Vac samples on each sampling date.

NOTE: Galecron was added to the June 23 treatment to control a heavy infestation of two-spotted spider mite.

LYGUS EXPERIMENT #2

Predator and parasite populations in a seed alfalfa plot treated with Carzol for lygus bug control. Diedrich Ranch, Firebaugh, California, 1971 1/.

Date of Application 2/	Days after Application 3/	Number of Predators and Parasites per 50 D-Vac Samples 4/													
		Orius		Geocoris		Nabis		Collops		Lacewing		Coccinellid		Par Wasps	Spiders
		A	N	A	N	A	N	A	L	A	L	A	L		
	Pre	178	38	86	136	24	118	5	0	14	3	10	1	90	25
June 23															
	6	32	63	14	94	5	24	2	0	2	6	2	0	83	94
	14	57	68	6	67	4	30	0	0	0	0	1	0	57	88
July 8															
	6	6	8	7	29	1	3	1	0	0	0	1	0	0	20
	14	9	0	1	0	2	1	12	4	2	0	2	0	6	22
	19	12	3	0	2	0	0	3	4	0	0	1	63	10	22
	27	24	0	3	0	0	0	32	39	5	50	0	108	11	28
August 5															
	5	3	0	0	1	0	0	1	6	8	1	0	0	1	30
	13	40	5	1	0	0	0	33	5	11	10	2	2	12	90
	19	47	7	1	0	0	0	27	2	53	28	3	24	35	68

1/ Plot size: 10 acres--non replicated.

2/ Carzol was applied as a spray by aircraft at 0.5 lbs. per acre at rate of 15 GPA on June 23. Carzol at 0.5 lb. per acre was applied on July 8 and August 5 at 10 GPA.

3/ Pretreatment counts were made June 22.

4/ 2-25 D-Vac samples on each sampling date.

LYGUS EXPERIMENT #2

Spotted alfalfa aphid and pea aphid populations in seed alfalfa plots treated for lygus bug control. Diedrich Ranch, Firebaugh, California, 1971 1/.

Date of Application 2/	Days after Application 3/	Number of aphids per 50 D-Vac Samples 4/					
		Treatment A		Treatment B		Treatment C	
		SAA	PA	SAA	PA	SAA	PA
	Pretreatment	1	1	0	0	4	1
June 23							
	6	4	0	0	0	0	0
	14	22	11	1	1	0	1
July 8							
	6	97	57	1	1	1	0
	14	202	540	10	0	0	1
	19	310	6772	6	7	14	8
	27	910	979	41	3	84	0
August 5							
	5	2080	297	41	1	49	0
	13	2714	760	58	0	22	0
	19	7614	5449	12	0	15	0

1/ Plot size: Each treatment 10 acres--non replicated.

2/ Insecticides were applied as sprays by aircraft at 15 GPA on June 23 and at 10 GPA on July 8 and August 5 as follows:

Treatment A. Carzol 0.5 lb. per acre.
Treatment B. Lannate 1.0 lb. + Galecron 1.0 lb. per acre on June 23. Lannate 1.0 lb. per acre on July 8 and August 5.
Treatment C. Dimethoate 0.5 lb. + Galecron 1.0 lb. per acre on June 23. DDT 2.0 lb. + Toxaphene 4.0 lb. per acre on July 8 and August 5.

3/ Pretreatment counts made June 22.

4/ 2-25 D-Vac samples per treatment on each sampling date.

NOTE: Galecron was added where indicated to the June 23 treatments to control a heavy infestation of two-spotted spider mite.

Mite populations in seed alfalfa plots treated for lygus bug control. Diedrich Ranch, Firebaugh, California, 1971 1/.

Date of Application 2/	Days after Application 3/	Average Number of Mites and Mite Eggs per Trifoliate Leaf 4/					
		Treatment A		Treatment B		Treatment C	
		Mites	Eggs	Mites	Eggs	Mites	Eggs
	Pre	38.8	56.9	34.9	49.2	44.1	33.9
June 23							
	6	8.3	6.1	3.0	11.7	1.4	0.3
	14	4.3	7.4	24.4	4.6	1.6	1.5
July 8							
	6	0.4	0.8	0.5	0.2	0.4	1.0
	14	0.3	1.0	3.4	6.5	2.4	2.4
	19	0.5	1.4	7.0	19.6	5.6	13.4
	27	0.5	0.7	14.8	23.8	11.7	4.7
August 5							
	5	0.2	0.7	14.8	14.3	7.2	10.5
	13	0.04	0.6	39.6	52.6	17.3	22.4
	19	0.3	2.2	55.9	57.4	17.5	17.9

1/ Plot size: Each treatment 10 acres--non replicated.

2/ Insecticides were applied as sprays by aircraft at 15 GPA on June 23 and at 10 GPA on July 8 and August 5 as follows:

Treatment A. Carzol 0.5 lb. per acre.
Treatment B. Lannate 1.0 lb. + Galecron 1.0 lb. per acre on June 23. Lannate 1.0 lb. per acre on July 8 and August 5.
Treatment C. Dimethoate 0.5 lb. + Galecron 1.0 lb. per acre on June 23. DDT 2.0 lb. + Toxaphene 4.0 lb. per acre on July 8 and August 5.

3/ Pretreatment counts made June 22.

4/ 75 infested trifoliate leaves examined from each treatment on each sampling date.

NOTE: Galecron was added where indicated to the June 23 treatments to control a heavy infestation of two-spotted spider mite.

LYGUS EXPERIMENT #3

Lygus bug populations in seed alfalfa plots treated with granular systemic insecticides applied to the soil. Frank Motte Ranch, San Joaquin, California, 1971.

Treatment 1/				Number of lygus bugs		
	AI/ Acre	Days after	Days after	Per sweep 5/		
Insecticide 2/	Lb.	Application 3/	Irrigation 4/	Adults	Nymphs	Total
		Pre-treatment	--	0.5	1.6	2.1
Baygon	3.0	14 a>	8	0.7	2.3	3.0
15%		21	15	0.8	0.6	1.3
granules		28 a>	22	1.5	2.4	3.9
		35	29	1.2	2.5	3.7
		Pre	--	0.6	1.1	1.7
Furadan	3.0	14	8	0.7	2.2	2.9
10%		21 a>	15	0.4	0.6	1.0
granules		28	22	0.9	2.6	3.5
		35	29	1.1	6.9	8.0
		Pre	--	0.8	1.5	2.3
DuPont 1410	3.0	14	8	0.9	1.6	2.5
10%		21	15	1.3	2.1	3.4
granules		28	22	1.5	6.2	7.7
		35	29	2.1	9.2	11.3
		Pre	--	0.5	0.9	1.4
Temik	3.0	14	8	0.3	0.4	0.7
10%		21	15	0.7	0.2	0.9
granules		28	22	0.7	0.6	1.3
		35	29	0.4	4.4	4.8

Treatment [1] Insecticide [2]	AI/ Acre Lb.	Days after Application [3]	Days after Irrigation [4]	Number of lygus bugs Per sweep [5] Adults	Nymphs	Total
Check (No treatment)	None	Pre		0.5	1.3	1.8
		14 a>	8	1.4	1.8	3.3
		21	15	0.6	0.3	0.8
		28	22	1.1	4.8	5.9
		35	29	0.8	7.2	8.0
Grower treatment [7]		Pre	--	-	-	-
		14 a>	8	0.8	2.2	3.0
		21	15	0.6	0.2	0.8
		28 b>	22	0.9	2.3	3.2
		35	29	0.4	0.1	0.6

[1] Plot size: (48 rows wide 1240' long) approximately 5 acres per treatment.

[2] Granules were placed on both sides of row 12" from center and 6" below soil surface (1" below bottom of irrigation furrow) with a four row commercial applicator 12:30 to 8:00 PM on May 26.

[3] Pretreatment counts were made 9:00 to 10:00 AM May 26.

[4] Plots were irrigated June 1.

[5] Average of 18 sweeps per treatment on each sampling date.

[6] 2-25 D-Vac samples per treatment on each sampling date. (Data not recorded here, but is available upon request.)

[7] Grower applications by aircraft: a> June 10--Bidrin 0.5# per acre plus Kelthane 1.5# per acre;
b> June 24--TEPP 0.5# per acre plus Toxaphene 2.0# per acre.

a> Insecticide spray drift from grower treatment affected plot.

NOTE: All granular treatments required additional treatments for lygus bug control within four weeks following irrigation.

LYGUS EXPERIMENT #3

Spotted alfalfa aphid and pea aphid populations in seed alfalfa plots treated with granular systemic insecticides applied to the soil.

Frank Motte Ranch, San Joaquin, California, 1971.

Treatment 1/		Days after application 3/	Days after irrigation 4/	Number of aphids per 50 D-Vac samples 5/	
Insecticide 2/	AI/ acre			S.A.A.	P.A.
Baygon 15% granules	3.0	Pre	-	2	10
		14	8	0	16
		21	15	0	11
		28	22	8	0
		35	29	6	0
Furadan 10% granules	3.0	Pre	0	2	6
		14	8	5	10
		21	15	1	2
		28	22	5	1
		35	29	1	0
DuPont 1410 10% granules	3.0	Pre	-	1	6
		14	8	5	23
		21	15	1	7
		28	22	2	0
		35	29	0	0
Temik 10% granules	3.0	Pre	-	2	13
		14	8	1	2
		21	15	1	0
		28	22	0	0
		35	29	0	0
Check (no treatment)	None	Pre	-	3	8
		14	8	0	18
		21	15	7	12
		28	22	9	2
		35	29	1	0

1/ Plot size (48 rows wide, 1240' long) approximately 5 acres per treatment.

2/ Granules were placed on both sides of row 12" from center and 6" below soil surface (1" below bottom of irrigation furrow) with a four row commercial applicator 12:30 to 8:00 PM on May 26.

3/ Pretreatment counts were made 9:00 to 10:00 AM May 26.

4/ Plots were irrigated June 1.

5/ Two 25 D-Vac samples per treatment on each sampling date.

LYGUS EXPERIMENT #3

Predator and parasite populations in seed alfalfa plots treated with granular systemic insecticides applied to the soil to control lygus bugs. Frank Motte Ranch, San Joaquin, California, 1971.

Treatment 1/		Days after application 3/	Days after irrigation 4/	Number of Predators and Parasites per 50 D-Vac samples 5/													
				Orius		Geocoris		Nabis		Collops		Lace-wing		Cocci-nellid		Par Wasps	Spiders
Insecticide 2/	AI/ Acre Lb.			A	N	A	N	A	N	A	L	A	L	A	L		
		Pre	--	28	14	2	6	7	5	1	0	0	0	20	1	74	8
Baygon	3.0	14	8	150	69	2	7	6	30	1	0	26	0	22	0	292	40
15%		21	15	145	96	9	14	17	118	2	0	13	2	4	0	187	71
granules		28	22	238	190	29	21	12	127	1	0	0	7	6	0	24	53
		35	29	246	113	47	22	32	70	0	0	1	3	9	0	63	62
		Pre	--	18	26	5	3	2	3	1	0	0	0	16	2	120	26
Furadan	3.0	14	8	133	100	7	13	10	27	5	0	18	0	27	0	278	35
10%		21	15	123	78	8	17	23	119	0	0	2	3	3	0	149	59
granules		28	22	336	354	18	10	23	106	0	0	2	9	3	0	26	42
		35	29	378	308	72	52	28	76	2	0	3	4	2	0	45	46
		Pre	--	27	18	3	5	1	1	0	0	0	0	9	0	128	8
DuPont 1410	3.0	14	8	162	116	20	13	7	41	1	0	18	0	39	0	447	31
10%		21	15	189	111	8	9	24	86	1	0	3	3	6	0	118	44
granules		28	22	339	261	35	21	17	113	2	0	0	10	0	0	37	21
		35	29	415	416	78	37	36	77	2	0	0	2	4	0	32	63
		Pre	--	37	31	8	0	2	4	0	0	1	0	4	2	69	11
Temik	3.0	14	8	87	67	4	3	7	11	1	0	3	1	19	0	354	76
10%		21	15	76	79	11	18	5	10	1	1	3	5	5	0	94	46
		28	22	288	352	20	16	4	6	1	0	1	7	0	0	54	40
		35	29	462	559	49	15	10	3	0	0	1	4	0	0	59	72
		Pre	--	21	23	0	5	3	0	0	0	0	0	46	0	68	12
Check	None	14	8	167	111	3	2	7	28	0	0	13	2	70	0	202	31
No treatment		21	15	182	104	11	22	26	143	3	0	4	4	11	0	113	78
		28	22	360	301	23	19	15	122	0	0	0	5	4	0	44	15
		35	29	677	343	45	63	44	111	1	0	1	1	7	0	12	72

1/ Plot size: each treatment approximately 5 acres (48 rows x 1240').

2/ Granules were placed on both sides of row 12" from center and 6" below soil surface (1" below bottom of furrow) with a four row commercial applicator 12:30 to 8:00 PM May 26.

3/ Pretreatment counts were made 9:00 to 10:00 AM May 26.

4/ Plots were irrigated June 1.

5/ 2-25 D-Vac samples per treatment on each sampling date.

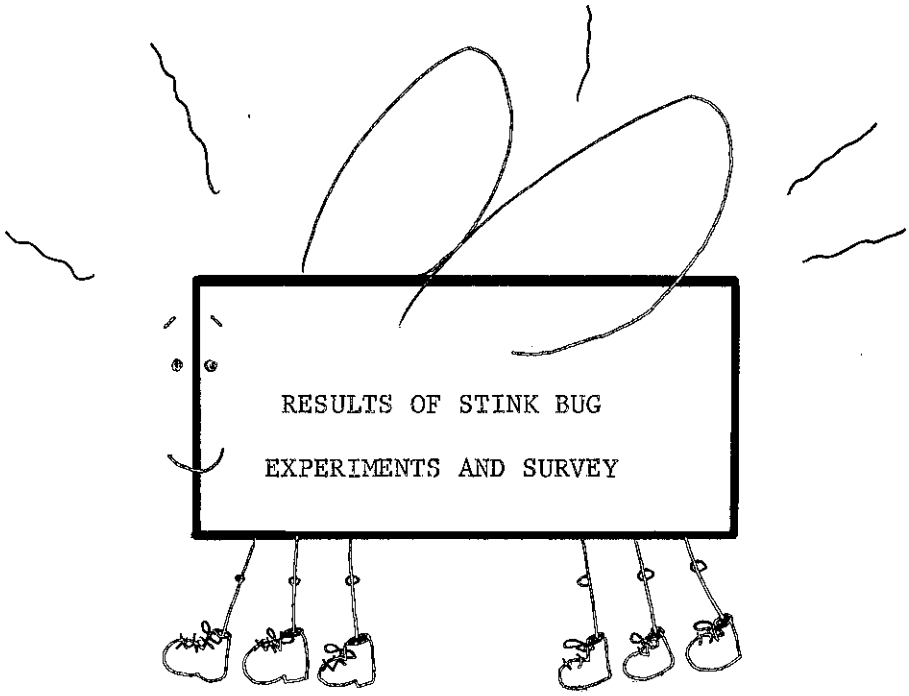
Lygus bug populations in seed alfalfa plots treated with Temik to control lygus bugs.

Crevolin Ranch, Firebaugh, California, 1971.

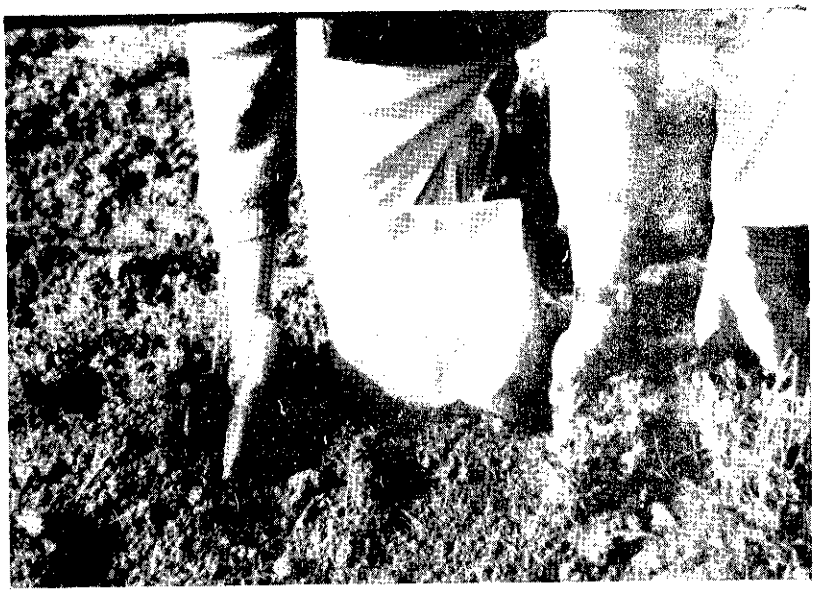
Date	Treatment		Date of Sample	Number of Lygus Bugs per Sweep 2/		
	Insecticide 1/	AI/Acre lb.		Adults	Nymphs	Total
June 9	Temik 10% granules	3.0	June 30	0.1	0.4	0.5
			July 8	1.2	0.5	1.7
			July 14	0.7	0.9	1.6
			July 22	1.8	3.9	5.7
June 2	Meta-Systox-R + Kelthane	0.375 1.5	June 30	1.4	1.7	3.1
			July 8	0.8	6.0	6.8
			July 14	1.6	3.3	4.9
			July 22	1.5	12.0	13.5

1/ Meta-Systox-R and Kelthane were applied with a ground sprayer. Temik granules were incorporated into the soil with a four row commercial applicator. The granule plot was irrigated on June 14.

2/ Average of 16 sweeps per treatment on each sampling date.



Insect and damaged seed counts in the following tables are not indicative of the entire field where counts were made because in several fields the sampled areas were purposely not treated so that stink bug populations effects could be studied.



The sampling procedures for stink bug populations from November to April in seed alfalfa involved removing 10" of plant row by pruning roots below the soil surface.

Stink bugs were then picked by hand from the alfalfa crowns and plant debris.

Evaluation of sampling methods to determine adult populations of Euschistus conspersus in seed alfalfa fields. Firebaugh, California, 1970.

Experiment No.	Sampling Method	Number of Stink Bugs	
		Alive	Dead
A 1/	25' of row was clipped with a mechanical sythe. A D-Vac sample was taken from each of 10 locations in the clipped area.	1	2
	A root crown sample (10 inches of row) was taken from each of the 10 D-Vac sample locations mentioned above.	5	15
B 2/	Visual inspection of the foliage in six 10' sections of rows without disturbing the plants.	41	0
	100 D-Vac samples taken in same row areas indicated above.	5	0

1/ Enrico Farms, Inc.--November 10.

2/ Echeveste and Elizaldi, Sec. 2, Field #3--November 11. Plants were 18" in height and had not been clipped since harvest.

WINTER SURVEY RESULTS

Adult Euschistus conspersus populations on the root crowns of seed alfalfa during the winter season. Fresno County, California, 1970-71.

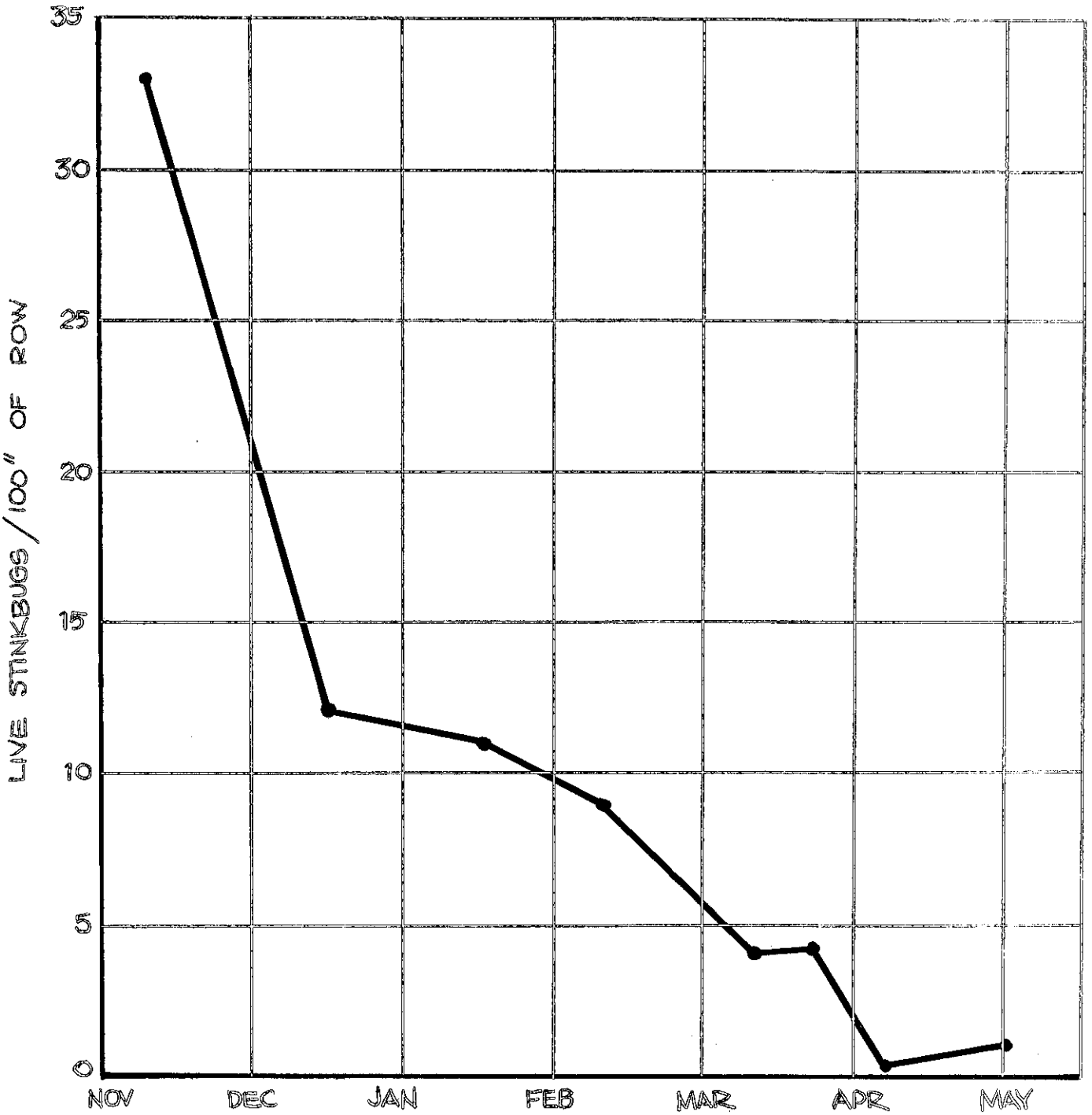
Field	Grower and Location	Alive or Dead	Number of stink bugs per 100 inches of row on dates indicated 1/							
			Nov 10	Dec 15	Jan 13	Feb 10	Mar 11	Mar 23	Apr 6	Apr 30
A	John Nakamura Sec. 34-12-13 Firebaugh	Alive	32	17	12	16	10	6	0	1
		Dead	9	1	3	1	1	1	0	0
B	Enrico Farms Inc. Sec. 3-13-13 Firebaugh	Alive	17	17	13	12	3	7	0	4
		Dead	39	34	40	28	32	25	22	3
C	John Nakamura Sec. 11-13-13 Firebaugh	Alive	107	10	14	5	7	9	1	1
		Dead	5	1	2	1	6	0	1	0
D	Giffen Cantua Ranch Sec. 26-17-15 West of Five Points	Alive	11	2	13	11	1	2	0	0
		Dead	4	0	8	0	3	0	3	0
E	Echeveste & Elizaldi Sec. 2-13-13 Field #3 Firebaugh	Alive	29	20	11	11	1	2	1	2
		Dead	2	1	0	4	0	0	1	0
F	Nicolini & Maitia Sec. 9-13-13 Firebaugh	Alive	34	16	12	6	4	4	0	-
		Dead	6	0	5	3	1	1	0	-
G	Benson Sec. 28-18-17 Five Points	Alive	-	1	3	1	1	0	0	0
		Dead	-	1	0	0	0	1	2	0

1/ 10 samples, each consisting of 10 row inches of root crowns were taken in each field on each date. No live nymphs were found on root crown samples.

Winter and Early Spring

1970-71 Stink Bug Population Survey in Fresno County

(Average Populations from 7 Alfalfa Seed Fields)



A "beating pan" proved effective for measuring stink bug populations during the warm months of May through September.

The pan is placed between two rows of alfalfa seed and the alfalfa plants on both sides are bent over the pan for beating. Instar stages of the stink bug life cycle can be followed with this sampling device with more success than with a sweep net or devac machine.

A comparison of three sampling methods for measuring populations of the consperse stink bug, Euschistus conspersus, in seed alfalfa. Nicolini and Maitia Ranch, Firebaugh, California, 1971.

Sampling Method 1/ 2/	Number of Stink Bugs									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
D-Vac	4	1	5	0	0	1	1	0	2	7
Sweep net	2	6	8	0	0	1	1	1	3	11
Beating pan	50	38	88	0	0	13	17	22	52	140

1/ Samples taken on July 6 in parallel rows in the same portion of the field.

2/ D-Vac = 25 square foot sucks with the D-Vac sampler.

Sweep net = 5 2-sweep samples (10 sweeps).

Beating pan = 5 pan samples, i.e. 25' of row (5' of row per sample).

A comparison of two methods of examining samples taken with a beating pan, for measuring populations of the consperse stink bug, Euschistus conspersus, in seed alfalfa. 1971.

Examination Method 1/	Number of Stink Bugs									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
Visual counts in field	23	13	36	0	62	11	0	14	87	123
Berlese separation	19	10	29	10	87	17	7	17	138	167

1/ Duplicate samples of 5 pans each (25' of row) were taken in the field with the beating pan. Half of the samples were examined in the field and the bugs observed in the pan samples were counted. The remaining half of the samples were brought to the laboratory and placed in Berlese separatory funnels for 24 hours, after which the separated insects were counted.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts. Field A. John Nakamura Section 34, Firebaugh, California, 1971.

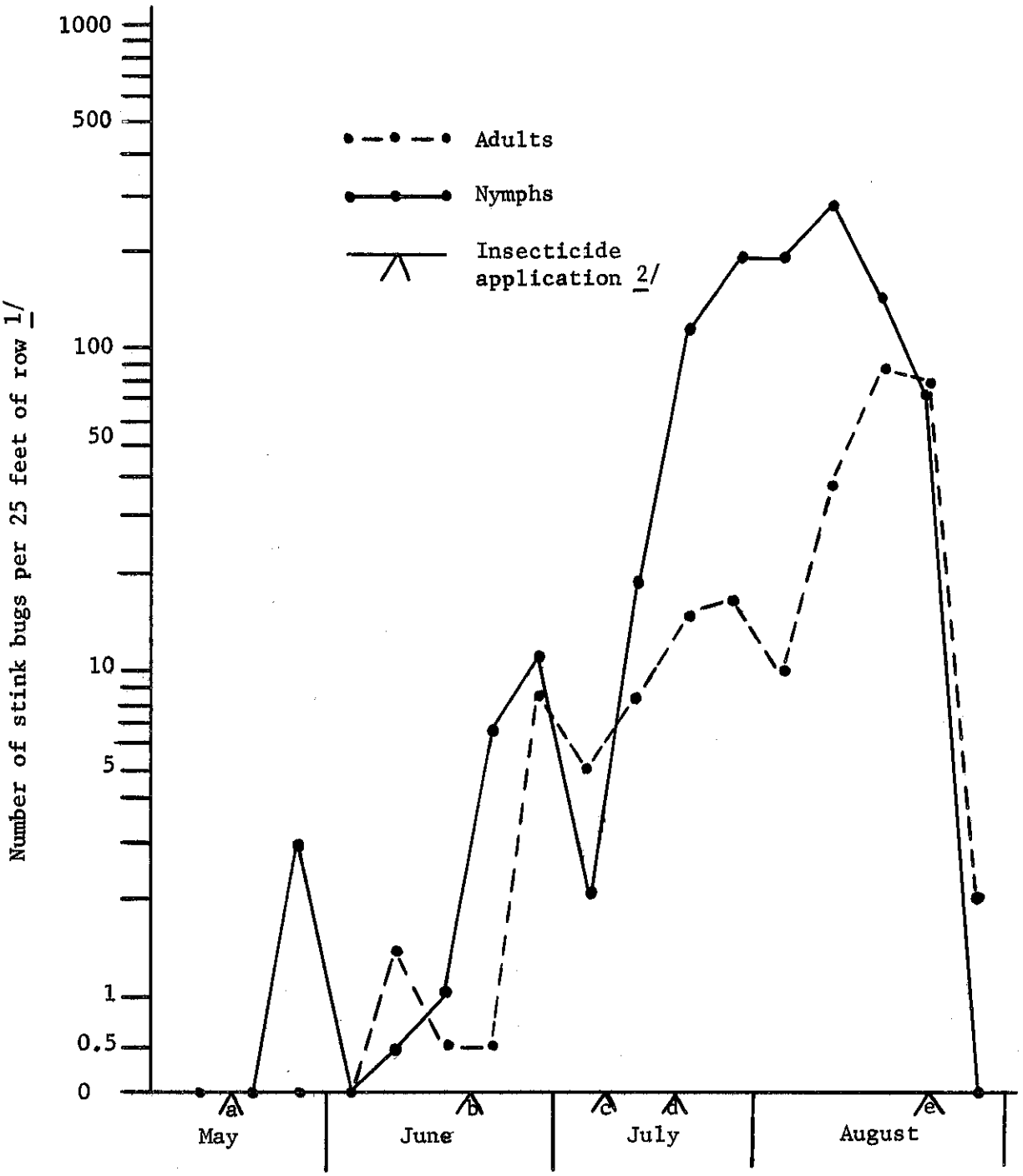
Dates field sampled 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
May 11 a)	0	0	0	0	0	0	0	0	0	0
May 17	0	0	0	0	0	0	0	0	0	0
May 25	0	0	0	0.5	2.5	0	0	0	3	3
June 2	0	0	0	0	0	0	0	0	0	0
June 8	0	1.5	1.5	0	0	0.5	0	0	0.5	2
June 15 b)	0	0.5	0.5	0	0	1	0	0	1	1.5
June 21	0	0.5	0.5	0	1	3.5	2	0	6.5	7
June 29	5.5	3.5	9	0	2	4	3	2.5	11.5	20.5
July 6 c)	2.5	2	4.5	1	0.5	0.5	0	0	2	6.5
July 13 d)	3.5	5	8.5	0	13.5	2.5	0	3	19	27.5
July 20	8.5	7	15.5	8.5	85.5	8	1.5	9	112.5	128
July 27	7	10	17	1	139	26	12	14	192	209
August 3	3	7	10	3	71	41	8	60	182	193
August 11	22	16	38	2	31	32	60	157	282	320
August 17	47	42	89	0	7	7	53	77	144	233
August 24 e)	49	32	81	0	0	4	14	53	71	152
August 31	1	1	2	0	0	0	0	0	0	2

1/ Insecticide applications
- a) May 15 Dimethoate 0.5#/acre + Kelthane 1.5#/acre
- b) June 18 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
- c) July 8 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
- d) July 19 Dylox 1.0#/acre + Galecron 0.75#/acre
- e) August 24 Methyl Parathion 1.2#/acre

2/ 5 beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Field A. John Nakamura Sec. 34, Firebaugh, California 1971.



1/ 5 beating pan samples on each date.

2/ a May 15 Dimethoate 0.5#/acre + Kelthane 1.5#/acre
b June 18 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
c July 8 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
d July 19 Dylox 1.0#/acre + Galecron 0.75#/acre
e August 24 Methyl Parathion 1.2#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey - Field A.

John Nakamura, Sec. 34, Firebaugh, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus Bug	Stink Bug	Shriveled	Water Damage	Green	Other	
	a	119	1	15	11	5	0	3	1	155
	b	118	1	16	19	0	0	4	0	158
1	c	116	5	13	9	0	1	5	1	150
	d	119	0	12	11	0	1	3	2	148
	Totals	472	7	56	50	5	2	15	4	611
	a	103	3	20	22	1	0	2	4	155
	b	105	3	17	10	1	0	3	2	141
2	c	86	2	14	15	2	0	3	6	128
	d	90	3	24	20	1	0	2	0	140
	Totals	384	11	75	67	5	0	10	12	564
	a	140	1	11	10	0	0	1	3	166
	b	119	1	6	17	0	2	6	0	151
3	c	112	2	22	13	0	0	0	1	150
	d	112	1	7	21	1	2	2	0	146
	Totals	483	5	46	61	1	4	9	4	613
	a	114	3	11	18	0	0	1	2	149
	b	117	0	12	23	4	0	5	1	162
4	c	124	1	10	14	3	0	4	0	156
	d	129	1	10	13	2	0	5	1	161
	Totals	484	5	43	68	9	0	15	4	628
	Totals	1823	28	220	246	20	6	49	24	2416
	% of total	75.5	1.15	9.10	10.2	0.82	0.24	2.02	1.00	100

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

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts. Field B. Enrico Farms, Firebaugh, California, 1971.

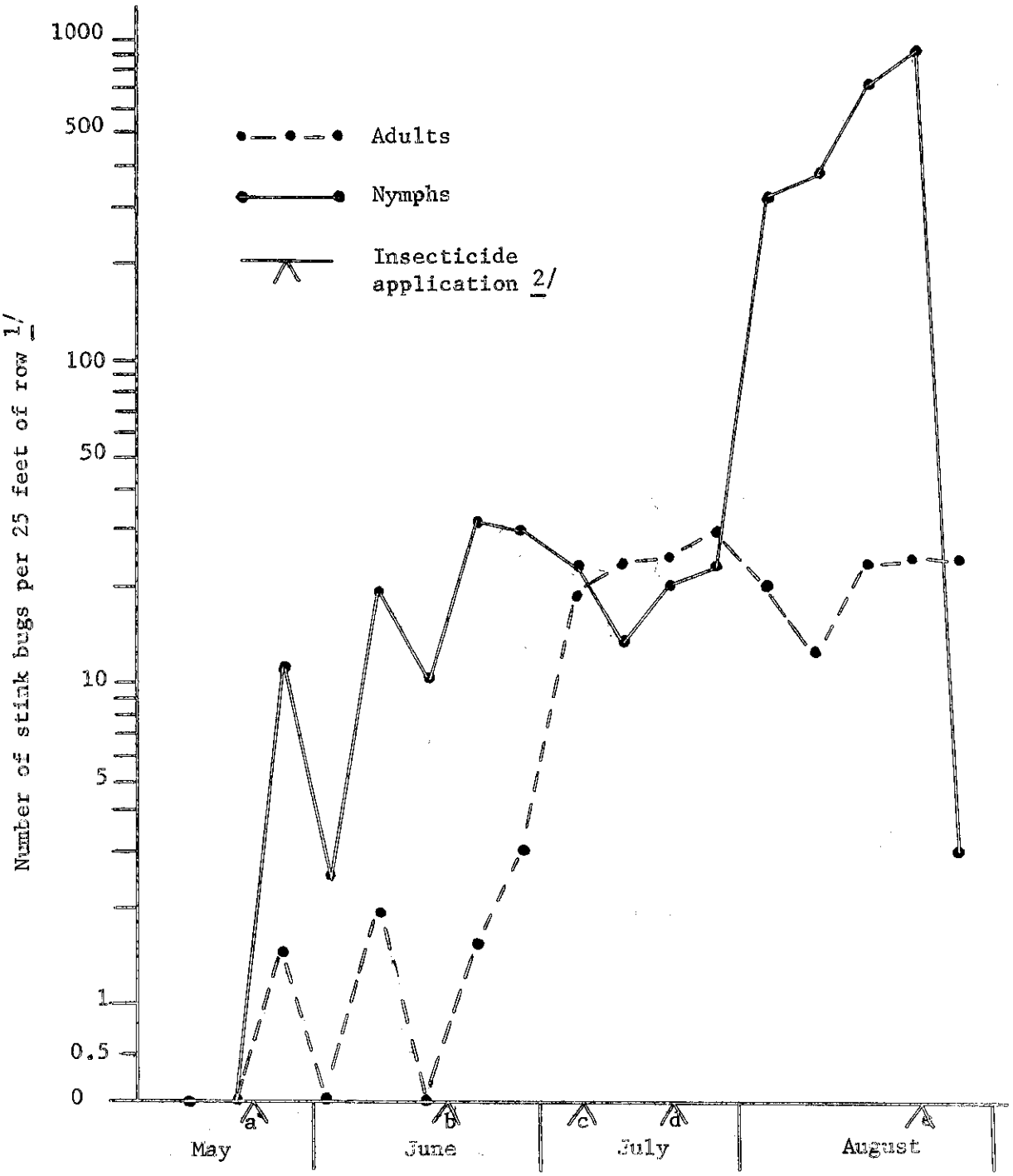
Dates field sampled 1/	Number of Stink Bugs per 25' of row 2/									
	Adults			Nymphal Instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
May 11	0	0	0	0	0	0	0	0	0	0
May 17	0	0	0	0	0	0	0	0	0	0
a) May 25	1	0.5	1.5	7.5	3	1.5	0	0	12	13.5
June 2	0	0	0	0	2.5	0	0	0	2.5	2.5
June 8	1.5	0.5	2	0	15.5	4	0	0	19.5	21.5
June 15	0	0	0	0	0.5	8.5	1	0	10	10
b) June 21	1	0.5	1.5	0	17	10.5	4	0	31.5	33
June 29	0.5	2.5	3	0	10	6.5	3.5	10	30	33
July 6	10	9	19	0	2	13.5	2	6	23.5	42.5
c) July 13	14	9	23	0	3.5	1	0.5	8.5	13.5	36.5
July 20	12	11.5	23.5	1.5	16.5	1	0	1.5	20.5	44
d) July 27	15	15	30	2	10	10	0	1	23	53
August 3	8	11	19	46	222	24	4	23	319	338
August 11	3	9	12	7	209	121	18	14	369	381
August 17	13	10	23	1	102	88	216	96	702	725
August 24	11	13	24	2	145	186	265	341	929	953
e) August 31	12	12	24	0	0	0	0	3	3	27

1/ Insecticide applications
- a) May 20 Kelthane 1.0#/acre + Dimethoate 0.334#/acre
- b) June 18 Meta-Systox-R 0.375#/acre + Dylox 1.0#/acre
- c) July 7 Meta-Systox-R 0.375#/acre + Dylox 1.0#/acre + Galecron 1.0#/acre
- d) July 21 Dylox 1.0#/acre + Toxaphene 4.0#/acre
- e) August 26 Methyl Parathion 1.25#/acre

2/ Five beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Field B. Enrico Farms, Firebaugh, California, 1971.



1/ 5 beating pan samples on each date.

2/
a May 20 Kelthane 1.0#/acre + Dimethoate 0.334#/acre
b June 18 Meta-Systox-R 0.375#/acre + Dylox 1.0#/acre
c July 7 Meta-Systox-R 0.375#/acre + Dylox 1.0#/acre + Galecron 1.0#/acre
d July 21 Dylox 1.0#/acre + Toxaphene 4.0#/acre
e August 26 Methyl Parathion 1.25#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey - Field B.

Enrico Farms, Firebaugh, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus Bug	Stink bug	Shriveled	Water Damage	Green	Other	
1	a	129	1	3	20	0	2	18	0	173
	b	142	0	9	21	0	0	19	0	191
	c	134	1	10	22	0	1	23	0	191
	d	137	0	2	26	0	0	22	0	187
	Totals	542	2	24	89	0	3	82	0	742
2	a	136	1	3	9	2	2	11	0	164
	b	133	0	6	13	0	1	15	0	168
	c	137	0	6	11	0	0	16	0	170
	d	141	0	4	16	0	2	8	0	171
	Totals	547	1	19	49	2	5	50	0	673
3	a	156	0	3	16	0	1	16	0	192
	b	147	0	3	13	0	2	13	0	178
	c	154	1	2	19	0	0	25	0	201
	d	153	0	3	13	0	0	12	0	181
	Totals	610	1	11	61	0	3	66	0	752
4	a	137	0	3	19	0	2	4	1	166
	b	167	0	3	10	0	0	12	0	192
	c	156	1	3	12	0	0	8	0	180
	d	160	0	2	22	0	1	6	0	191
	Totals	620	1	11	63	0	3	30	1	729
	Totals	2319	5	65	262	2	14	228	1	2896
	% of total	80.1	.17	2.2	9.1	.07	.48	7.9	.03	100

1/ Four 2-quart samples of pods were hand stripped from plants on September 8 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts. Field C. John Nakamura Sec. 11, Firebaugh, California, 1971.

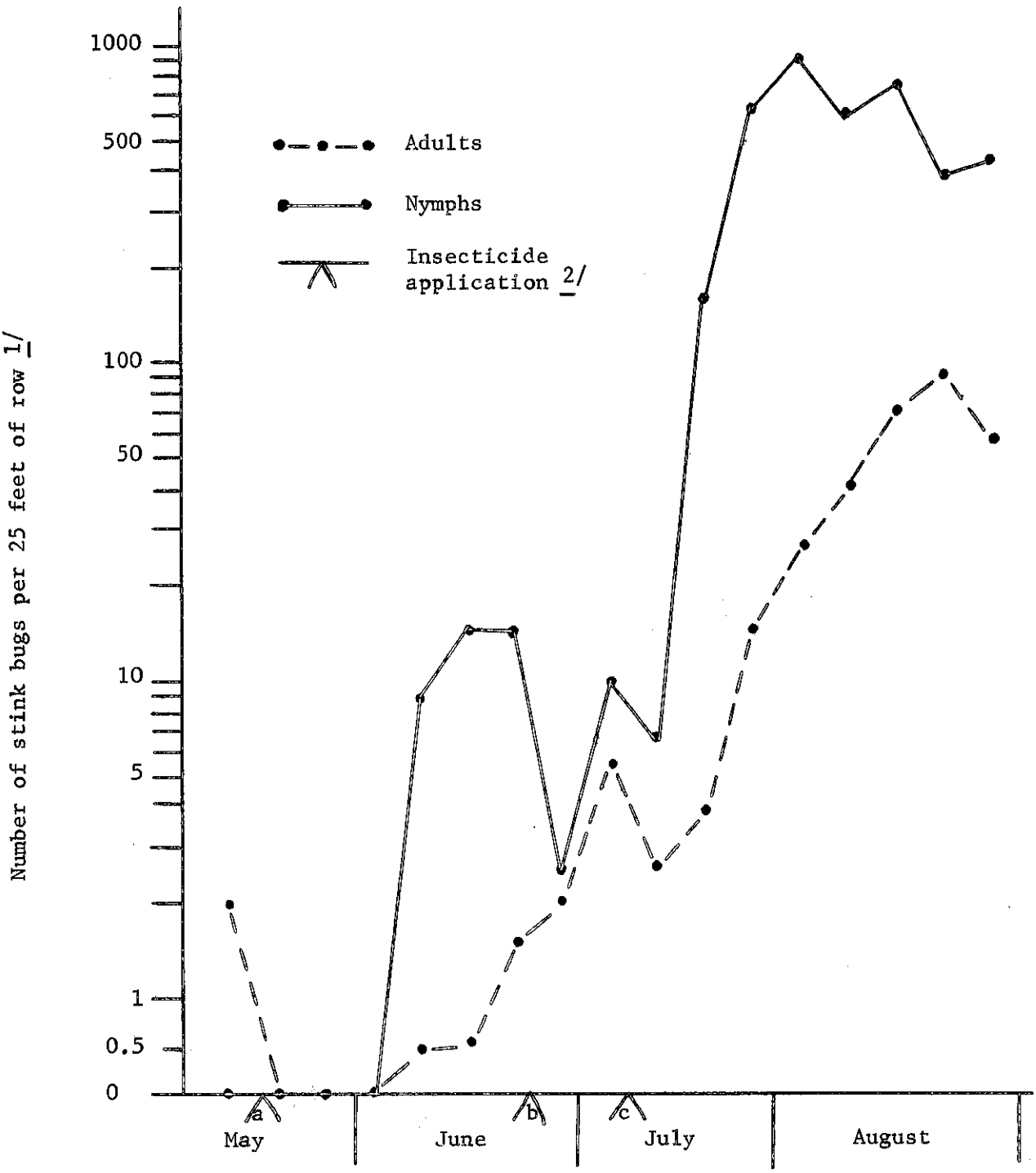
Dates field sampled 1/	Number of Stink Bugs per 25' of row 2/									
	Adults			Nymphal Instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
May 11 a)	-	-	2	0	0	0	0	0	0	2
May 17	0	0	0	0	0	0	0	0	0	0
May 25	0	0	0	0	0	0	0	0	0	0
June 2	0	0	0	0	0	0	0	0	0	0
June 8	0.5	0.5	1	0	6.5	2	0	0	8.5	9.5
June 15	0	0.5	0.5	0	6	3	4	1.5	14.5	15
June 21 b)	1.5	1.5	3	0	0.5	0.5	7	6.5	14.5	17.5
June 29	4.5	2	6.5	0	0	0	1.5	1	2.5	9
July 6 c)	11	5.5	16.5	0.5	4	0	0	1	5.5	22
July 13	4	2.5	6.5	1	4.5	0.5	0	0.5	6.5	13
July 20	5.5	4	9.5	6	126	24.5	1.5	5.5	163.5	173
July 27	8	14	22	14	434	108	18	40	614	636
August 3	22	26	50	21	252	278	95	263	904	954
August 11	43	40	83	5	280	150	45	118	598	681
August 17	78	70	148	0	64	262	341	74	741	889
August 24	104	90	194	0	21	87	164	105	377	571
August 31	60	57	117	0	13	42	88	287	430	547

1/ Insecticide applications
- a) May 15 Dimethoate 0.5#/acre + Kelthane 1.5#/acre
- b) June 22 Dibrom 0.75#/acre + Toxaphene 4.0#/acre + Galecron 0.75#/acre
- c) July 8 Dibrom 1.0#/acre + Toxaphene 4.0#/acre

2/ 5 beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Field C. John Nakamura Sec. 11, Firebaugh, California, 1971.



1/ 5 beating pan samples on each date.

2/ a May 15 Dimethoate 0.5#/acre + Kelthane 1.5#/acre
b June 22 Dibrom 0.75#/acre + Toxaphene 4.0#/acre + Galecron 0.75#/acre
c July 8 Dibrom 1.0#/acre + Toxaphene 4.0#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey - Field C.

John Nakamura, Sec. 11, Firebaugh, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug	Stink Bug	Shriveled	Water Damage	Green	Other	
	a	64	0	11	46	0	0	7	2	130
	b	55	0	21	34	0	0	6	3	119
1	c	74	0	11	39	0	0	6	3	133
	d	68	0	34	42	0	0	10	3	157
	Totals	261	0	77	161	0	0	29	11	539
	a	86	0	17	61	0	1	5	0	170
	b	58	0	19	51	0	1	4	0	133
2	c	60	0	30	55	0	1	1	1	148
	d	57	0	24	50	1	1	7	0	140
	Totals	261	0	90	217	1	4	17	1	591
	a	71	0	30	86	1	1	6	1	196
	b	75	0	11	75	0	3	2	3	169
3	c	72	0	27	80	1	0	1	1	182
	d	74	0	27	73	1	0	2	0	177
	Totals	292	0	95	314	3	4	11	5	724
	a	112	0	12	43	0	0	2	0	169
	b	113	0	13	43	0	0	3	3	175
4	c	101	0	19	42	0	0	4	2	168
	d	115	0	18	50	0	0	3	3	189
	Totals	441	0	62	178	0	0	12	8	701
	Totals	1255	0	324	870	4	8	69	25	2555
	% of total	49.1	0	12.6	34.1	.16	.31	2.7	1.0	100

1/ Four 2-quart samples of pods were hand stripped from plants on September 8 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Field D. Giffen, Inc., Cantua Ranch, Fresno County, California, 1971.

Dates field sampled 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
May 11	0	0	0	0	0	0	0	0	0	0
May 17 3/	-	-	-	-	-	-	-	-	-	-
May 25 3/	-	-	-	-	-	-	-	-	-	-
June 2 3/	-	-	-	-	-	-	-	-	-	-
June 8 a)	0	0	0	0	0	0	0	0	0	0
June 15	0	0	0	0	0	0	0	0	0	0
June 18	0	0	0	0	0	0	0	0	0	0
June 21	0	0	0	0	0	0	0	0	0	0
June 29	0	0	0	0	0	0	0	0	0	0
July 6 b)	0	0	0	0	0	0	0	0	0	0
July 13	0	0	0	0	0	0	0	0	0	0
July 20 c)	1	1	2	0	0.5	2.5	0	2.5	5.5	7.5
July 27	1	3	4	0	0	1	0	2	3	7
August 3	7	7	14	6	17	2	0	0	25	39
August 11	0	1	1	0	2	4	6	1	13	14
August 17	2	2	4	0	1	0	1	10	12	16

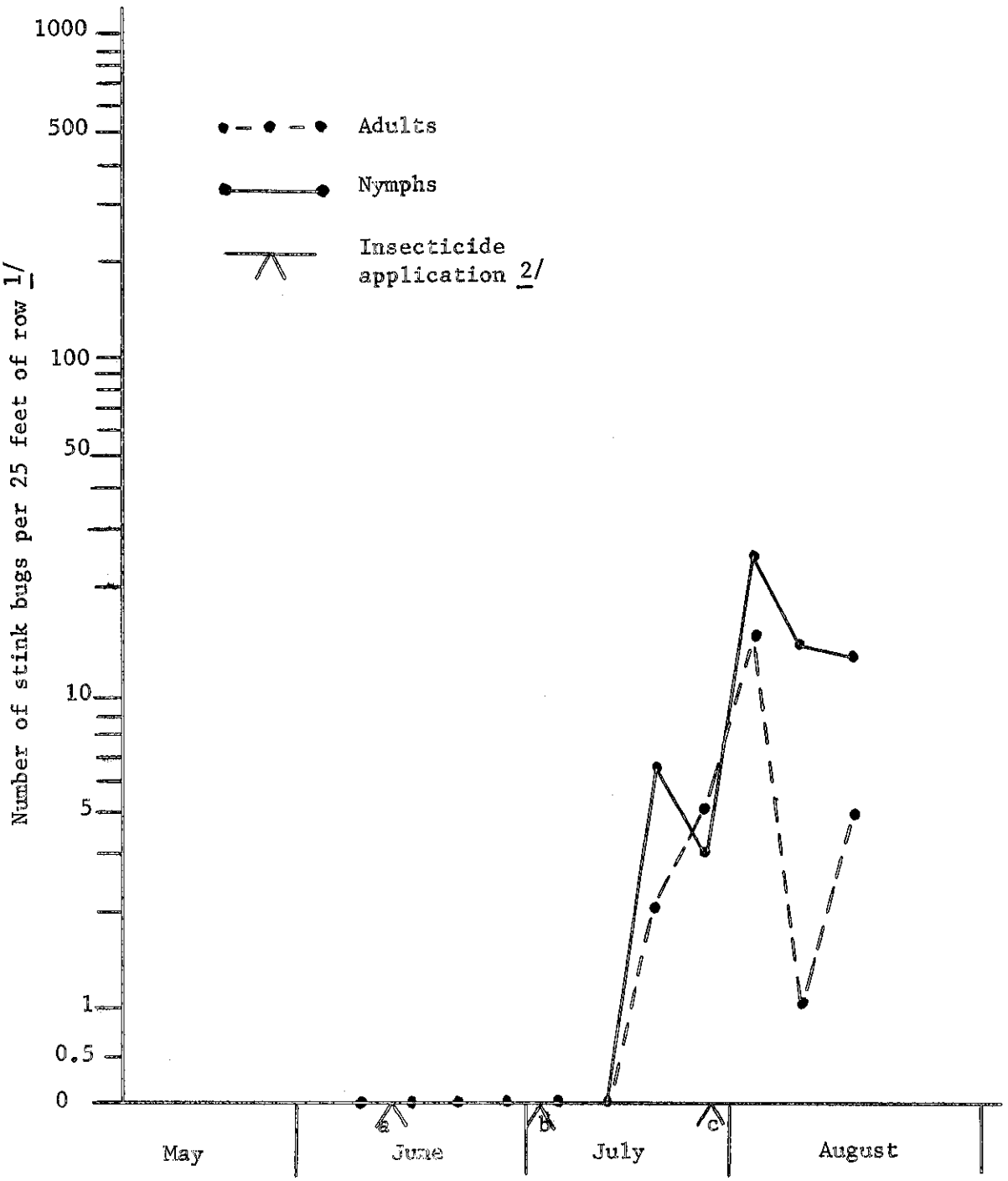
1/ Insecticide applications
- a) June 11 Dimethoate 0.5#/acre
- b) July 3 DDT 1.5#/acre + Toxaphene 3.0#/acre + Dylox 1.2#/acre
- c) July 27 Thimet 600 1.0#/acre + Toxaphene 3.0#/acre + Dylox 1.2#/acre

2/ 5 beating pan samples on each sampling date.

3/ Cultivated and too short to sample.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Field D. Giffen, Inc. Cantua Ranch, Fresno County, California, 1971.



1/ 5 beating pan samples on each date.

2/ a June 11 Dimethoate 0.5#/acre
b July 3 DDT 1.5#/acre + Toxaphene 3.0#/acre + Dylox 1.2#/acre
c July 27 Thimet 600 1.0#/acre + Toxaphene 3.0#/acre + Dylox 1.2#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey - Field D.

Cantua Ranch, (Giffen, Inc.), Fresno County, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus Bug	Stink Bug	Shriveled	Water damage	Green	Other	
	a	203	0	5	3	0	0	3	0	214
	b	187	0	3	3	2	0	2	0	197
1	c	189	0	2	2	0	1	4	0	198
	d	195	0	8	0	0	0	1	0	204
	Totals	774	0	18	8	2	1	10	0	813
	a	155	1	3	1	1	0	1	3	165
	b	159	0	6	3	1	0	0	0	169
2	c	162	0	4	3	2	0	0	2	173
	d	167	0	3	3	2	1	0	1	177
	Totals	643	1	16	10	6	1	1	6	684
	a	187	0	4	1	0	0	1	0	193
	b	174	0	3	1	1	1	0	0	180
3	c	176	0	6	2	1	2	3	1	191
	d	168	0	3	5	2	1	3	0	182
	Totals	705	0	16	9	4	4	7	1	746
	a	164	0	8	2	2	0	0	1	177
	b	186	0	1	1	1	0	1	0	190
4	c	177	0	5	2	1	0	1	0	186
	d	178	0	2	1	0	4	0	0	185
	Totals	705	0	16	6	4	4	2	1	738
	Totals	2827	1	66	33	16	10	20	8	2981
	% of total	94.8	.03	2.2	1.1	0.54	.34	.67	.27	100

1/ Four 2-quart samples of pods were hand stripped from plants on August 24 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Field E. Echeveste and Elizaldi, Sec. 2, Field #3, Firebaugh, California, 1971.

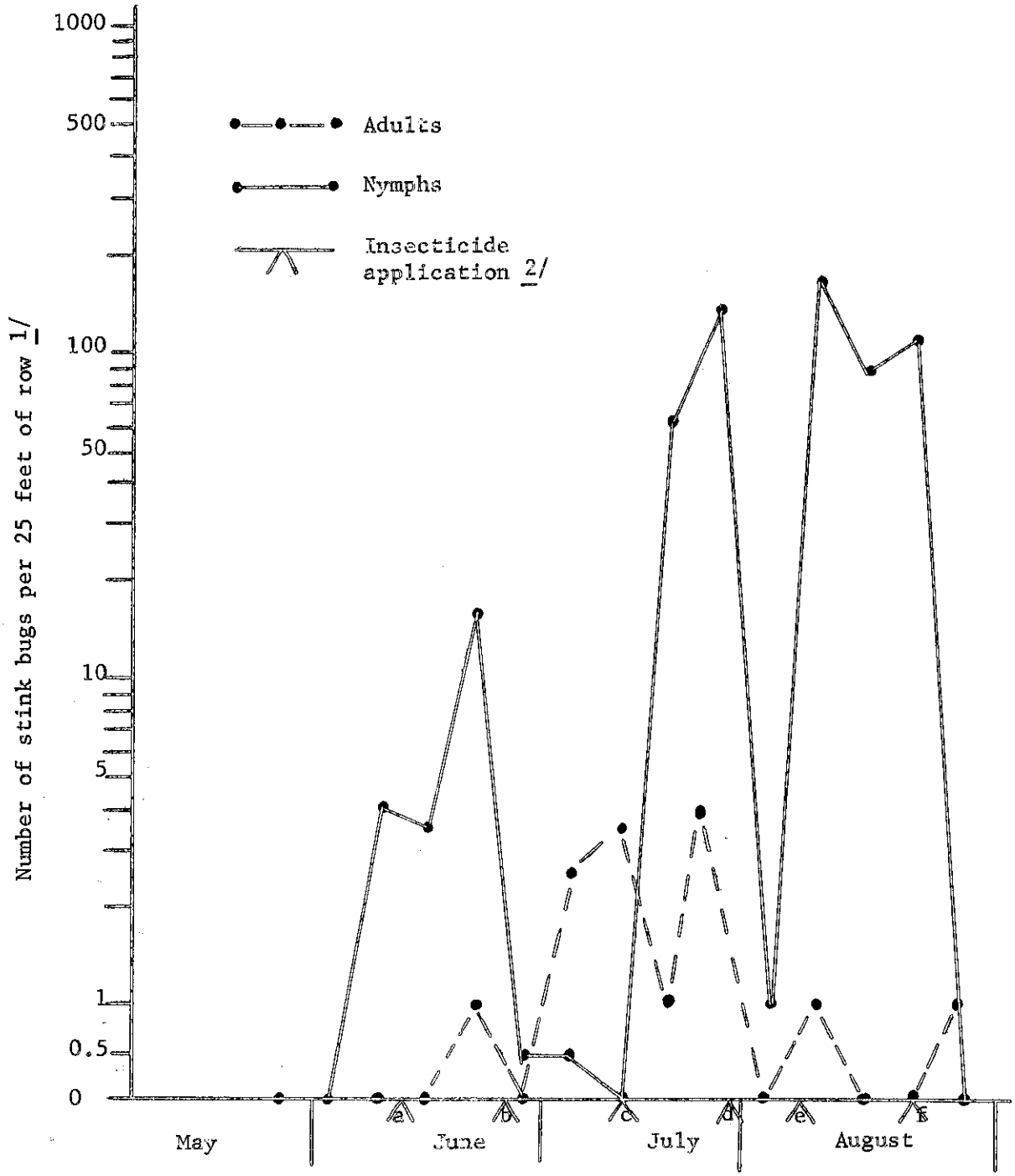
Dates field sampled 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
May 11	-	-	-	-	-	-	-	-	-	-
May 17	-	-	-	-	-	-	-	-	-	-
May 25	0	0	0	0	0	0	0	0	0	0
June 2	0	0	0	0	0	0	0	0	0	0
June 8	0	0	0	0	1.5	2.5	0	0	4	4
a)										
June 15	0	0	0	0	0.5	2	1	0	3.5	3.5
June 21	0	1	1	0	7.5	5	3	0	15.5	16.5
b)										
June 29	2.5	3.5	6	0	0.5	0	0	0	0.5	6.5
July 6	1.5	1	2.5	0	0	0	0	0.5	0.5	3
July 13	1	2.5	3.5	0	0	0	0	0	0	3.5
c)										
July 20	1	0	1	6	53	2	0	0	60	61
July 27	2	2	4	1	132	3	0	0	136	140
d)										
August 3	0	0	0	0	0	0	0	1	1	1
e)										
August 11	0	1	1	0	159	2	0	1	162	163
August 17	0	0	0	0	0	23	63	0	86	86
August 24	0	0	0	0	0	1	3	104	108	108
f)										
August 31	0	1	1	0	0	0	0	0	0	1

1/ Insecticide applications
- a) June 11 Galecron 1.0#/acre
- b) June 24 Dibrom 0.75#/acre + Toxaphene 4.0#/acre
- c) July 13 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
- d) July 28 Methyl Parathion 1.25#/acre + Dimethoate 0.5#/acre
- e) August 9 Thiodan 1.5#/acre + Galecron 1.0#/acre
- f) August 24 Methyl Parathion 1.25#/acre

2/ 5 beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts. Field E.

Echeveste and Elizaldi Sec. 2, Field #3, Firebaugh, California, 1971.



1/ 5 beating pan samples on each date.

2/ a June 11 Galecron 1.0#/acre
b June 24 Dibrom 0.75#/acre + Toxaphene 4.0#/acre
c July 13 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
d July 28 Methyl Parathion 1.25#/acre + Dimethoate 0.5#/acre
e August 9 Thiodan 1.5#/acre + Galecron 1.0#/acre
f August 24 Methyl Parathion 1.25#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey - Field E.

Echeveste and Elizaldi, Sec. 2, Field #3, Firebaugh, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green	Other	
	a	173	0	3	11	0	2	1	0	190
	b	181	1	5	14	0	0	0	0	201
1	c	177	0	3	13	0	0	0	2	195
	d	173	0	1	14	0	0	2	3	193
	Totals	704	1	12	52	0	2	3	5	779
	a	184	0	4	12	0	5	1	0	206
	b	178	0	1	11	0	5	2	0	197
2	c	185	0	1	7	0	5	2	0	200
	d	184	0	2	16	0	0	0	0	202
	Totals	731	0	8	46	0	15	5	0	805
	a	179	0	2	10	0	5	0	2	198
	b	175	0	1	17	0	3	0	1	197
3	c	186	0	1	14	0	3	0	0	204
	d	175	0	4	14	2	6	0	0	201
	Totals	715	0	8	55	2	17	0	3	800
	a	182	0	3	14	0	0	0	0	199
	b	188	0	1	15	0	3	2	0	209
4	c	181	0	4	15	0	10	0	0	210
	d	181	0	4	12	0	3	3	0	203
	Totals	732	0	12	56	0	16	5	0	821
	Totals	2882	1	40	209	2	50	13	8	3205
	% of total	89.9	.03	1.3	6.5	.06	1.6	.41	.25	100

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

Populations of the conspersus stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Field F. Nicolini and Maitia Ranch, Sec. 9, Firebaugh, California, 1971.

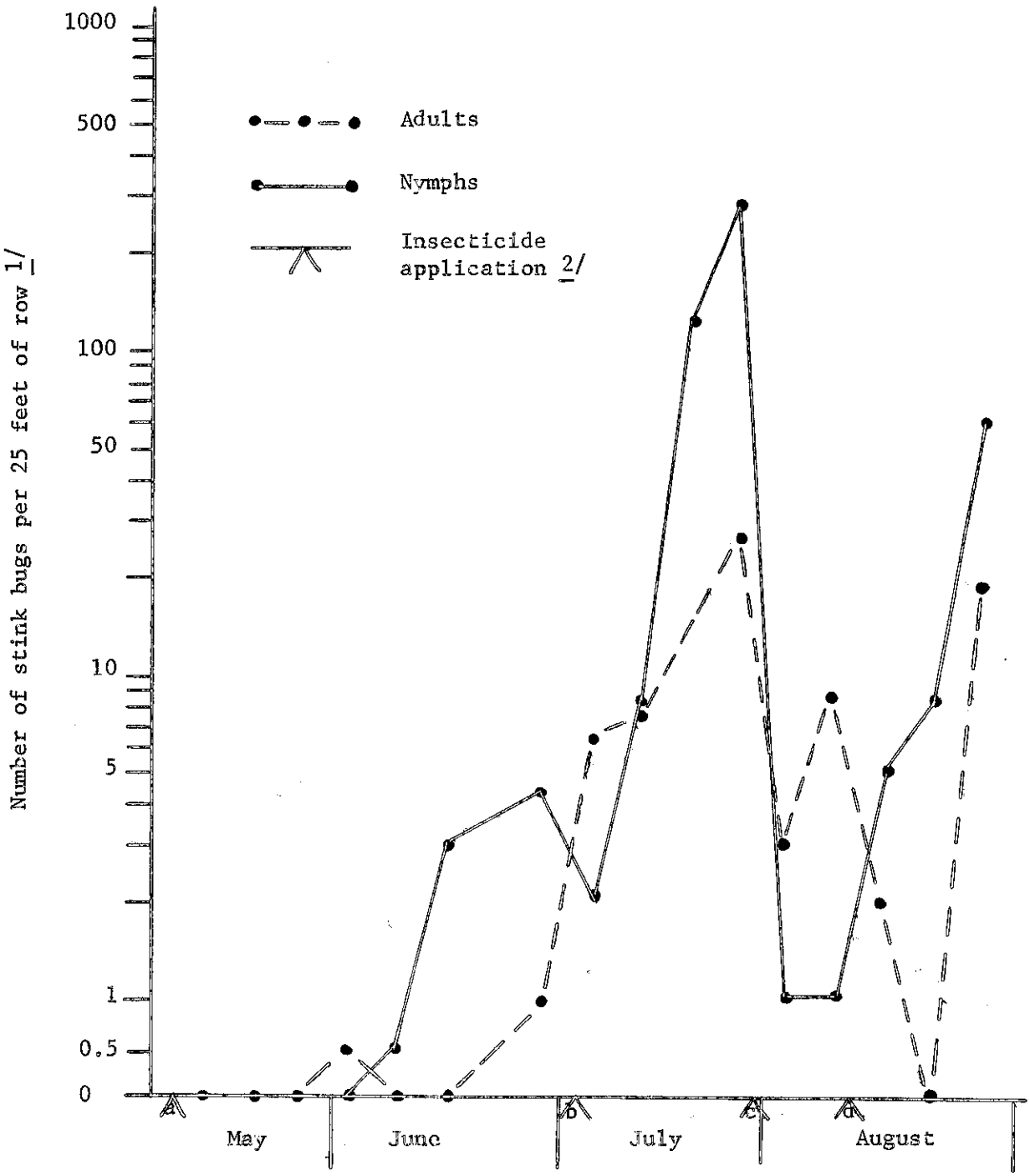
Dates field sampled 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
a)										
May 11	0	0	0	0	0	0	0	0	0	0
May 17	0	0	0	0	0	0	0	0	0	0
May 25	0	0	0	0	0	0	0	0	0	0
June 2	-	-	0.5	0	0	0	0	0	0	0.5
June 8	0	0	0	0	0.5	0	0	0	0.5	0.5
June 15	0	0	0	0	0	3	0	0	3	3
June 21	-	-	-	-	-	-	-	-	-	-
June 28	0	1	1	0	2	1	1	0.5	4.5	5.5
b)										
July 6	3	3.5	6.5	0	0	1.5	0	0.5	2	8.5
July 13	2	5.5	7.5	0	3	2.5	0	3	8.5	16
July 20	7	7	14	3	67	27	8	8	123	137
July 27	13	14	27	5	230	17	13	16	281	308
c)										
August 3	1	2	3	0	0	0	0	1	1	4
August 11	6	3	9	0	1	0	0	0	1	10
d)										
August 17	2	0	2	0	0	0	5	0	5	7
August 24	0	0	0	0	0	0	0	8	8	8
August 31	8	11	19	0	19	17	16	7	59	78

1/ Insecticide applications
- a) May 7 Kelthane 1.5#/acre + Dimethoate 0.5#/acre
- b) July 2 Thimet 600 1.0#/acre + Toxaphene 4.0#/acre + Galecron 1.0#/acre
- c) July 28 Methyl Parathion 1.25#/acre
- d) August 12 Dibrom 1.5#/acre

2/ 5 beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts. Field F.

Nicolini and Maitia Ranch, Sec. 9, Firebaugh, California, 1971.



1/ 5 beating pan samples on each date.

2/ a May 7 Kelthane 1.5#/acre + Dimethoate 0.5#/acre
b July 2 Thimet 600 1.0#/acre + Toxaphene 4.0#/acre + Galecron 1.0#/acre
c July 28 Methyl Parathion 1.25#/acre
d August 12 Dibrom 1.5#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey - Field F.

Nicolini and Maitia, Sec. 9, Firebaugh, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green	Other	
	a	205	0	3	10	0	2	0	0	220
	b	220	0	2	1	0	2	0	0	225
1	c	218	1	3	5	0	1	2	0	230
	d	214	0	2	3	0	0	1	0	220
	Totals	857	1	10	19	0	5	3	0	895
	a	215	1	3	9	0	6	0	0	234
	b	228	0	3	3	0	3	0	0	237
2	c	216	0	1	5	0	4	0	0	226
	d	214	2	2	7	0	3	0	0	228
	Totals	873	3	9	24	0	16	0	0	925
	a	205	0	5	2	0	1	0	0	213
	b	214	1	6	10	0	0	0	0	231
3	c	212	0	1	7	0	2	0	0	222
	d	205	0	1	5	0	5	1	0	217
	Totals	836	1	13	24	0	8	1	0	883
	a	186	0	3	7	0	2	0	0	198
	b	200	0	6	7	0	1	1	0	215
4	c	207	0	3	4	0	3	0	0	217
	d	211	1	1	3	0	1	0	0	217
	Totals	804	1	13	21	0	7	1	0	847
	Totals	3370	6	45	88	0	36	5	0	3550
	% of total	94.9	.17	1.3	2.4	0	1.0	.14	0	100

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

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Nicolini and Maitia, Sec. 33, Field #3, Firebaugh, California, 1971.

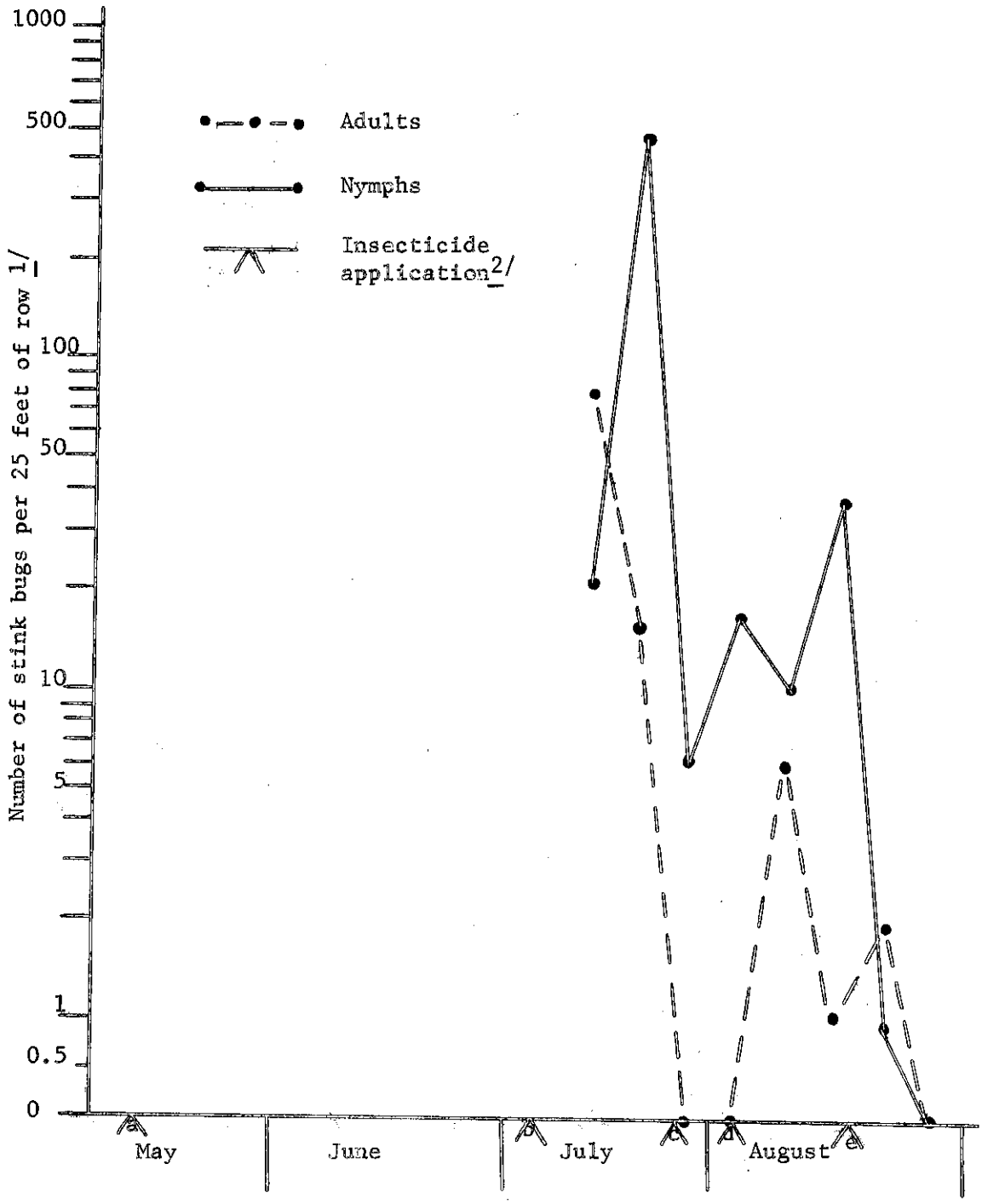
Dates field sampled 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
July 13	48	30	78	0	12	1	4	4	21	99
July 20	11	5	16	1	406	49	1	0	457	473
a) July 27	0	0	0	0	0	0	1	5	6	6
b) August 3	0	0	0	1	14	0	1	1	17	17
August 11	2	4	6	0	2	2	6	0	10	16
August 17	1	0	1	0	16	11	0	11	38	39
c) August 24	0	2	2	0	0	0	0	1	1	3
August 31	0	0	0	0	0	0	0	0	0	0

1/ Insecticide applications
April 26 Kelthane MF 1.5#/acre + Dimethoate 0.5#/acre
May 10 Thiodan 1.5#/acre
July 7 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
a) July 26 Methyl Parathion 1.25#/acre
b) August 3 Thimet 600 1.0#/acre + Galecron 0.75#/acre
c) August 18 Thiodan 1.5#/acre + Dibrom 1.0#/acre

2/ 5 beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Nicolini and Maitia, Sec. 33, Field #3, Firebaugh, California, 1971.



1/ 5 beating pan samples on each date.

2/
- a May 10 Thiodan 1.5#/acre
- b July 7 Dibrom 1.0#/acre + Toxaphene 4.0#/acre
- c July 26 Methyl Parathion 1.25#/acre
- d August 3 Thimet 600 1.0#/acre + Galecron 0.75#/acre
- e August 18 Thiodan 1.5#/acre + Dibrom 1.0#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey - Field #3

Nicolini and Maitia, Sec. 33, Field #3, Firebaugh, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green	Other	
	a	155	4	0	18	0	4	1	0	182
	b	172	2	2	22	0	4	0	0	202
1	c	160	7	1	15	0	5	0	0	188
	d	168	4	1	20	0	0	1	0	194
	Totals	655	17	4	75	0	13	2	0	766
	a	169	4	2	18	0	0	1	0	194
	b	178	3	0	10	0	0	3	0	194
2	c	176	3	3	11	0	2	2	0	197
	d	183	4	3	14	0	0	0	0	204
	Totals	706	14	8	53	0	2	6	0	789
	a	178	2	4	28	0	0	0	0	212
	b	184	7	0	17	0	0	0	0	208
3	c	179	2	2	16	0	1	0	0	200
	d	174	2	0	25	0	1	0	0	202
	Totals	715	13	6	86	0	2	0	0	822
	a	172	2	2	24	0	1	1	0	202
	b	163	9	2	23	0	0	3	0	200
4	c	174	4	2	17	0	1	4	0	202
	d	157	2	3	16	0	0	3	0	181
	Totals	666	17	9	80	0	2	11	0	785
	Totals	2742	61	27	294	0	19	19	0	3162
	% of total	86.7	1.9	.90	9.3	0	.6	.6	0	100

1/ Four 2-quart samples of pods were hand stripped from plants on September 8 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Harnish, Brinker Ranch, Five Points, California, 1971.

Dates field sampled 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
May 17	0	0	0	0	0	0	0	0	0	0
a)										
June 2	-	-	5	1	34	7.5	0	0	42.5	47.5
June 8	-	-	5	-	-	-	-	-	40.5	45.5
June 15	2.5	4	6.5	0	51	44.5	29	2	126.5	133.0
b)										
June 21	3	2	5	0	77	38	65	7.5	187.5	192.5
c)										
June 29	4	3.5	7.5	0	0	0	0	0	0	7.5
July 6	8	10.5	18.5	0	0	0	0	0	0	18.5
d)										
July 13	23.5	18.5	42	0	1.5	0	0	0	1.5	43.5
e)										
July 20	11	10	21	1.5	28.5	0.5	0	0	30.5	51.5
July 27	7	9	16	2	220	38	12	5	277	293
August 3	33	41	74	5	300	245	141	178	869	943
f)										
August 11	4	4	8	15	8	0	1	12	36	44
August 17	21	24	45	0	17	20	0	6	43	88

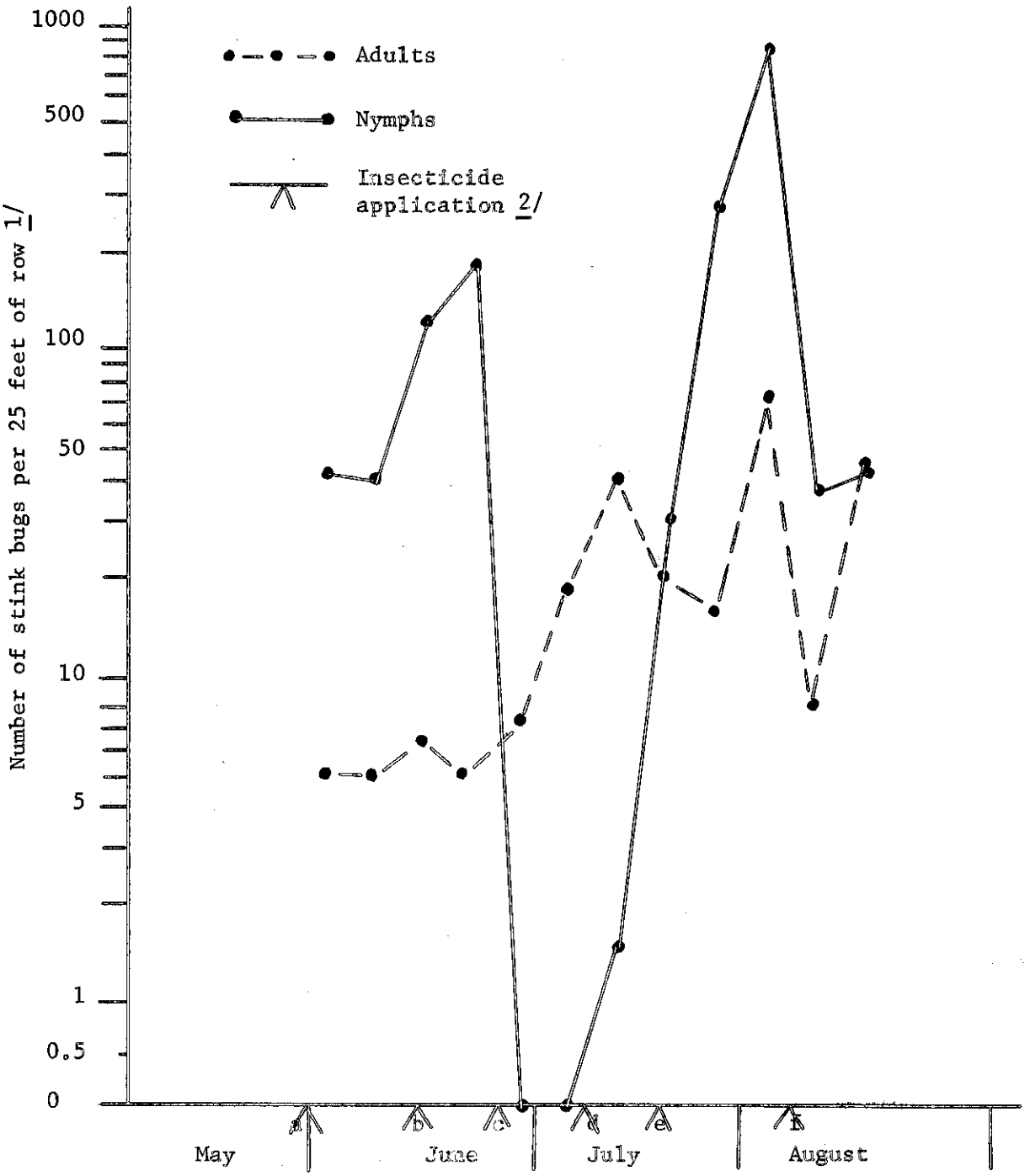
1/ Insecticide applications

a) May 30 Malathion 1#/acre + Toxaphene 4#/acre
b) June 15 Malathion 1#/acre + Toxaphene 4#/acre
c) June 24 Methyl Parathion 1.25#/acre
d) July 7 TEPP 0.75#/acre + Toxaphene 4#/acre
e) July 18 Dibrom 1.0#/acre + Toxaphene 2#/acre + DDT 1.0#/acre
f) August 5 Methyl Parathion 1.25#/acre

2/ 5 beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Harnish, Brinker Ranch, Five Points, California, 1971.



1/ 5 beating pan samples on each date.

2/
a May 30 Malathion 1.0#/acre + Toxaphene 4.0#/acre
b June 15 Malathion 1.0#/acre + Toxaphene 4.0#/acre
c June 24 Methyl Parathion 1.25#/acre
d July 7 TEPP 0.75#/acre + Toxaphene 4#/acre
e July 18 Dibrom 1.0#/acre + Toxaphene 2.0#/acre + DDT 1.0#/acre
f August 5 Methyl Parathion 1.25#/acre

Numbers and percentages of good and defective alfalfa seeds in samples from stink bug survey.

Harnish, Brinker Ranch, Five Points, California, 1971.

Sample 1/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green	Other	
	a	138	2	2	24	0	1	2	0	169
	b	127	0	6	29	0	2	0	0	164
1	c	136	0	4	23	0	3	0	0	166
	d	134	1	8	25	0	1	2	0	171
	Totals	535	3	20	101	0	7	4	0	670
	a	152	1	2	27	0	1	0	0	183
	b	143	2	3	22	1	0	0	0	171
2	c	133	1	7	24	0	0	0	0	165
	d	125	0	7	14	0	0	0	0	146
	Totals	553	4	19	87	1	1	0	0	665
	a	129	2	2	30	0	2	1	0	166
	b	136	2	5	30	1	0	1	1	176
3	c	132	1	4	26	0	0	1	0	164
	d	150	0	3	30	0	1	0	0	184
	Totals	547	5	14	116	1	3	3	1	690
	a	149	0	3	19	0	1	3	0	175
	b	138	1	2	26	0	1	0	0	168
4	c	128	1	8	29	0	1	0	0	167
	d	142	0	6	22	0	0	0	0	170
	Totals	557	2	19	96	0	3	3	0	680
	Totals	2192	14	72	400	2	14	10	1	2705
	% of total	81.0	.52	2.7	14.7	.07	.52	.37	.04	100

1/ Four 2-quart samples of pods were hand stripped from plants on August 24 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Echeveste and Elizaldi, Sec. 2, Field #2, Firebaugh, California, 1971.

Dates Field Sampled 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
May 11	-	-	1	0	0	0	0	0	0	1
May 17	0	0	0	0	0	0	0	0	0	0
May 25	0	0.5	0.5	0	0	0	0	0	0	0.5
June 2	0	0	0	0	0	0	0	0	0	0
June 8	0	0.5	0.5	0	10	0.5	0	0	10.5	11
a) June 15	0	0.5	0.5	0.5	1.5	3	0	1	6	6.5
b) June 21	1	0	1	0	0	0	0	0	0	1
June 29	1.5	1	2.5	0	3.5	0	0.5	0	4	6.5
July 6	3.5	3.5	7	0	4	2	0	0.5	6.5	13.5
c) July 13	5	5.5	10.5	0	5.5	4.5	0.5	2.5	13	23.5
d) July 20	0.5	1	1.5	0	1	2	0	2	5	6.5
July 27	15	31	46	0	16	3	3	13	35	81

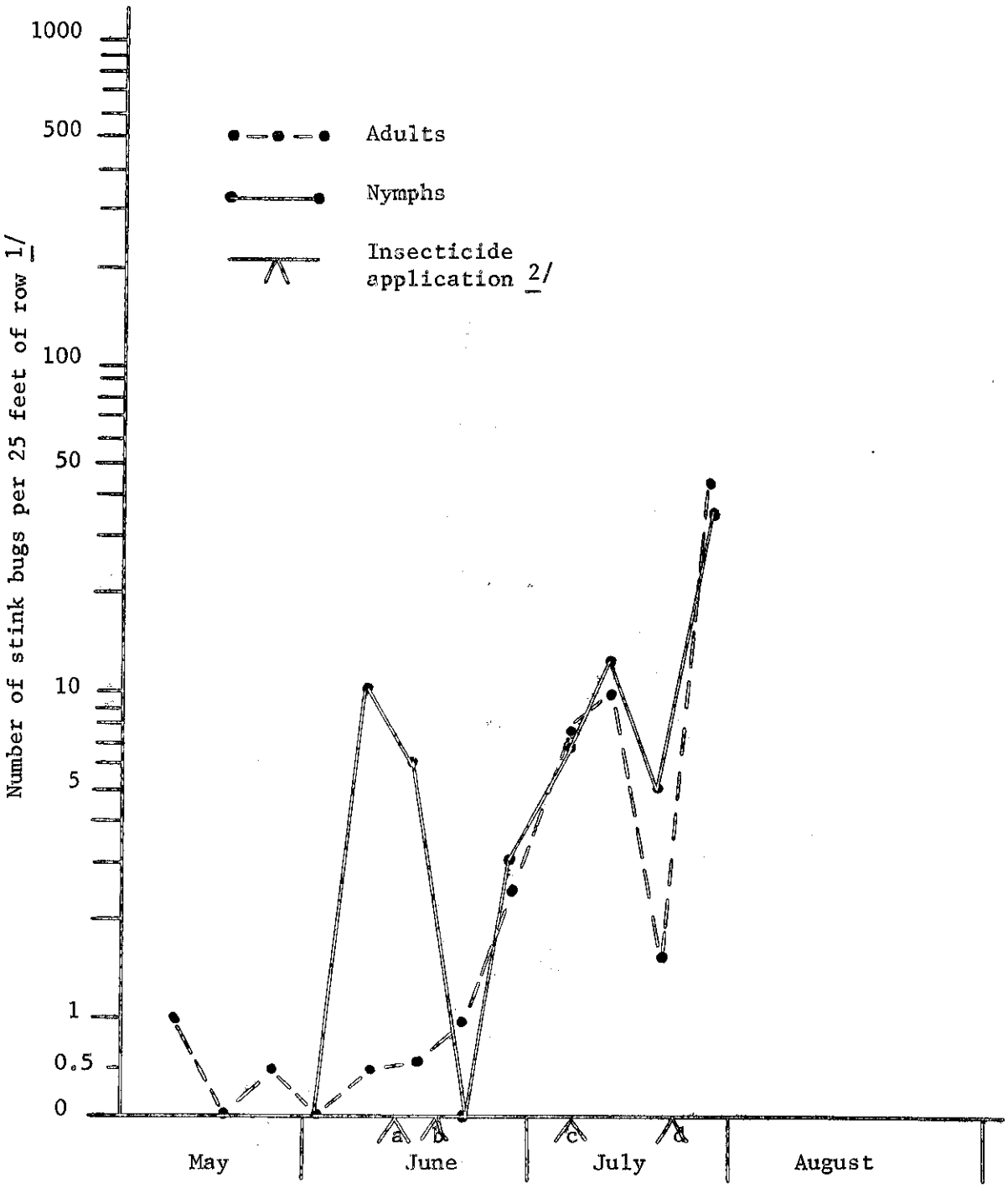
1/ Insecticide applications

a) June 11 Galecron 1.0#/acre
b) June 17 Dylox 1.2#/acre + Toxaphene 4.0#/acre
c) July 8 Meta Systox-R 0.37#/acre
d) July 19 Thimet 600 1.0#/acre

2/ 5 beating pan samples on each date.

Populations of the consperse stink bug, Euschistus conspersus, in an alfalfa seed field as determined by weekly survey counts.

Echeveste and Elizaldi Sec. 2, Field #2, Firebaugh, California, 1971.



1/ 5 beating pan samples on each date.

2/ a June 11 Galecron 1.0#/acre
b June 17 Dylox 1.2#/acre + Toxaphene 4.0#/acre
c July 8 Meta Systox-R 0.37#/acre
d July 19 Thimet 600 1.0#/acre

SUMMARY

1971 Summer Populations of Stink Bugs in 9 Alfalfa Seed Fields in Fresno County

Number of Stink Bugs (adults & nymphs) per 25' of row [1]

Grower and Field	May			June					July				August				
	11	17	25	2	8	15	21	29	6	13	20	27	3	11	17	24	31
Field A Nakamura Sec. 34	0	0	3	0	2	2	7	21	7	28	128	209	193	320	233	152	2 [2]
Field B Enrico	0	0	14	3	22	10	33	33	38	37	44	53	338	381	728	953	27 [2]
Field C Nakamura Sec. 11	2	0	0	0	10	15	18	9	22	13	173	636	954	681	889	571	547
Field D Giffen, Inc. Cantua Ranch	0	-	-	-	0	0	0	0	0	0	8 [3]	7	39	14	16	-	-
Field E Echeveste Sec. 2 (#3)	-	-	0	0	4	4	17	7	3	4	61	140	1 [2]	163	86	108	1 [2]
Field F Maitia Sec. 9	0	0	0	1	1	3	-	6	9	16	137	308	4 [2]	10	7	8	78
Echeveste Sec. 2 (#2)	1	0	1	0	11	7	1	-	14	24	7	81	-	-	-	-	-
Maitia Sec. 33 (#3)	-	-	-	-	-	-	-	-	-	99	473	6 [2]	17	16	39	3	0
Harnish-Brinker Five Points	-	0	-	48	46	133	193	8 [2]	19	44	52	293 [3]	943	44 [2]	88	-	-

[1] 5 beating pan samples on each date. [2] Methyl Parathion application. [3] Adjacent sugar beet field harvested.

NOTE: Population counts in this table are not indicative of the entire field because in several fields the sampled areas were purposely not treated so that stink bug populations could be studied.

SUMMARY

Percentages of good and defective alfalfa seeds in samples from stink bug survey fields.

Fresno County, California, 1971.

Grower and Location	Date Sampled 1/	Good Seeds	Defective Seeds 2/						
			Chalcid	Lygus Bug	Stink Bug	Shriveled	Water Damage	Green	Other
Field A John Nakamura Sec. 34	Sept. 1	75.5	1.2	9.1	10.2	0.83	0.25	2.0	1.0
Field B Enrico Farms	Sept. 8	80.1	0.17	2.2	9.1	0.07	0.48	7.9	0.03
Field C John Nakamura Sec. 11	Sept. 8	49.1	0.00	12.6	34.1	0.16	0.31	2.7	1.0
Field D Giffen, Inc., Cantua Ranch	Aug. 24	94.8	0.03	2.2	1.1	0.54	0.34	0.67	0.27
Field E Echeveste and Elizaldi Sec. 2, Field #3	Sept. 1	89.9	0.03	1.3	6.5	0.06	1.6	0.41	0.25
Field F Nicolini and Maitia Sec. 9	Sept. 1	94.9	0.17	1.3	2.4	0.00	1.0	0.14	0.00
Nicolini & Maitia Sec. 33, Field #3	Sept. 9	86.7	1.9	0.90	9.3	0.00	0.60	0.60	0.00
Harnish, Brinker Ranch Five Points	Aug. 24	81.0	0.52	2.7	14.7	0.07	0.52	0.37	0.04

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 based on four subsamples drawn from each of the threshed 2-quart samples.

2/ Damage counts in this table are not indicative of the seed quality of the entire field because in several fields the sampled areas were purposely not treated so that stink bug population effects could be studied.

STINK BUG EXPERIMENT #1

Results obtained with Methyl Parathion and Azodrin to control overwintering populations of the consperse stink bug.

Euschistus conspersus in seed alfalfa.

John Nakamura Ranch, Firebaugh, California. 1970.

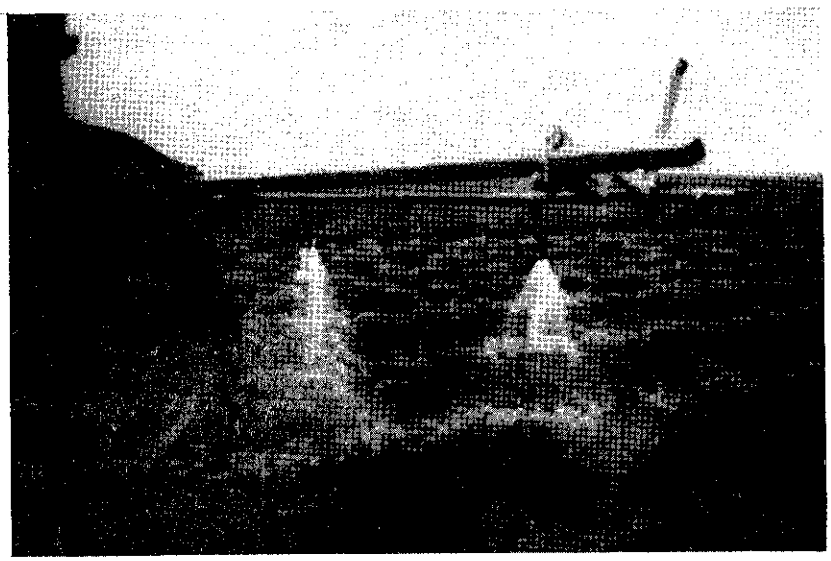
Treatment 1/		No. of stink bugs per 100" of row 3/	
Insecticide 2/	AI per acre	Pre-Treatment 4/	Post-treatment 28 days
Check Untreated	None	53	17
Methyl Parathion	1.0	55	12
Azodrin	1.0	60	10

1/ Plots were 24 rows X 1320 feet.

2/ Applied as sprays at 60 GPA by ground rig November 19.

3/ Ten 10 inch row samples of root crowns from each treatment on each sampling date.

4/ Pre-treatment counts were made November 18.



zodrin, Methyl Parathion, and Dibrome were applied during the winter by groundrig, ut proved ineffective in controlling overwintering stink bug populations.

STINK BUG EXPERIMENT #2

Effect of clipping, burning, and insecticide applications on overwintering populations of the consperse stink bug, Euschistus conspersus in seed alfalfa.

Echevesti and Elizaldi. Firebaugh, California, 1971.

Treatments 1/					Number of stink bugs per 150" of row 5/		
		Insecticide applications 4/			Pre-	Post-Treatment Days	
Clipping 2/	Burning 3/	Materials	AI/Acre	Gal/Acre	Treatment 6/	6	14
Clipped Checks	None	None	---	---	26	22	14
Unclipped Checks	None	None	---	---	59	49	34
Clipped	Burned	None	---	---	17	5	--
Unclipped	Burned	None	---	---	74	50	--
Clipped	None	Methyl Parathion	1.0	50	29	9	6
		Methyl Parathion	1.0	150	23	8	4
		Dibrom	1.0	50	34	28	--
		Dibrom	1.0	150	23	17	--
Unclipped	None	Methyl Parathion	1.0	50	47	25	22
		Methyl Parathion	1.0	150	47	19	23
		Dibrom	1.0	50	69	53	--
		Dibrom	1.0	150	29	39	--

1/ Plots were 1 acre (8-40" rows x 1635') except burned plots which were ½ acre (4 rows x 1635').
2/ Clipped January 15.
3/ Burned with a 2-row butane burner January 20.
4/ Applied with a ground sprayer January 20.
5/ Fifteen 10 inch row samples of root crowns from each treatment on each sampling date.
6/ Pre-application counts were made January 19.

Results obtained with several insecticides applied to control the consperse stink bug, Euschistus conspersus in seed alfalfa. John Nakamura Ranch, Sec. 11, Firebaugh, California, 1971.

Treatment 1/		Days after	Number of stink bugs per 25' of row 4/									
			Adults			Nymphal Instars						Total Adults & Nymphs
Insecticide 2/	AI/Acre	Treatment 3/	Males	Females	Total	1	2	3	4	5	Total	
Methyl Parathion	1.0	Pre	7	5	12	6	349	57	47	27	486	498
		2	0	0	0	3	1	2	0	0	6	6
Thimet 600 +	1.0	Pre	8	6	14	23	370	65	33	33	530	544
Dylox	1.5	2	1	1	2	2	12	14	47	69	140	142
Thiodan +	2.0	Pre	29	18	47	51	690	80	40	25	886	933
Dylox	1.5	2	17	7	24	36	218	41	36	33	369	393
Lannate	1.0	Pre	16	16	32	12	779	28	26	36	881	917
		2	6	5	11	13	311	51	54	34	463	474
Carzol	1.0	Pre	1	1	2	1	251	98	77	36	463	465
		2	0	0	0	0	2	4	3	7	16	16

1/ Plot size: Each treatment 5 acres (165' x 1320').

2/ Applied as sprays at 15 GPA by aircraft 4:45 to 6:15 AM on July 28. Weather conditions, good.

3/ Pretreatment counts were made July 27.

4/ 5 beating pan samples per treatment on each date.

STINK BUG EXPERIMENT #4

Results obtained with Carzol applied to control the consperse stink bug, Euschistus conspersus in seed alfalfa. John Nakamura Ranch, Sec. 11, Firebaugh, California, 1971.

Treatment 1/		Days after	Number of stink bugs per 25' of row 4/									
			Adults			Nymphal Instars						Total
Insecticide 2/	AI/Acre	Treatment 3/	Males	Females	Total	1	2	3	4	5	Total	Adults & Nymphs
Carzol	1.0	Pre	15	12	27	12	60	20	53	168	303	330
		5	5	8	13	12	24	1	0	2	39	52
		13	11	16	27	0	0	0	0	1	1	28

1/ Plot size 7 acres (231' x 1320')

2/ Applied as spray at 15 GPA by aircraft 5:00 to 5:15 AM on August 5. A 6 MPH wind was blowing from northwest.

3/ Pretreatment counts made August 4.

4/ 5 beating pan samples on each date.

STINK BUG EXPERIMENT #5

Results obtained with several insecticides applied to control the consperse stink bug, Euschistus conspersus, in seed alfalfa. R. and N. Farms, Firebaugh, California, 1971.

Treatment 1/		Days after	Number of stink bugs per 25' of row 4/								
			Adults			Nymphal Instars						Total Adults & Nymphs
Insecticide 2/	AI/Acre	Treatment 3/	Males	Females	Total	1	2	3	4	5	Total	
Carzol	0.5	Pre	1	4	5	10	165	25	2	40	242	247
		7	29	26	55	1	17	22	78	7	123	178
Carzol	1.0	Pre	4	5	9	1	128	33	8	41	211	220
		7	9	10	19	1	12	14	18	2	47	66
Carzol +	0.5	Pre	1	2	3	3	100	12	3	34	151	154
Thimet 600	1.0	7	15	25	40	0	3	2	11	4	20	60
Galecron	1.0	Pre	4	3	7	14	121	28	4	43	210	217
		7	18	24	42	0	0	10	59	6	75	117
Fundal	1.0	Pre	2	7	9	0	113	50	6	79	248	257
		7	33	31	64	0	2	12	84	26	124	188
No Treatment	None	Pre	3	1	4	5	100	29	7	46	187	191
		7	40	45	85	0	0	15	78	19	112	197

1/ Plot size: Each treatment 5 acres (165' x 1320').

2/ Applied as sprays at 15 GPA by aircraft 4:35 to 5:25 AM on August 11. Weather conditions good.

3/ Pretreatment counts made August 10.

4/ 5 beating pan samples per treatment on each date.

STINK BUG EXPERIMENT #6

Populations of the consperse stink bug, Euschistus conspersus, occurring in seed alfalfa field plots treated with several insecticides throughout the season to control lygus bugs.

Diedrich Ranch, Firebaugh, California, 1971.

Treatment 1/	Number of stink bugs per 25' of row 2/									
	Adults			Nymphal instars						Total adults and nymphs
	Males	Females	Total	1	2	3	4	5	Total	
A	1	8	9	0	1	1	1	1	4	13
B	34	34	68	2	17	37	70	139	265	333
C	36	21	57	1	29	24	57	99	210	267
D	20	25	45	0	36	25	13	71	145	190

1/ Plot size: each treatment 10 acres (330' x 1320'). Insecticides applied as sprays by aircraft at 10 or 15 GPA.

Treatment A: Carzol 0.5 lb/A at 15 GPA June 23.
Carzol 0.5 lb/A at 10 GPA July 8 and August 5.

Treatment B: Lannate 1.0 lb/A + Galecron 1.0 lb/A at 15 GPA June 23.
Lannate 1.0 lb/A at 10 GPA July 8 and August 5.
Dibrom 1.2 lb/A + Thiodan 1.44 lb/A at 15 GPA August 25.

Treatment C: Dimethoate 0.5 lb/A + Galecron 1.0 lb/A at 15 GPA June 23.
DDT 2.0 lb/A + Toxaphene 4.0 lb/A at 10 GPA July 8 and August 5.
Dibrom 1.2 lb/A + Thiodan 1.44 lb/A at 15 GPA August 25.

Treatment D: Thimet 600 1.0 lb/A + Galecron 0.75 lb/A + DDT 2.0 lb/A + Toxaphene 4.0 lb/A at 15 GPA June 16.
Thimet 600 1.0 lb/A + Dylox 1.2 lb/A at 10 GPA July 28.
Dibrom 1.2 lb/A at 10 GPA August 10.
Dibrom 1.2 lb/A + Thiodan 1.44 lb/A at 15 GPA August 25.

2/ Five pan samples per treatment on August 31.

Numbers and percentages of good and defective alfalfa seeds from a plot treated with Lannate for insect control. 1/

Diedrich Ranch, Firebaugh, California, 1971.

Sample 2/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green	Other	
	a	160	0	13	12	0	0	0	0	185
	b	154	0	3	19	0	1	0	0	177
1	c	153	0	5	10	0	0	0	0	168
	d	146	3	5	16	0	2	0	0	172
	Totals	613	3	26	57	0	3	0	0	702
	a	148	0	10	11	0	1	0	0	170
	b	146	1	6	18	0	2	0	0	173
2	c	97	0	6	34	0	0	0	0	137
	d	140	1	7	21	0	0	0	0	169
	Totals	531	2	29	84	0	3	0	0	649
	Totals	1144	5	55	141	0	6	0	0	1351
	% of total	84.7	.37	4.1	10.4	0	.44	0	0	100

1/ Plot size: 10 acres (330' x 1320'). Lannate at 1.0 lb. per acre was applied as spray by aircraft on June 23, July 8, and August 5. Galecron at 1.0 lb. per acre was added to June 23 treatment to control a heavy infestation of two-spotted spider mite.

2/ Two 2-quart samples were hand harvested October 5 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

Numbers and percentages of good and defective alfalfa seeds from a plot treated with a standard treatment for insect control. 1/

Diedrich Ranch, Firebaugh, California, 1971.

Sample 2/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug	Stink bug	Shriveled	Water damage	Green	Other	
	a	125	0	3	28	2	1	1	0	160
	b	100	1	11	33	0	0	0	0	145
1	c	124	4	6	27	0	1	0	0	162
	d	127	0	4	29	0	1	0	0	161
	Totals	476	5	24	117	2	3	1	0	628
	a	125	0	11	30	0	0	0	0	166
	b	147	0	7	19	0	0	1	0	174
2	c	131	1	9	26	0	0	2	1	170
	d	132	0	5	31	0	0	2	0	170
	Totals	535	1	32	106	0	0	5	1	680
	Totals	1011	6	56	223	2	3	6	1	1308
	% of total	77.3	.46	4.3	17.0	.15	.23	.46	.08	100

1/ Plot size: 10 acres (330' x 1320'). Dimethoate at 0.5 lb. per acre was applied as spray by aircraft on June 23. Galecron at 1.0 lb. per acre was added to control a heavy infestation of two-spotted spider mite. DDT at 2.0 lb. per acre plus Toxaphene at 4.00 lb. per acre were applied on July 8 and August 5.

2/ Two 2-quart samples were hand harvested October 5 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

Numbers and percentages of good and defective alfalfa seeds from a plot treated with Carzol for insect control. 1/

Diedrich Ranch, Firebaugh, California, 1971.

Sample 2/	Sub Sample	Good Seeds	Defective Seeds							Total Seeds
			Chalcid	Lygus bug 3/	Stink bug	Shriveled	Water damage	Green	Other	
	a	144	1	18	3	0	1	3	0	170
	b	145	1	18	2	0	1	2	0	169
1	c	130	0	24	1	0	2	0	0	157
	d	144	0	19	7	0	0	1	0	171
	Totals	563	2	79	13	0	4	6	0	667
	a	159	0	11	3	0	0	0	1	174
	b	150	2	9	4	0	1	0	2	168
2	c	154	2	10	2	0	2	0	0	170
	d	151	0	20	3	0	1	1	0	176
	Totals	614	4	50	12	0	4	1	3	688
	Totals	1177	6	129	25	0	8	7	3	1355
	% of total	86.9	.44	9.5	1.9	0	.59	.52	.22	100

1/ Plot size 10 acres (330' x 1320'). Carzol at 0.5 lb. per acre was applied as spray by aircraft on June 23, July 8, and August 15.

2/ Two 2-quart samples were hand harvested October 5 prior to commercial harvest. Samples were hand threshed and lightly cleaned in a clipper seed cleaner. Counts based on four subsamples from each of the threshed 2-quart samples.

3/ Carzol plot did not receive a methyl parathion application for stink bug and lygus control in late August which was applied to Lannate plot and grower treatment portion of the field.

Consperse stink bug populations observed on the foliage of sugar beets. Fresno County, California, 1971.

Date	Location	Observations
May 3-4	Vista del Llano, Sec. 15	Adults and 258 eggs collected.
May 12	Vista del Llano, Sec. 15	Adults and 83 eggs collected.
May 17	Vista del Llano, Sec. 15	Adults and 222 eggs collected.
May 25	Vista del Llano, Sec. 15	Spent one hour looking for eggs. Found no eggs, or live nymphs or adults.
June 3	Vista del Llano, Sec. 26	2 third and 3 fourth instars. No eggs or adults.
June 15	Vista del Llano, Sec. 15	2 to 12 nymphs per plant, second, third, fourth, and fifth instars.
July 7	West of Five Points	10 plant survey: 14 adults, no nymphs.
July 13-14	Giffen Cantua #1	10 plants: 1 adult, 7 nymphs (third, fourth, and fifth instars).
	Giffen Cantua #2	10 plants: 3 adults and 1 fifth instar nymph.
	Firebaugh 1 mile south of Broadview Gin	10 plants: 3 adults and 8 nymphs (third, fourth, and fifth instars).
July 20	Giffen Cantua #1	10 plants: 2 adults, no nymphs.

Research on the Consperse Stink Bug

Thomas F. Leigh,[1/] Charles E. Jackson,[2/] and O. G. Bacon[1/]

The following is a progress report covering research on the consperse stink bug, Euschistus conspersus Uhler, conducted during the 1971 season at Shafter and in the western portion of Fresno and Kings Counties. This research was supported in part through funds provided by the California Planting Cotton Seed Distributors. We are grateful to Robert Long, Tony Mortimore, Janice Carpenter, and Joe Leyva for their assistance in collection and rearing of the stink bugs and in carrying out the topical insecticide treatments.

Parasites of the Consperse Stink Bug

Thomas F. Leigh, U.C.D.

A survey for parasites of the consperse stink bug was begun in June of 1971 and continued into mid-September. Eggs, nymphs, and adults were collected from weed hosts, alfalfa, sugar beets, safflower, and milo at several locations in western Fresno and Kings Counties. All collections were brought to the insectary at Shafter and held for emergence of parasites. Adults and nymphs were provided green beans to assure survival.

Egg masses were difficult to locate, particularly in alfalfa fields. This is apparently a result of their "protective" coloration and the selection by females of dry leaves on which to deposite eggs. While nearly 40 egg masses were located in the course of the survey, no egg parasites were recovered.

Nearly 5,000 nymphal and adult stink bugs were collected from the several plant hosts. From these we were able to rear 4 parasites in the family Tachinidae. These have not yet been identified to species. This family of flies contains many very effective parasites of insect pests. Of particular interest, the 4 parasites were collected from alfalfa to which no insecticides were applied, 2 from a planting of alfalfa at the U. C. West Side Field Station and 2 from an isolated clump of alfalfa plants about 5 miles west of Five Points.

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A parasite of the same family (but different species) was reared from an adult of the red-shouldered plant bug collected from alfalfa at Shafter.

This survey indicates that few parasites are likely to be recovered in fields under insecticide treatment programs unless more selective insecticides can be located. Further surveys will be conducted in areas free of insecticide use to ascertain if other parasites exist and apparent potential for control of the consperse stink bug.

Laboratory Susceptibility of the Consperse Stink Bug to Selected Insecticides

Charles E. Jackson, Thomas F. Leigh, and O. G. Bacon

Many insect pests have shown increased tolerance to insecticidal compounds in recent years. To ascertain if the same situation exists with the consperse stink bug, Euschistus conspersus Uhler, adults were collected during the winter and summer of 1971 and treated with measured doses of three insecticides: Dylox® (trichlorfon), methyl parathion, and Dibrom® (naled). Adults were also treated with Bidrin® (3-hydroxy-N,N-dimethyl-cis-crotonamide), Carzol® (formetanate), and Orthene® (O,S-dimethyl N-acetyl phosphoramidoate) to establish their susceptibility to these compounds.

Susceptibility was established on a time-mortality basis. Bugs were treated in groups of 80 or 100. Each bug was treated with 100 micrograms of toxicant in 3 microliters of acetone solution which also contained 1% of glycerin. (Carzol was used in a methanol solution.) Mortality was then determined at frequent intervals over a 3- to 4-hour period.

Field-collected bugs were held on green beans for 1 or 2 days before treatment. Laboratory-reared adults and nymphs were the first generation offspring of adults collected from seed alfalfa fields in the Five Points to Firebaugh area of Fresno County. Nymphs were treated when in the 5th instar and adults when 1-week old. For adult tests, equal numbers of males and females were used.

The results are presented in the accompanying table (Table L-1) along with similar results from work conducted in 1962. Under laboratory conditions this insect is highly susceptible to Dibrom with an ET50 (time for 50% mortality) of only 0.22 hour, Carzol with an ET50 of 0.23 hour, and Bidrin with an ET50 of 0.17 hour. Susceptibility to methy parathion and Dylox was nearly equal with ET50's of 0.61 and 0.72 hour, respectively. It is less susceptible to Orthene at an ET50 of 2.24.

When the results for 1971 are compared with results for 1962 they show a significant increase in tolerance to methyl parathion but not to Dylox. However, these data are not interpreted at this time as indicating a very meaningful increase in tolerance in the consperse stink bug. A

comparison of mortalities for field-collected bugs that are in diapause with mortality for laboratory reared bugs that are reproductive shows significantly greater tolerance in diapausing bugs to methyl parathion, Dylox, and Orthene.

These results are valuable in detecting significant changes in the susceptibility of stink bugs to insecticides, but may not be useful for inference to field conditions. Inherent characteristics of each chemical may greatly influence its field performance. For example, while both Dylox and Dibrom perform well in the laboratory, they have not provided consistently good control in the field. This may be due to their short residual life compared to the longer residual life of methyl parathion.

Table L-1. Effective time for 50% mortality (ET50) in the consperse stink bug following topical treatment with several insecticides at a dosage of 100 micrograms of toxicant in 3 microliters of solvent plus 1% glycerin.

Toxicant	ET50 in hours	Confidence Limits upper	lower
	Laboratory reared adults		
Methyl parathion	0.67	0.72	0.63
Dylox	0.68	0.72	0.65
Bidrin	0.17	0.19	0.15
Dibrom	0.22	0.24	0.20
Carzol	0.23	0.25	0.21
Orthene	2.24	2.40	2.09
	Laboratory reared nymphs		
Methyl parathion	0.61	0.70	0.53
Dylox	0.72	0.78	0.66
Dibrom	0.20	0.23	0.17
	Comparisons		
Season	Methyl parathion		
Field collected - 1962	0.75	0.82	0.69
Field collected - 1971	0.89	0.94	0.83
Laboratory reared - 1971	0.76	0.86	0.67
	Dylox		
Field collected - 1962	1.33	1.44	1.23
Field collected - 1971	1.35	1.42	1.28
Laboratory reared - 1971	1.07	1.16	0.99
	Orthene		
Field collected - 1971	3.56	3.79	3.35
Laboratory reared - 1971	2.24	2.40	2.09

The use of trade names is sometimes necessary to convey information more clearly. No endorsement of products named in this publication is intended nor is criticism implied of similar products not mentioned.

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