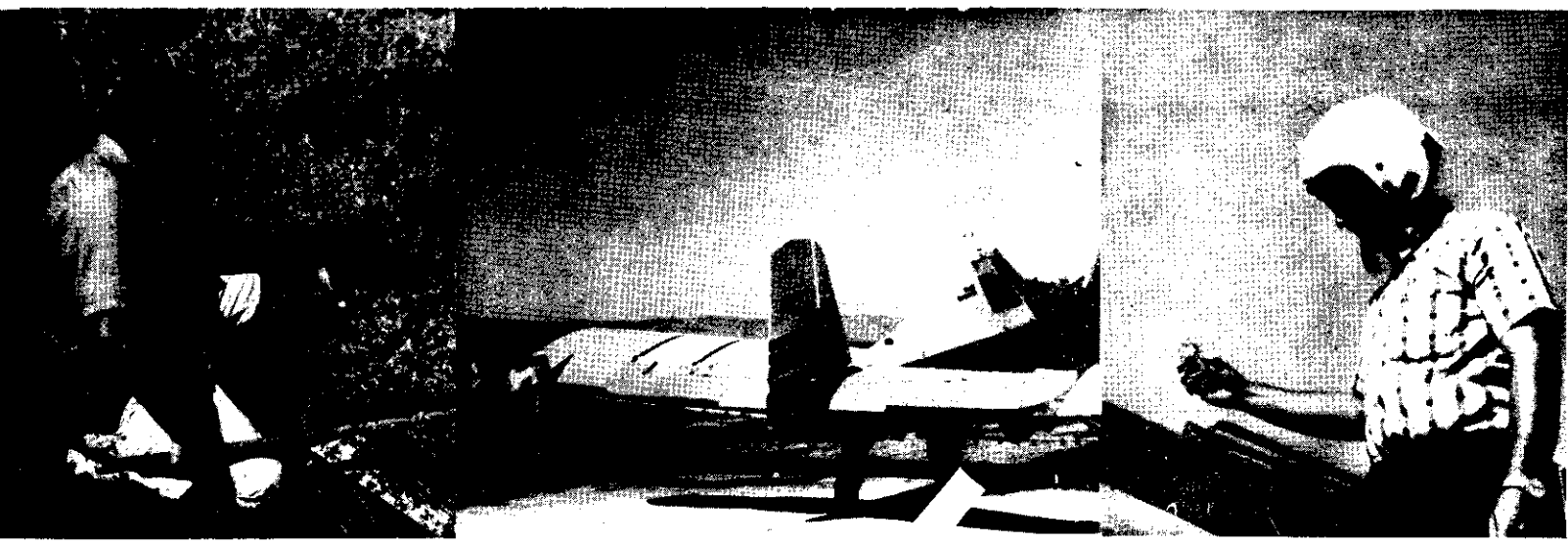
ACKNOWLEDGEMENTS

The work reported here was made possible by financial support of seed growers, chemical and seed companies, the Fresno County Pure Seed League, California Crop Improvement Association, and the California Planting Cotton Seed Distributors. This support and cooperation is greatly appreciated.

The assistance of grower cooperators and chemical applicators who donated their time, equipment, and fields to conduct these experiments is deeply appreciated. Special thanks are due Don Darnell of Panoche Chemical Company, Bob Vance of Tri-Air and Wilbur Ellis Company for their interest and many hours of work with these and past experiments concerning insect control in seed alfalfa.

The experiments and surveys in Fresno County were conducted in alfalfa seed fields of the following growers: John Nakamura, Joe Echeveste, John Maitia, Dominic and John Enrico, Mike Perez, Don Schramm, R & N Farms, Anderson Clayton Company, J. G. Boswell Co., and Giffen Ranches, Inc. It was necessary in certain experimental areas to allow insect populations to remain untreated or to reach higher than recommended levels in order to obtain desired information on population trends or control effectiveness of pesticides. In so doing, growers experienced some losses in seed quality and quantity in certain of the experimental plots. We are grateful for their interest and these contributions in making it possible to conduct the experiments. The assistance of graduate students, Mark Sears and Steve Bennett in carrying out the various surveys and experiments is sincerely appreciated.



Don Darnell

The work horse

Bob Vance

I N D E X

RESEARCH ON INSECTS AFFECTING SEED ALFALFA--1972

O. G. Bacon[1], T. F. Leigh[1], B. Sheesley[2], W. D. Riley[3], and R. H. James[3]

Introduction

This progress report summarizes research on insects affecting seed alfalfa conducted in Fresno County during 1972. It is our desire to fully inform seed growers and agribusiness cooperators of the research conducted with their generous and much appreciated 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.

---

1 Entomologists, Department of Entomology, University of California, Davis.

2 Farm Advisor, Fresno County.

3 Staff Research Associates, Department of Entomology, University of California, Davis.

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

Carzol®
Ciba Geigy 13608
Dibrom®
dimethoate (Cygon®)
DDT
Dursban®
Dylox®
Fundal®
Galecron®
Kelthane®
Meta-Systox-R®
Methyl Parathion®
Orthene®
Pirimicarb (Pirimor)®
Supracide®
Systox®
Temik 10G®
TEPP
Thimet 10G®
Thimet 600®
Thiodan®
toxaphene
Uni Royal K840
Vydate®
Zoecon ZR512

Discussion of 1972 Research Results

Research was continued on the control of lygus bugs, aphids, and spider mites and on the biology and population dynamics of the consperse stink bug. Although data were obtained on more than one pest in each of several experiments the results are categorized and reported according to the pest rather than by individual experiments.

LYGUS BUGS

Thirteen insecticides and insecticide combinations were evaluated for control of lygus bugs in four separate experiments. Insecticides applied as foliar sprays by aircraft were Pirimicarb, Carzol, Carzol + Pirimicarb, Vydate, Supracide, Dursban, CGA 13608, Orthene, dimethoate, DDT + toxaphene and Carzol + Thiodan. Temik and Thimet were applied to

the soil as granular formulations with a commercial shank applicator. The following briefly summarizes the results obtained with each of the materials in controlling lygus bugs.

Pirimicarb applied at the rate of 0.25 lb. active ingredient per acre did not effectively control lygus bugs. A slight reduction in population was observed for the first three days after application but this was followed by normal population increases.

Carzol applied at 0.5 lb. active ingredient per acre effectively controlled lygus bugs in all experiments for 14 days and in some experiments lygus bug populations did not return to pre-treatment levels for as long as 21 days after application.

A combination of Carzol 0.5 lb./A + Pirimicarb 0.25 lb./A provided control of lygus bugs for 21 days after application. The effective agent in the combination appeared to be Carzol rather than Pirimicarb.

A combination of Carzol 0.5 lb./A and Thiodan 1.0 lb./A was about as effective as Carzol alone in controlling lygus bug populations. The combination gave control for periods of from 13 to 20 days after application.

Vydate at 0.75 lb./A held lygus bug populations below pre-treatment levels for approximately 21 days following application.

Supracide, Dursban, CGA 13608, and Orthene each at 1.0 lb./A held lygus bug populations below pre-treatment levels for 14 to 21 days after application.

Dimethoate at 0.5 lb./A, the standard treatment against which many of the materials were compared, gave effective control of lygus bugs for 14 days after application. A second standard, toxaphene 4 lb./A + DDT 2 lb./A prevented lygus bug populations from reaching pre-treatment levels for approximately 14 days after application.

Temik and Thimet were applied as 10% granules to the soil at rates of 3.0 and 5.3 lbs. active ingredient per acre respectively. Neither reduced lygus bug populations until activated with irrigation water. Lygus bug populations were not eliminated at any time in the granular treatments, but with Temik significant reductions in nymph populations were observed as early as six days after irrigation. Maximum population reductions occurred within a period of 6 to 13 days after irrigation. Thereafter populations increased gradually, reaching total population pre-treatment levels in one experiment approximately 27 days after irrigation (33 days after application of Temik) and in the other, between 21 and 28 days after irrigation (in this case 21-28 days after application of Temik). When compared with an untreated check plot in the latter experiment, fewer lygus bugs were present in the Temik treatment 35 days after application and irrigation than in the untreated check (7.7 bugs per sweep for Temik vs. 49.7 bugs per sweep for check).

The data obtained indicate that perhaps adult lygus bugs were less affected by Temik than nymphs, especially young nymphs. It is difficult to accurately evaluate the effects of Temik on adults because they readily move from one area to another.

Lygus bug populations were much lower in plots treated with Temik than in plots treated with a foliar spray of Carzol (0.5 lb./A) when evaluated 20 days after application of the Carzol and 20 days after irrigation of Temik (26 days after Temik application).

Observations were not made on lygus bug populations in Carzol treated plots beyond 20 days following application because of the recurrence of the bug populations and the need for retreatment.

It would appear from the two experiments conducted with the granular formulations that Temik at 3.0 lb. active per acre, although not eliminating

the lygus bugs, did result in their effective control for approximately 30 days after activation of the material with irrigation water.

Thimet applied as granules did not appear highly effective in reducing lygus bug populations. With the exception of one sampling made 13 days after irrigation (19 days after application) lygus bug populations increased over pre-treatment levels each week until the experiment was terminated 26 days after application (20 days after irrigation).

APHIDS

Data on control of aphids were obtained for all materials evaluated for lygus bug control. In addition, two separate experiments were conducted to evaluate the effectiveness of several new specific aphicides for control of the spotted alfalfa aphid and the pea aphid.

In the lygus bug experiments those insecticides applied as foliar sprays that were most effective in controlling the spotted alfalfa aphid were Dursban, Supracide, Vydate, and CGA 13608. Pirimicarb appeared to deter or slow development of spotted alfalfa aphid populations but at the dosage level used, 0.25 lb./A, it did not control the aphid as effectively as the aforementioned materials. Carzol, Orthene, and dimethoate were not effective and perhaps may have even contributed to population increases of the spotted alfalfa aphid. High spotted alfalfa aphid populations were especially noticeable in a plot treated with Orthene. A combination of Carzol plus Pirimicarb did not provide effective control of the spotted alfalfa aphid and populations approximated those where Carzol was used alone.

Temik and Thimet granular formulations applied to the soil were highly effective in controlling both the spotted alfalfa aphid and the pea aphid. More data were obtained for Temik than for Thimet because

Temik was more extensively investigated for lygus bug control. At 35 days after application of Temik, populations of both the spotted alfalfa aphid and pea aphid had increased over initial population reductions but the numbers of aphids observed were extremely low when compared with populations in an untreated check and in plots treated with Carzol.

Pea aphid populations were generally very low initially in the lygus bug experiments and most of the insecticides used in these experiments appeared to control populations of this aphid. A notable exception to this was toxaphene-DDT which resulted in a serious pea aphid infestation after two applications. Carzol did not appear highly effective in controlling the pea aphid. Thiodan combined with Carzol resulted in good control of the pea aphid and, although not highly effective, the combination significantly reduced populations of the spotted alfalfa aphid.

Three new aphicides were compared in two experiments with an untreated check and a standard 1.0 lb./A Thiodan treatment for control of the spotted alfalfa aphid.

The new aphicides and dosage levels evaluated were Pirimicarb 0.25 lb./A, Uni Royal K840 0.5 and 1.0 lb./A and Zoecon ZR512 1.0 lb./A. Of the three only Uni Royal K840 effectively controlled the spotted alfalfa aphid. On the basis of limited data there did not appear to be significant differences between the results obtained with the two dosage levels of K840 (0.5 and 1.0 lb./A). Thiodan was highly effective in the first experiment and much less effective in the second experiment. Uni Royal K840 is especially interesting because of its effectiveness and because the material is reported to be non-toxic to the honey bee. Further work should be conducted with Pirimicarb at higher dosage levels and perhaps also with the Zoecon material. These compounds are also reported to be non-toxic to bees.

SPIDER MITES

Data on control of spider mites were obtained with foliar sprays of Carzol, Carzol plus Thiodan, Vydate and for the granular applications of Temik and Thimet.

Carzol applications and the Carzol-Thiodan combination generally resulted in excellent control of spider mites. While mites could be found in the Carzol plots the numbers were very low after treatment and they remained low for periods of 20 days or more. Repeated applications of Carzol for lygus bug control in these plots further reduced the numbers of mites and mite eggs.

Vydate was not highly effective in controlling the mites.

Temik granules applied to the soil resulted in excellent mite control for 26 to 28 days after application. Mite populations had increased significantly 35 days after application, but were still less than those observed in an untreated check plot.

Thimet granules applied to the soil also resulted in good mite control, but the control did not appear to be as effective as that obtained with Temik.

CONSPERSE STINK BUG

Stink bug populations were monitored in seven alfalfa seed fields on the west side of the San Joaquin Valley from November 16, 1971 through August 1972. As in 1971, overwintering adult populations were determined by examining 10 samples, each consisting of 10 row inches of root crowns (100 row inches) from each field on each date at approximately monthly intervals from November 16, 1971 through April 12, 1972. Beginning on May 2, 1972 and continuing at bi-weekly intervals for the remainder of the season, stink bug populations were sampled by using the "beating pan" technique developed in 1971 where five pan samples (25 row feet) were examined in each field on each sampling date.

Overwintering populations of adults were scarce and generally very low populations were encountered in alfalfa seed fields during the entire 1972 crop season. Populations were sufficiently high in three of the survey fields to obtain excellent data on seasonal population trends and to again correlate population levels with seed damage. Population trends were similar to those noted in 1971. As was observed in 1971, two generations of the stink bug occurred. Nymphs of the first generation were first observed in two of the survey fields on May 17, 1972. This was approximately one week earlier than the appearance of the first generation in 1971 which was noted on May 25th. Nymphs of the second generation began to appear on July 5th which coincided very closely with their appearance in 1971 when second generation nymphs were found on July 6th. As was observed in 1971, the second generation was much larger than the first and reached population peaks from about August 1st to the 22nd. Population peaks occurred in 1971 between August 3rd and the 17th.

As in 1971, seed samples were hand harvested from each of the survey fields just prior to commercial harvest. The samples were taken from restricted locations in the fields where the stink bug counts had actually been made during the season. We wish to emphasize that the damage counts recorded in the tables are not necessarily indicative of the seed quality of the entire field because in some 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.

Seed from these samples were examined for sucking insect damage and other injuries. Damage attributed to the stink bug correlated well with stink bug populations observed in the sampling areas. In keeping with the lower stink bug populations in the fields during 1972 the amount of damage observed was proportionally less than that observed in 1971. One experi-

mental area that remained untreated during 1972 developed very high stink bug populations which were approximately of the same magnitude as those observed in the same area during 1971.

The percentage of damaged seed attributed to the stink bug in this experimental area in 1972 was 32.8% as compared with 34.1% for 1971.

An attempt was made to investigate stink bug populations in crops and areas bordering alfalfa seed fields. Stink bug numbers were extremely low in these areas. Twenty-five plants in each of four sugar beet fields were examined on each sampling date at bi-weekly intervals from May 17th to June 20th and at weekly intervals from June 20th through July 18th and 25th when the fields were harvested. A total of only 11 stink bugs were found, six adults, five nymphs and they were distributed randomly over the fields and over the entire sampling period.

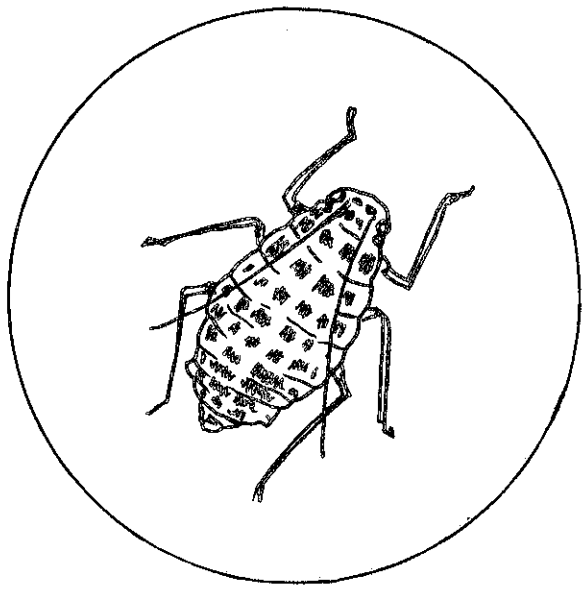
Because of the generally low stink bug populations in seed alfalfa fields no experiments were conducted with insecticides for their control. The populations were not sufficiently high over large enough areas to permit adequate insecticide evaluations. No stink bugs were observed in fields utilized for lygus bug control experiments at the time the lygus bug control experiments were being conducted.

Effects of Insecticides on Beneficial Insect Species

In each of the lygus bug control experiments, data were obtained on the effects of the various insecticides on eight categories of predatory arthropods. Much data were gathered and it is difficult to generalize, but it would appear that the materials having the least detrimental effect on these beneficial forms were the sprays of Pirimicarb, Carzol, and the granular formulations of Temik and Thimet. Pirimicarb was not highly effective against any of the pest species at the dosage level tested and

its effects at higher dosage levels on predatory and parasitic forms is not known. Carzol applications initially reduced populations of the beneficial species, but the reductions were not as great as for most of the other insecticides applied as sprays and the populations tended to increase more rapidly in the Carzol plots than in those of the other treatments. Temik and Thimet appeared to have little effect on the predatory bugs Orius and Geocoris, but may have adversely affected lacewings, Coccinellids and perhaps to some extent parasitic wasps. The effects on lacewings, Coccinellids, and parasitic wasps may have been due in part to a reduction in the aphid populations rather than a direct effect on the predators and parasites. With most of the other experimental insecticides drastic reductions in parasite and predator populations occurred within the first day after treatment and the populations were slow in regenerating. It is obvious that repeated applications of most of these materials at intervals of 2 to 3 weeks would virtually eliminate the predatory and parasitic forms from the fields.

Detailed studies on honey bee toxicity resulting from the application of Carzol spray and Temik granules were conducted by Mr. L. E. Atkins, Department of Entomology, U. C. Riverside. The results of his experiments revealed that the Carzol foliar treatments and the soil applications of Temik had no adverse effects on the bees. Data were not obtained on alkali or leafcutter bees.



APHID

Spotted alfalfa aphid and pea aphid populations in seed alfalfa plots treated with insecticide sprays applied by aircraft to control lygus bugs. Nicolini & Maitia, Firebaugh, California, 1972.

Treatment 1/			Number of aphids per 50 D-Vac samples 4/	
Insecticide 2/	AI/ Acre Lb.	Days After Application 3/	S.A.A.	P.A.
		Pre	78	11
		1	18	0
		3	59	0
Pirimicarb	0.25	7	48	0
		14	78	0
		21	142	10
		29	213	0
		Pre	102	17
		1	43	9
		3	115	4
Carzol	0.5	7	49	4
		14	244	1
		21	1046	4
		29	6924	5
		Pre	105	21
		1	236	0
Carzol	0.5	3	163	0
plus		7	168	0
Pirimicarb	0.25	14	313	1
		21	1050	1
		29	4992	0
		Pre	41	13
		1	4	0
		3	13	0
Vydate	0.75	7	7	0
		14	33	0
		21	93	3
		29	718	1

Treatment 1/			Number of aphids per 50 D-Vac samples 4/	
Insecticide 2/	AI/ Acre Lb	Days After Application 3/	S.A.A.	P.A.
Supracide	1.0	Pre	59	13
		1	3	8
		3	4	0
		7	9	0
		14	36	0
		21	33	0
		29	397	0
Dursban	1.0	Pre	26	13
		1	0	0
		3	1	0
		7	0	1
		14	0	0
		21	6	0
		29	86	1
CGA 13608	1.0	Pre	31	10
		1	12	0
		3	8	0
		7	2	2
		14	6	0
		21	61	0
		29	780	0
Orthene	1.0	Pre	43	7
		1	266	0
		3	209	0
		7	132	1
		14	2023	2
		21	8952	1
		29	64,432	1

Treatment 1/		Days After Application 3/	Number of aphids per 50 D-Vac sample 4/	
Insecticide 2/	AI/ Acre Lb.		S.A.A.	P.A.
		Pre	72	9
		1	214	0
		3	165	0
Dimethoate	0.5	7	162	0
		14	733	0
		21	1457	1
		29	9451	0

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

2/ Sprays applied at 10 GPA on June 6th from 3:20 to 5:45 a.m. Carzol was a 95% soluble powder, CGA 13608 was a 50% wettable powder, Orthene was a 75% wettable powder. Pirimicarb was water miscible liquid formulation (JF 3722 containing 1.5 lb. a.i. per U.S. gallon). The remaining insecticides were emulsifiable concentrates.

3/ Pretreatment counts were made June 5th.

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

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

Schramm Ranches, San Joaquin, California, 1972.

Treatment 1/		Applications 2/		Irrigation 3/		Number of Aphids per 50 D-Vac Samples 5/	
Insecticide	AI/ Acre Lb	Dates	Days After 4/	Dates	Days After 4/	S.A.A.	P.A.
			Pre			406	289
			Pre			48	3
Carzol		June 2		June 1			
Foliar	0.5		5			36	8
Spray			12			50	27
			19			60	85
		June 22					
			13			2,911	3,560
			Pre		Pre	666	485
		May 26					
Temik			6		Pre	15	2
10%	3.0			June 1			
Granules			12		6	0	1
			19		13	2	0
			26		20	1	6
			40		33	32	26
			Pre		Pre	572	410
		May 26					
Thimet			6		Pre	66	9
10%	5.3			June 1			
Granules			12		6	6	3
			19		13	8	2
			26		20	13	6

1/ Plot size: Carzol and Temik each 16 acres; Thimet 5 acres.

2/ Granules were placed on both sides of row 12" from center and 6" below soil surface with a four row commercial applicator. Carzol was applied by aircraft at 5 GPA on June 2nd and 10 GPA on June 22nd.

3/ Plots were furrow irrigated.

4/ Pretreatment counts were made May 25th and June 1st.

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

Spotted alfalfa aphid and pea aphid populations in seed alfalfa plots treated with a foliar spray and a granular systemic insecticide applied to the soil. Schramm Ranches, San Joaquin, California, 1972.

Treatment 1/		Applications 2/		Number of aphids per 50 D-Vac Samples 4/	
Insecticide	AI/ Acre Lb.	Dates	Days After 3/	S.A.A.	P.A.
Temik 10% Granules	3.0	June 21	Pre	3	0
			15	3	6
			21	7	36
			28	25	26
			35	49	94
Carzol Foliar Spray	0.5	July 6	Pre	3	2
			1/6	216	13
			6	252	49
			13	473	95
			20	3,745	393
Check (No treatment)	None	None	Pre	3	2
			15	30	92
			21	281	330
			28	391	812
			35	461	5,365

1/ Plot size: Temik and Carzol each 5 acres; Check 0.5 acres.

2/ Granules were placed on both sides of row 12" from center and 6" below soil surface with a four row commercial applicator. Plots were furrow irrigated immediately after granular application. Carzol was applied by aircraft at 5 GPA.

3/ Pretreatment counts were made June 21st.

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

Spotted alfalfa aphid and pea aphid populations in seed alfalfa plots treated for lygus bug control.
R & N Farms, Firebaugh, California, 1972 1/

Dates of Applications 2/	Days after Application 3/	Number of aphids per 50 D-Vac samples 4/							
		Treatment A		Treatment B		Treatment C		Treatment D	
		SAA	PA	SAA	PA	SAA	PA	SAA	PA
	Pretreatment	23	27	0	4	10	18	9	10
June 14									
	6	1	16	71	25	24	1	13	0
	13	6	316	300	381	57	2	123	33
June 28									
	7	3	996	598	579	105	0	195	24
	20	124	17,096	5,624	7,944	7,308	204	2,424	780
	27 5/	-	-	-	-	10,668	216	-	-
July 20									
	5	10	17	58	81	-	-	88	1

1/ Plot size: A, B, and C 10 acres each (330' x 1320'); D 5 acres (165' x 1320').

2/ Insecticides were applied as sprays by aircraft at 10 GPA. Applications on June 14th and 28th were as follows:
Treatment A. DDT 2.0 lb. per acre plus Toxaphene 4.0 lb. per acre.
Treatment B. Carzol 0.5 lb. per acre.
Treatment C. Carzol 0.5 lb. per acre plus Thiodan 1.0 lb. per acre.
Treatment D. Carzol 0.75 lb. per acre.
Because of heavy infestations of pea aphid in Treatments A and B and of two spotted spider mite in Treatment D the following applications were made on July 20th:
Treatments A and B. Thiodan 1.5 lb. per acre.
Treatment D. Carzol 0.75 lb. per acre.

3/ Pretreatment counts were made June 13th.

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

5/ Data not taken because of irrigation.

Spotted alfalfa aphid populations in seed alfalfa plots treated for aphid control.
Perez Brothers, Firebaugh, California, 1972.

Treatment 1/		Number of Aphids per 50 D-Vac Samples 3/				
Insecticide 2/	AAI/ Acre Lb	July 25 (pre)	Aug 1	Aug 8	Aug 15	Aug 22
None (Check)	None	15,460	49,672	87,944	--	--
ZR 512 4/	1.0	25,224	41,856	56,612	--	--
Pirimicarb 5/	0.25	28,648	34,024	35,448	--	--
K-840 (Uniroyal)	1.0	25,368	41	1,549	1,742	33,448
Thiodan	1.0	19,516	269	2,208	216	8,413

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

2/ Insecticides applied as spray by aircraft at 10 GPA from 5:25 to 6:15 a.m. July 26th. The Check, ZR 512, and Pirimicarb plots and the remainder of the field were treated with TEPP 1.0 lb. per acre plus Thiodan 1.5 lb. per acre on August 11th. Drift from this application appears to have effected the Thiodan plot.

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

4/ Zoecon Altozar 4E.

5/ Pirimor 50% WP (coded JF 2538).

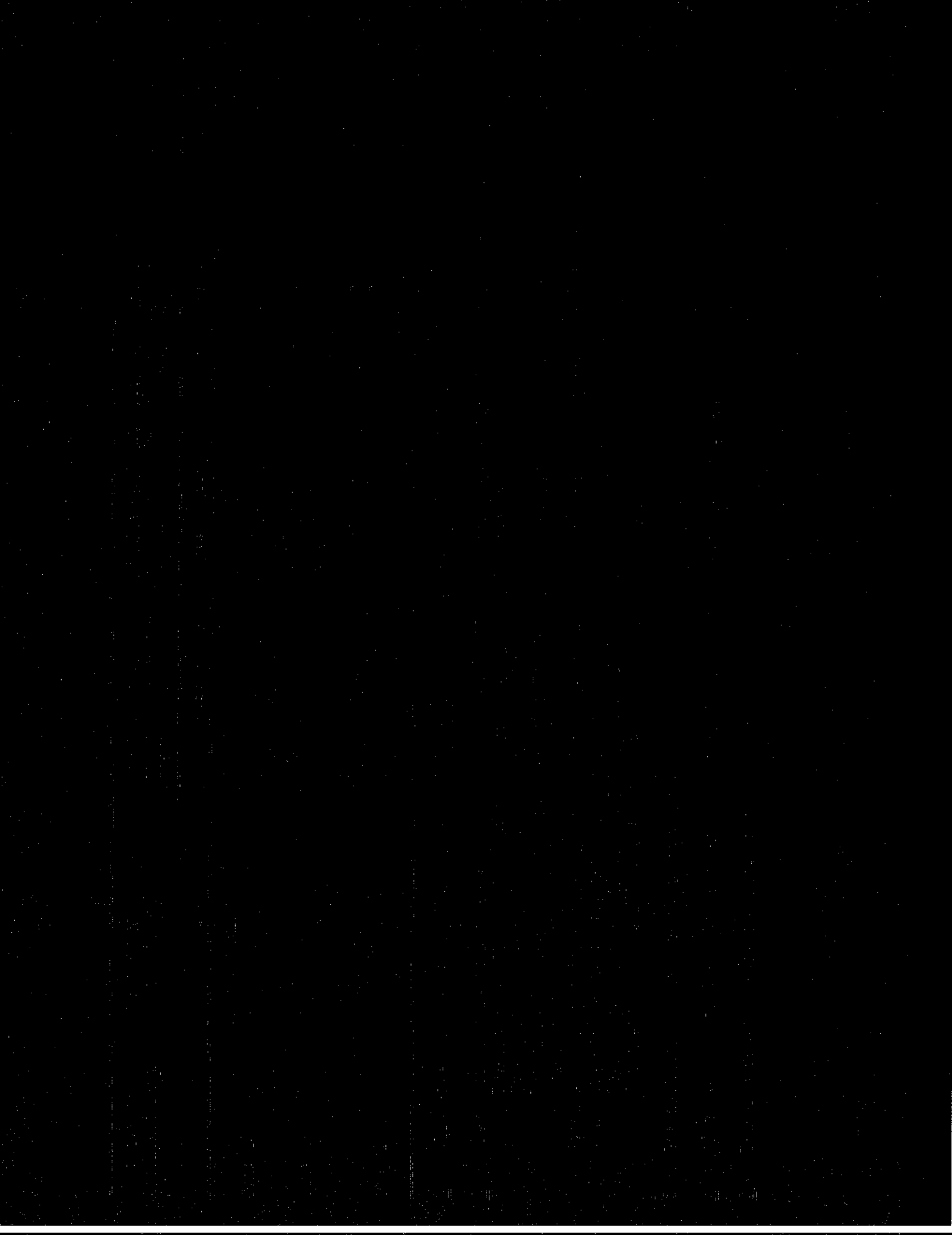
Spotted alfalfa aphid populations in seed alfalfa plots treated for aphid control.
Perez Brothers, Firebaugh, California, 1972.

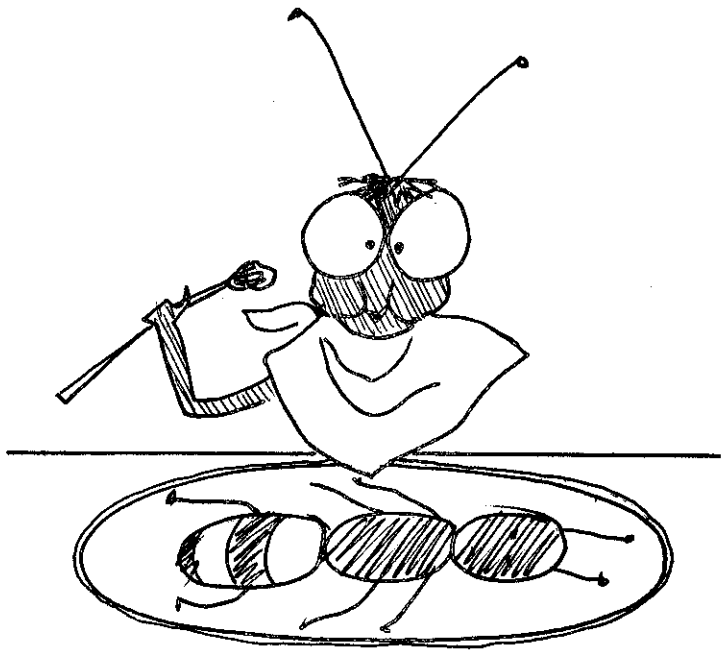
Treatment 1/		Number of Aphids per 50 D-Vac Samples 3/			
Insecticides 2/	AAI/ Acre Lb	Aug 15	Aug 22	Aug 29	Sept 6
None (Check)	None	5,275	28,136	30,760	92,768
K-840 (Uniroyal)	1.0	11,528	348	950	10,844
K-840 (Uniroyal)	0.5	15,238	207	570	9,264
Thiodan	1.0	9,270	4,322	4,864	49,288

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

2/ Insecticides applied as spray by aircraft at 10 GPA from 4:20 to 5:10 a.m. August 16th.

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





PREDATORS & PARASITES

Predator and parasite populations in seed alfalfa plots treated with insecticide sprays applied by aircraft to control lygus bugs. Nicolini & Maitia, Firebaugh, California, 1972.

Treatment 1/		Days After Application 3/	Number of Predators and Parasites per 50 D-Vac Samples 4/													
			Orius		Geocoris		Nabis		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
Insecticide 2/	AI/ Acre Lb		A	N	A	N	A	N	A	L	A	L	A	L		
		Pre	271	88	54	41	29	81	19	0	11	0	2	0	359	10
		1	88	69	44	14	21	43	14	5	17	0	5	0	22	5
		3	99	91	24	10	11	50	18	1	34	0	1	0	132	9
Pirimicarb	0.25	7	142	333	43	3	22	99	4	0	7	0	2	0	40	31
		14	87	109	64	5	6	44	1	2	0	0	3	0	111	5
		21	102	137	74	17	20	22	0	4	1	0	14	0	253	14
		29	13	18	20	26	7	4	0	3	0	0	10	0	127	5
		Pre	259	189	89	86	29	140	22	1	21	1	1	1	274	10
		1	4	6	11	4	2	7	0	1	15	0	3	0	0	2
		3	9	18	1	1	1	4	3	0	10	0	3	0	11	12
Carzol	0.5	7	23	24	4	0	0	9	1	1	18	0	0	0	13	10
		14	12	37	12	1	2	8	2	1	3	0	2	0	25	5
		21	50	43	30	5	3	1	9	1	2	0	7	0	83	3
		29	154	41	9	0	5	3	21	10	0	2	4	0	82	9
		Pre	298	164	49	119	19	100	25	1	11	0	1	1	328	9
		1	0	6	3	3	1	5	1	0	12	0	4	0	0	2
Carzol	0.5	3	9	5	0	0	0	1	3	0	6	0	3	0	6	1
plus		7	12	9	3	4	0	7	0	6	12	0	3	0	6	9
Pirimicarb	0.25	14	10	19	12	3	0	1	2	4	7	0	2	0	23	3
		21	24	14	17	3	2	1	6	4	0	0	2	0	42	5
		29	47	10	2	2	3	3	4	3	0	2	9	1	64	2
		Pre	300	194	58	139	19	124	53	1	26	1	3	0	341	7
		1	0	0	1	1	0	0	0	0	1	0	1	0	0	5
		3	0	4	2	0	0	0	1	0	0	0	1	0	15	9
Vydate	0.75	7	12	7	4	1	1	1	0	1	5	0	4	0	14	12
		14	14	12	21	2	1	0	0	4	1	0	0	0	36	5
		21	56	30	33	6	4	0	5	4	0	0	11	0	96	6
		29	130	76	8	9	1	3	3	7	0	0	4	0	47	15

Treatment 1/		Days after application 3/	Number of Predators and Parasites per 50 D-Vac Samples 4/															
			Orius		Geocoris		Nabis		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
Insecticide 2/	AI/ Acre Lb		A	N	A	N	A	N	A	L	A	L	A	L		
Supracide	1.0	Pre	318	179	56	175	19	128	48	4	24	3	2	1	278	11
		1	0	0	5	8	0	0	0	3	0	0	0	0	0	0
		3	2	0	5	5	1	0	3	1	0	0	0	0	12	0
		7	11	2	18	3	2	0	4	2	0	0	0	0	22	3
		14	16	17	62	3	2	6	4	9	1	0	1	0	44	6
		21	54	35	93	8	9	10	1	12	0	0	3	0	106	3
		29	194	92	36	33	11	13	4	2	0	0	5	0	74	1
Dursban	1.0	Pre	259	134	102	136	30	67	46	0	21	1	1	0	189	5
		1	0	0	2	0	0	1	0	0	0	0	0	0	1	2
		3	3	1	1	0	0	0	1	0	1	0	2	0	4	2
		7	15	1	2	0	3	22	1	5	1	0	0	0	18	8
		14	11	10	14	1	7	22	2	6	0	0	1	0	20	3
		21	58	44	65	2	3	10	0	8	0	0	2	0	75	4
		29	113	32	15	14	4	8	0	5	0	0	4	0	40	2
CGA 13608	1.0	Pre	255	107	92	194	27	107	77	1	30	4	3	0	222	21
		1	0	0	1	0	0	0	0	0	0	0	0	0	0	8
		3	0	1	1	0	2	0	0	1	0	0	0	0	0	2
		7	4	0	13	1	2	9	0	2	0	0	1	0	8	14
		14	22	7	48	4	3	21	1	7	0	0	1	0	34	6
		21	51	23	57	7	3	18	0	7	0	0	2	0	93	3
		29	14	7	8	11	1	18	0	4	0	0	2	0	17	0
Orthene	1.0	Pre	305	136	67	188	15	98	95	1	40	0	3	0	309	8
		1	0	0	0	1	1	1	1	0	0	0	0	0	0	3
		3	2	0	1	1	0	4	0	0	0	0	0	0	12	1
		7	1	1	0	3	0	1	1	0	2	0	0	0	28	12
		14	13	2	7	3	0	3	2	0	0	0	1	0	33	3
		21	12	2	67	1	1	0	9	1	2	0	2	0	96	2
		29	42	0	3	1	0	0	9	4	0	0	7	0	80	3

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		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
			A	N	A	N	A	N	A	L	A	L	A	L		
		Pre	283	128	87	220	18	38	43	2	25	1	3	0	263	4
		1	0	2	3	4	1	5	3	1	0	0	0	0	2	3
		3	3	3	4	3	1	1	5	1	0	0	1	0	16	4
Dimethoate	0.5	7	33	5	2	1	1	14	2	1	3	0	0	1	23	12
		14	17	21	13	5	3	15	11	9	0	0	2	0	47	2
		21	68	27	84	3	3	11	20	6	2	0	3	0	123	8
		29	95	12	6	3	2	0	8	5	0	2	7	0	127	5

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

2/ Sprays applied at 10 GPA on June 6th from 3:20 to 5:45 a.m. Carzol was a 95% soluble powder, CGA 13608 was a 50% wettable powder, Orthene was a 75% wettable powder. Pirimicarb was water miscible liquid formulation (JF 3722 containing 1.5 lb. a.i. per U.S. gallon.) The remaining insecticides were emulsifiable concentrates.

3/ Pretreatment counts were made June 5th.

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

Predator and parasite populations in seed alfalfa plots treated with a foliar spray and granular systemic insecticides applied to the soil.

Schramm Ranches, San Joaquin, California, 1972.

Treatment 1/		Days After 2/		Number of Predators and Parasites per 50 D-Vac Samples 3/													
Insecticide	AI/ Acre Lb.	Application	Irrigation	Orius		Geocoris		Nabis		Lacewings		Coccinellids		Collops		Par Wasps	Spiders
				A	N	A	N	A	N	A	L	A	L	A	L		
		Pre		97	143	10	125	3	87	11	3	4	14	0	0	395	17
		Pre		287	231	9	136	13	216	4	3	9	8	0	0	181	30
Carzol		5		34	53	1	46	1	17	0	1	0	1	1	0	25	46
Foliar	0.5	12		79	38	16	16	0	20	8	1	2	1	2	0	79	47
Spray		19		145	95	20	27	2	31	5	8	3	1	1	0	120	110
		13 2/		79	49	24	43	2	16	11	11	0	14	2	0	64	32
		Pre	Pre	66	128	12	71	4	59	18	0	15	19	2	0	463	10
		6	Pre	76	102	2	60	1	71	0	14	3	10	0	0	80	17
Temik		12	6	112	62	38	127	3	33	6	3	2	1	4	0	61	32
10%	3.0	19	13	71	44	55	55	0	4	2	2	2	0	2	0	68	50
Granules		26	20	80	80	55	24	52	38	1	0	1	0	0	0	64	144
		40	33	126	77	44	35	2	6	2	6	0	1	2	0	118	162
		Pre	Pre	65	149	1	75	0	29	6	1	14	31	0	0	358	3
Thimet		6	Pre	244	186	2	67	5	147	1	3	1	1	0	0	91	17
10%	5.3	12	6	256	125	42	211	22	146	4	3	0	3	0	0	86	30
Granules		19	13	197	74	23	54	11	95	7	0	3	0	1	0	95	38
		26	20	135	260	38	40	10	48	0	0	0	0	1	0	61	122

1/ Plot size: Carzol and Temik each 16 acres; Thimet 5 acres.

2/ Granules were placed on both sides of row 12" from center and 6" below soil surface with a four row commercial applicator on May 26th. Plots were furrow irrigated on June 1st. Carzol was applied by aircraft on June 2nd and June 22nd. Pretreatment counts were made May 25th and June 1st.

3/ 2-25 D-Vac samples from each treatment on each sampling date.

Predator and parasite populations in seed alfalfa plots treated with a foliar spray and a granular systemic insecticide applied to the soil.

Schramm Ranches, San Joaquin, California, 1972.

Treatment 1/		Days After Application 2/	Number of Predators and Parasites per 50 D-Vac Samples 3/													
			Orius		Geocoris		Nabis		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
Insecticide	AI/ Acre Lb		A	N	A	N	A	N	A	L	A	L	A	L		
Temik 10% Granules	3.0	Pre	25	12	3	2	7	2	4	18	0	0	1	0	26	8
		15	22	33	3	1	1	4	0	11	0	0	1	0	21	2
		21	74	74	4	5	1	21	2	13	0	0	8	0	109	6
		28	48	41	2	1	1	1	1	2	0	0	2	0	45	7
		35	43	96	2	3	0	0	1	1	0	0	2	3	97	9
Carzol Foliar Spray	0.5	Pre	17	12	3	2	3	2	1	11	0	0	1	0	42	14
		1/6	49	59	7	1	3	22	0	9	0	2	4	0	12	3
		6	36	24	18	8	0	90	3	17	0	0	5	0	55	5
		13	17	12	0	0	1	10	1	3	0	0	2	0	29	5
		20	40	4	2	1	0	2	6	0	0	3	3	0	66	2
Check (no treatment)	None	Pre	17	12	3	2	3	2	1	11	0	0	1	0	42	14
		15	72	80	3	0	1	27	3	14	0	0	0	0	28	3
		21	146	127	4	7	2	74	5	11	0	0	4	0	129	2
		28	68	24	1	2	2	65	13	1	0	2	1	0	85	4
		35	40	23	0	3	42	146	15	0	0	14	3	0	93	4

1/ Plot size: Temik and Carzol each 5 acres; Check 0.5 acres. Granules were placed on both sides of row 12" from center and 6" below surface with a four row commercial applicator on June 21st. Plots were furrow irrigated immediately after granule application. Carzol was applied by aircraft at 5 GPA on July 6th.

2/ Pretreatment counts were made June 21st.

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

Predator and parasite populations in a seed alfalfa plot treated with DDT and toxaphene for lygus bug control.

R & N Farms, Firebaugh, California, 1972 1/.

Dates of applications 2/	Days after applications 3/	Number of Predators and Parasites per 50 D-Vac samples 4/													
		Orius		Geocoris		Nabis		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
		A	N	A	N	A	N	A	L	A	L	A	L		
	Preatreatment	59	69	102	224	14	76	5	3	6	2	0	0	79	10
June 14															
	6	40	20	2	1	0	0	0	6	0	0	0	0	4	4
	13	84	35	6	1	0	0	1	5	0	0	0	0	14	2
June 28															
	7	20	26	1	0	0	0	1	2	0	0	0	0	1	2
	20	41	2	0	0	0	1	2	0	0	0	1	0	4	0
July 20															
	5	49	77	0	1	0	0	2	2	0	0	2	0	1	0

1/ Plot size: 10 acres (330' x 1320').

2/ DDT 2.0 lb. per acre plus toxaphene 4.0 lb. per acre were applied as a spray by aircraft at 10 GPA on June 14th and 28th. When a heavy infestation of pea aphid developed, Thiodan 1.5 lb. per acre was applied July 20th.

3/ Pretreatment counts were made June 13th.

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

Predator and parasite populations in a seed alfalfa plot treated with Carzol for lygus bug control.

R & N Farms, Firebaugh, California, 1972 1/.

Dates of applications 2/	Days after applications 3/	Number of Predators and Parasites per 50 D-Vac samples 4/													
		Orius		Geocoris		Nabis		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
		A	N	A	N	A	N	A	L	A	L	A	L		
June 14	Pretreatment	63	79	77	173	5	26	10	4	5	4	1	0	29	7
	6	13	8	0	2	0	15	1	0	0	25	1	0	2	7
June 28	13	29	15	7	14	3	17	1	9	0	17	1	0	19	14
	7	4	0	0	0	0	0	0	0	1	8	5	0	2	8
July 20	20	4	0	0	0	0	0	2	1	0	5	0	0	1	2
	5	6	0	0	0	0	0	3	0	0	15	0	0	0	9

1/ Plot size: 10 acres (330' x 1320').

2/ Carzol 0.5 lb. per acre was applied as a spray by aircraft at 10 GPA on June 14th and 28th. When a heavy infestation of pea aphid developed Thiodan 1.5 lb. per acre was applied July 20th.

3/ Pretreatment counts were made June 13th.

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

Predator and parasite populations in a seed alfalfa plot treated with Carzol and Thiodan for lygus bug control.

R & N Farms, Firebaugh, California, 1972 1/.

Dates of applications 2/	Days after applications 3/	Number of Predators and Parasites per 50 D-Vac Samples 4/													
		Orius		Geocoris		Nabis		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
		A	N	A	N	A	N	A	L	A	L	A	L		
June 14	Pretreatment	107	88	88	225	8	90	11	5	1	3	1	0	62	5
	6	15	7	4	0	0	16	0	8	1	21	0	0	3	8
June 28	13	27	13	8	2	1	24	1	6	0	4	3	0	12	7
	7	2	3	0	0	0	1	0	1	0	0	3	0	1	8
	20	11	5	0	0	1	2	1	1	0	0	0	0	2	5
	27	6	0	0	0	0	0	1	1	0	0	2	0	1	1

1/ Plot size: 10 acres (330' x 1320').

2/ Carzol 0.5 lb. per acre plus Thiodan 1.0 lb. per acre were applied as a spray by aircraft at 10 GPA on June 14th and 28th.

3/ Pretreatment counts were made June 13th.

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

Predator and parasite populations in a seed alfalfa plot treated with Vydate for lygus bug control.

R & N Farms, Firebaugh, California, 1972 1/.

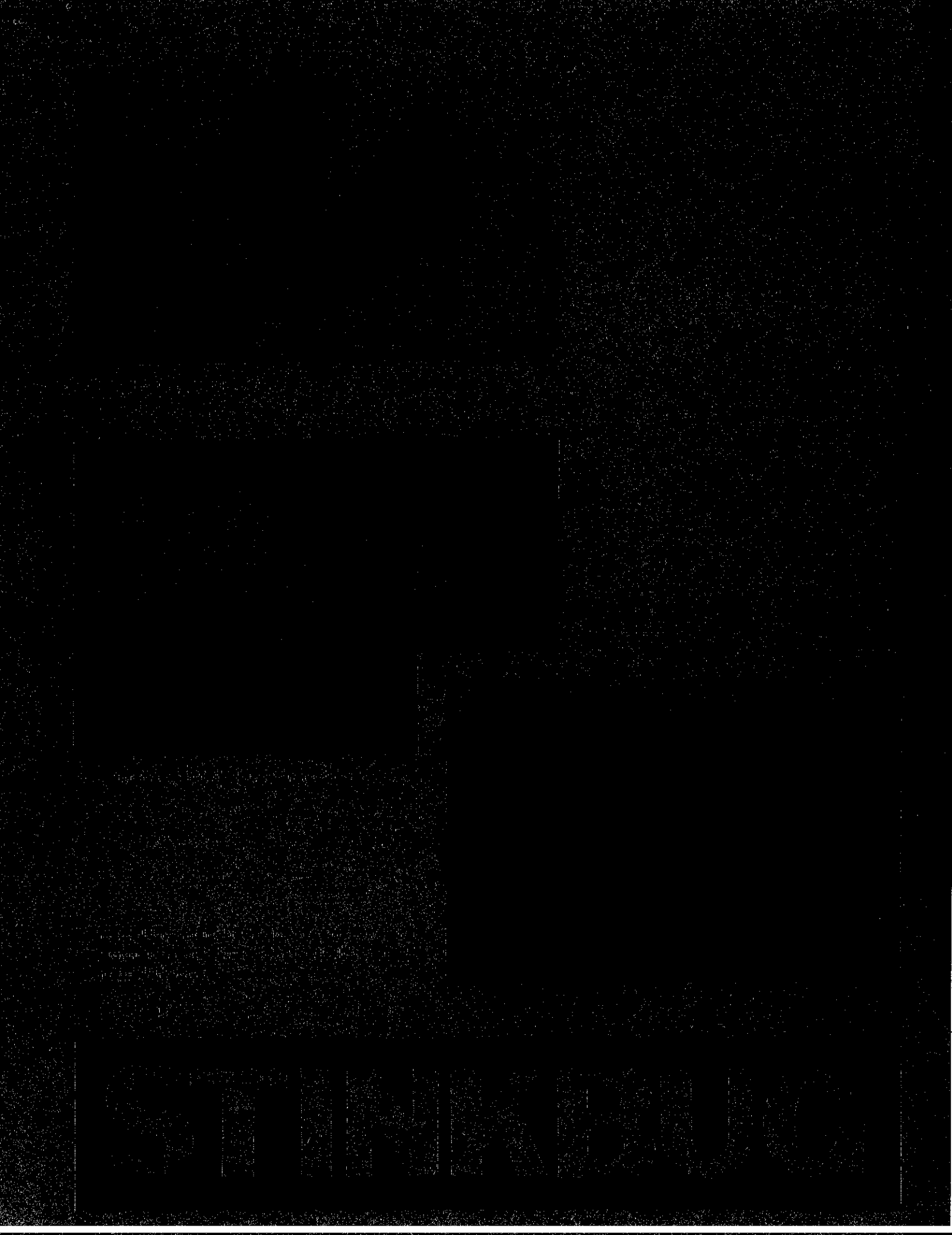
Dates of applications 2/	Days after applications 3/	Number of Predators and Parasites per 50 D-Vac Samples 4/													
		Orius		Geocoris		Nabis		Lace-wings		Cocci-nellids		Collops		Par Wasps	Spiders
		A	N	A	N	A	N	A	L	A	L	A	L		
	Pretreatment	106	73	96	289	7	66	5	6	7	2	0	0	76	3
June 14															
	6	6	6	0	1	0	2	0	2	1	1	0	0	2	12
	13	17	5	2	13	1	5	0	1	0	0	0	0	26	10
June 28															
	7	4	1	1	2	2	0	0	0	0	0	2	0	2	10
	20	8	0	0	0	0	0	0	0	0	0	2	0	9	4
July 20															
	5	3	0	0	0	0	0	0	6	0	0	1	0	0	11

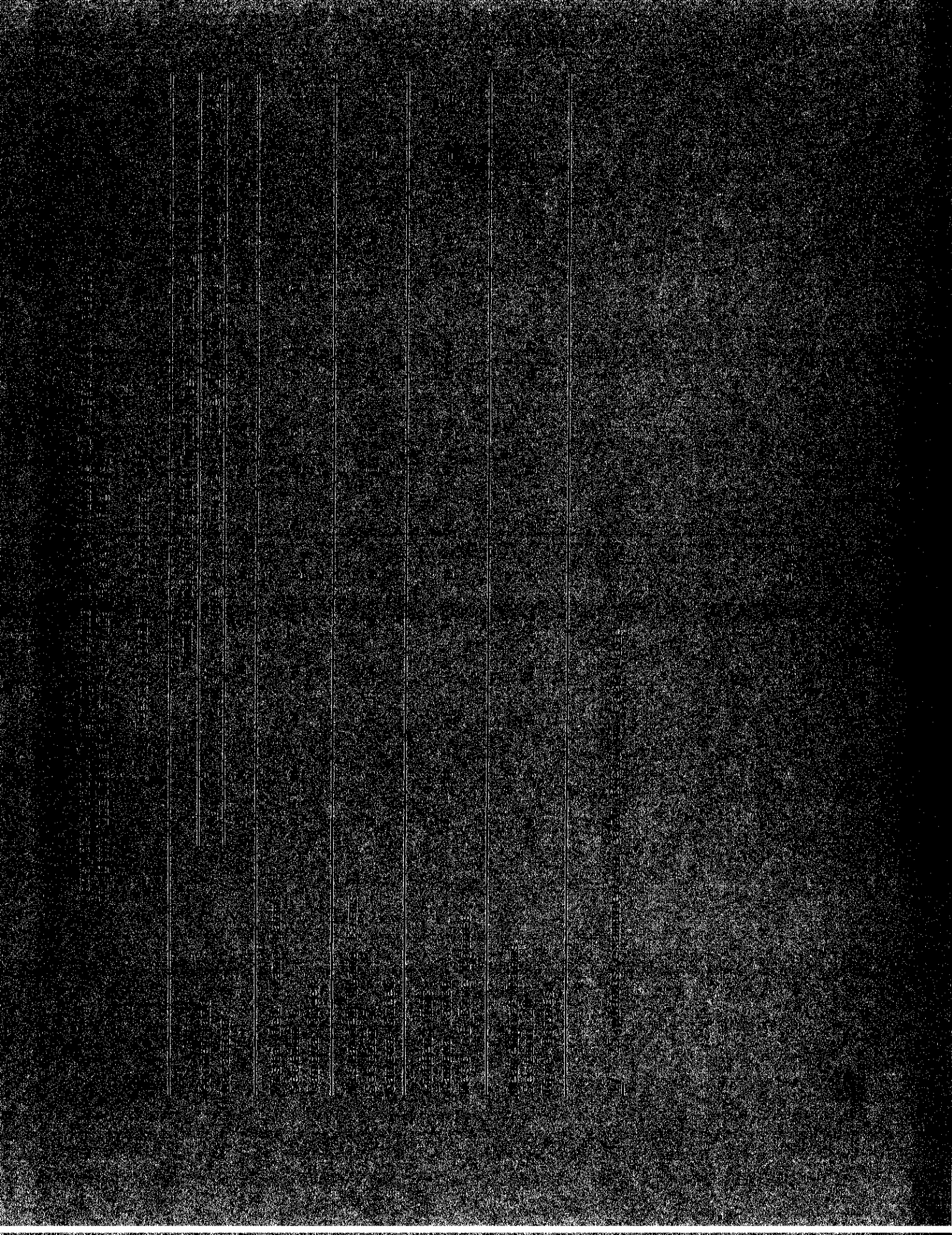
1/ Plot size: 5 acres (165' x 1320').

2/ Vydate 0.75 lb. per acre was applied as a spray by aircraft at 10 GPA on June 14th and 28th. When a heavy infestation of two spotted spider mite developed Carzol 0.75 lb. per acre was applied July 20th.

3/ Pretreatment counts were made June 13th.

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





Adult consperse stink bug populations on the root crowns of seed alfalfa during the winter season.

Fresno County, California, 1971-72.

...er and ...tion	Alive or Dead	Number of stink bugs per 100 inches of row on dates indicated 1/					
		Nov 16	Dec 14	Jan 12	Feb 15	Mar 15	Apr 12
...co Farms	alive	1	2	2	4	0	0
...3							
...bbaugh, Calif.	dead	21	5	3	4	11	2
...n Nakamura	alive	20	2	1	1	2	0
... 11							
...bbaugh, Calif.	dead	6	3	1	1	0	0
...en, Inc.	alive	9	0	1	0	0	0
...tus Ranch							
...s of Five Points	dead	0	0	0	1	1	0
...veste and Elizaldi	alive	1	0	0	0	0	0
... 2, Field #3							
...bbaugh, Calif.	dead	1	2	0	0	0	0
...olini and Maitia	alive	-	3	4	0	0	0
... 33, Field #3							
...bbaugh, Calif.	dead	-	2	1	0	0	2
...hhd Thomas	alive	-	-	3	1	1	0
... 21							
... Points, Calif.	dead	-	-	0	0	0	0
...mport Farms	alive	-	-	1	1	0	3
... 20							
... Points, Calif.	dead	-	-	0	0	0	0

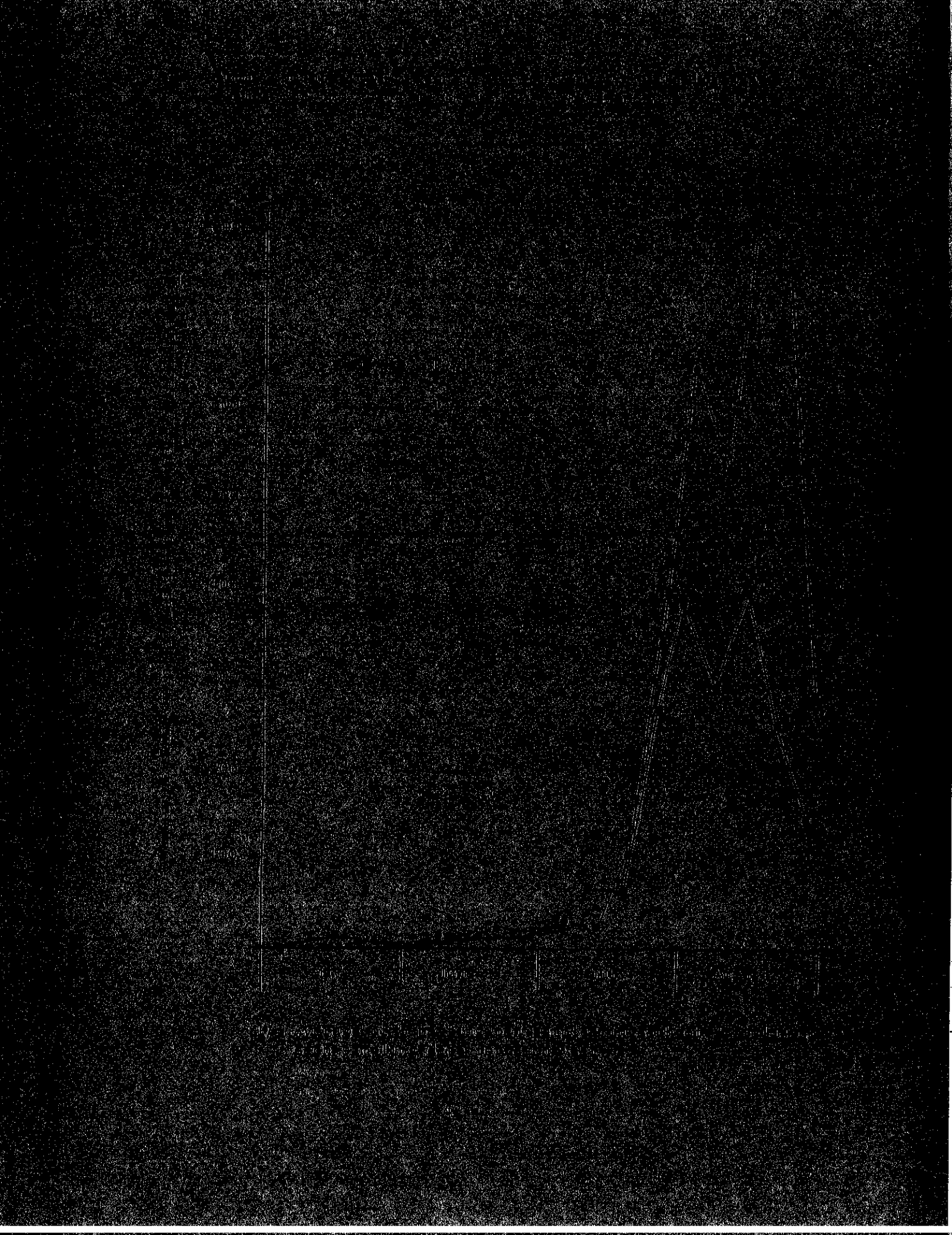
1/ 10 samples, each consisting of 10 row inches of root crowns were taken in each field on each date. No live nymphs were found on root crown samples.

[illegible]

Fresno County, California, 1972 1/

Grower and Location	May			June			July				August					Sept.
	Number of [illegible] bugs [illegible] per 25 [illegible]															
	2	17	31	6	20	27	5	11	18	25	1	8	15	22	29	6
Enrico Farms Sec. 1 Firebaugh, Calif.	–	0	0	0	3	2	–	16	20	46	40	60	115	250	150	–
John Nakamura Sec. 11 Firebaugh, Calif.	1	30	7	12	16	25	63	121	119	480	742	531	694	–	–	–
Giffen, Inc. Cantua Ranch, Sec. 26 West of Five Points	–	0	2	0	30	10	–	1	14	2	1	28	8	28	100	[illegible]
Echeveste and Elizaldi Sec. 2, Field #3 Firebaugh, Calif.	–	0	10	0	0	0	–	50	–	18	22	31	26	0	4	–
Nicolini and Mairta Sec. 33, Field #3 Firebaugh, Calif.	–	0	0	0	2	2	–	1	7	7	0	2	2	4	–	–
Raymond Thomas Sec. 21 Five Points, Calif.	–	0	0	0	0	0	–	0	0	1	0	0	0	0	–	–
Davenport Farms Sec. 20 Five Points, Calif.	0	0	1	0	1	1	–	0	1	0	0	0	0	0	0	–

1/ 5 beating pan samples on each date.

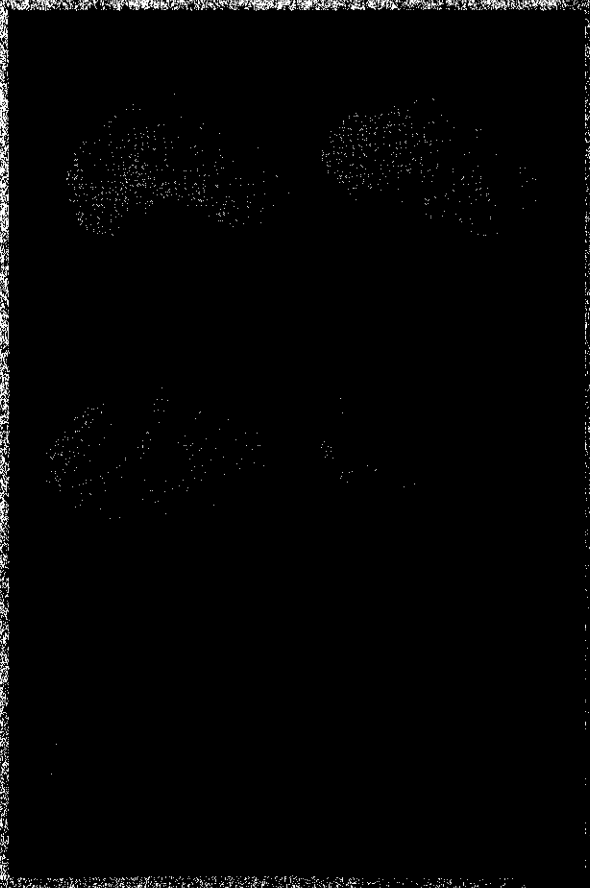


	Percent of Seeds								Total Seeds in Sample 1/	Date Sampled
	Good Seeds	Chalcid	Lygus	Stink Bug	Shriveled	Water Damaged	Green	Other		
Enrico Farms Sec. 3 Firebaugh, Calif.	91.0	0.8	4.4	2.6	0.0	0.5	0.7	0.0	2966	Aug 29
J. Nakamura Sec. 11 Firebaugh, Calif.	53.1	0.03	13.4	32.8	0.06	0.17	0.44	0.0	2928	Aug 22
Giffen, Inc. Cantua Ranch	90.8	1.0	5.4	1.8	0.0	0.03	0.06	0.01	2852	Sept 6
Echeveste & Elizaldi, Sec. 2 Firebaugh, Calif.	89.2	0.2	6.7	1.3	0.0	1.1	1.4	0.0	3037	Aug 29
Nicolini & Maitia Sec. 33 Firebaugh, Calif.	82.2	4.7	11.2	0.6	0.0	0.26	1.0	0.0	2973	Aug 29
Raymond Thomas Sec. 21 Five Points, Calif.	93.2	0.12	3.8	1.0	0.0	1.1	0.8	0.06	3103	Aug 22
Deavenport Farms Sec. 20 Five Points, Calif.	90.3	4.2	3.7	0.8	0.03	0.43	0.43	0.12	3188	Aug 29

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 from each of the threshed 2-quart samples.

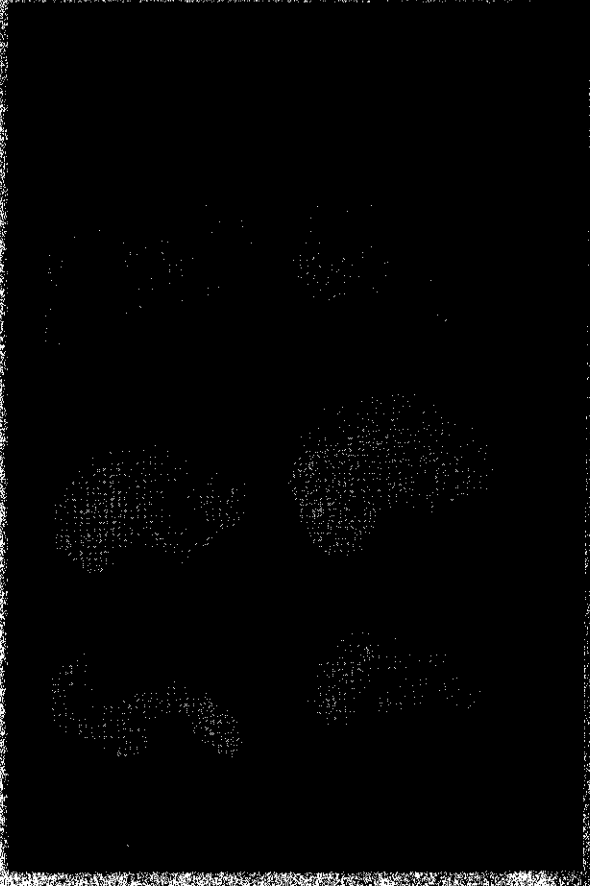
2/ Damaged seed counts in this table are not indicative of the entire field because in several fields the sampled areas of the field were purposely not treated so that stink bug population effects could be studied.

Seed, edible seed.

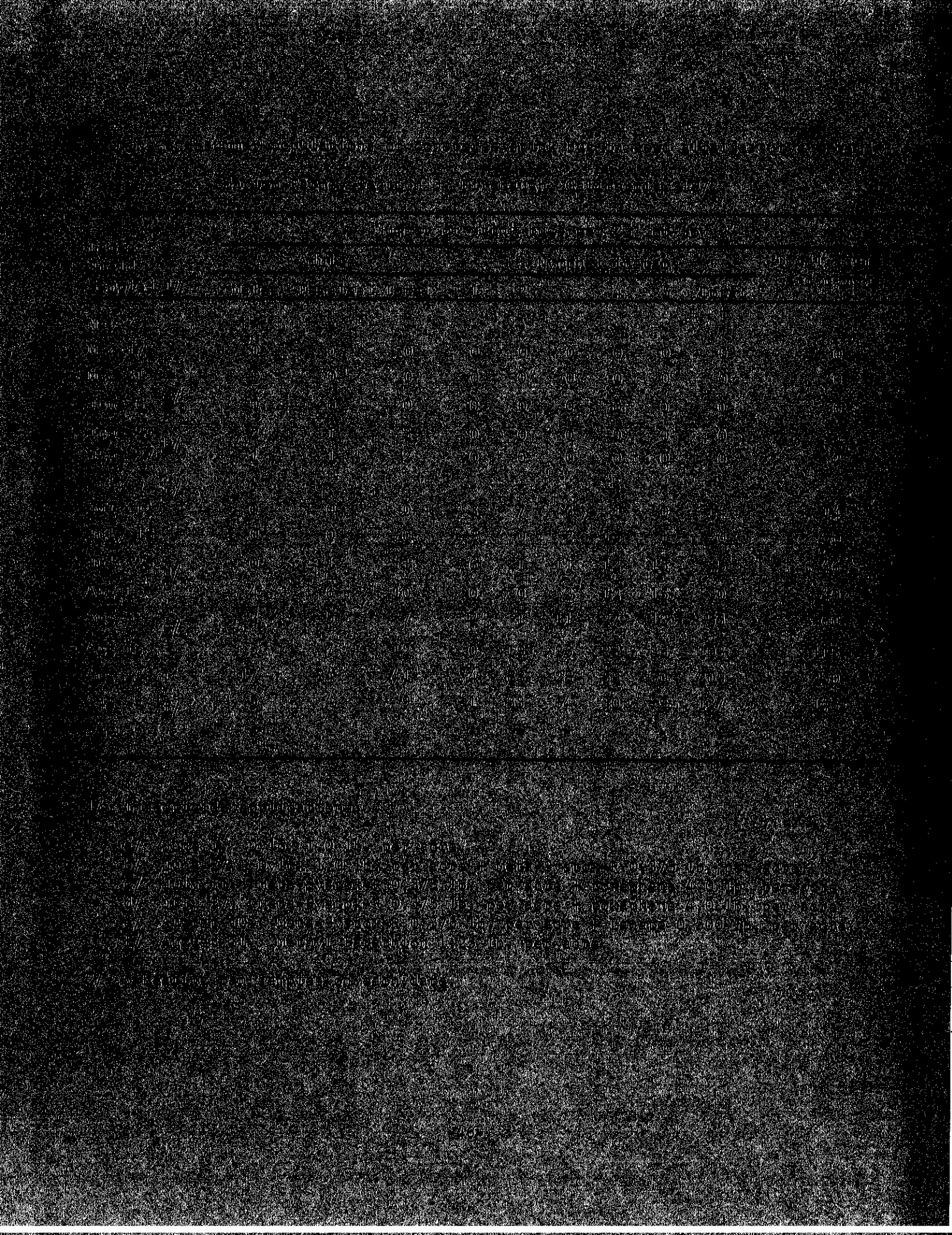


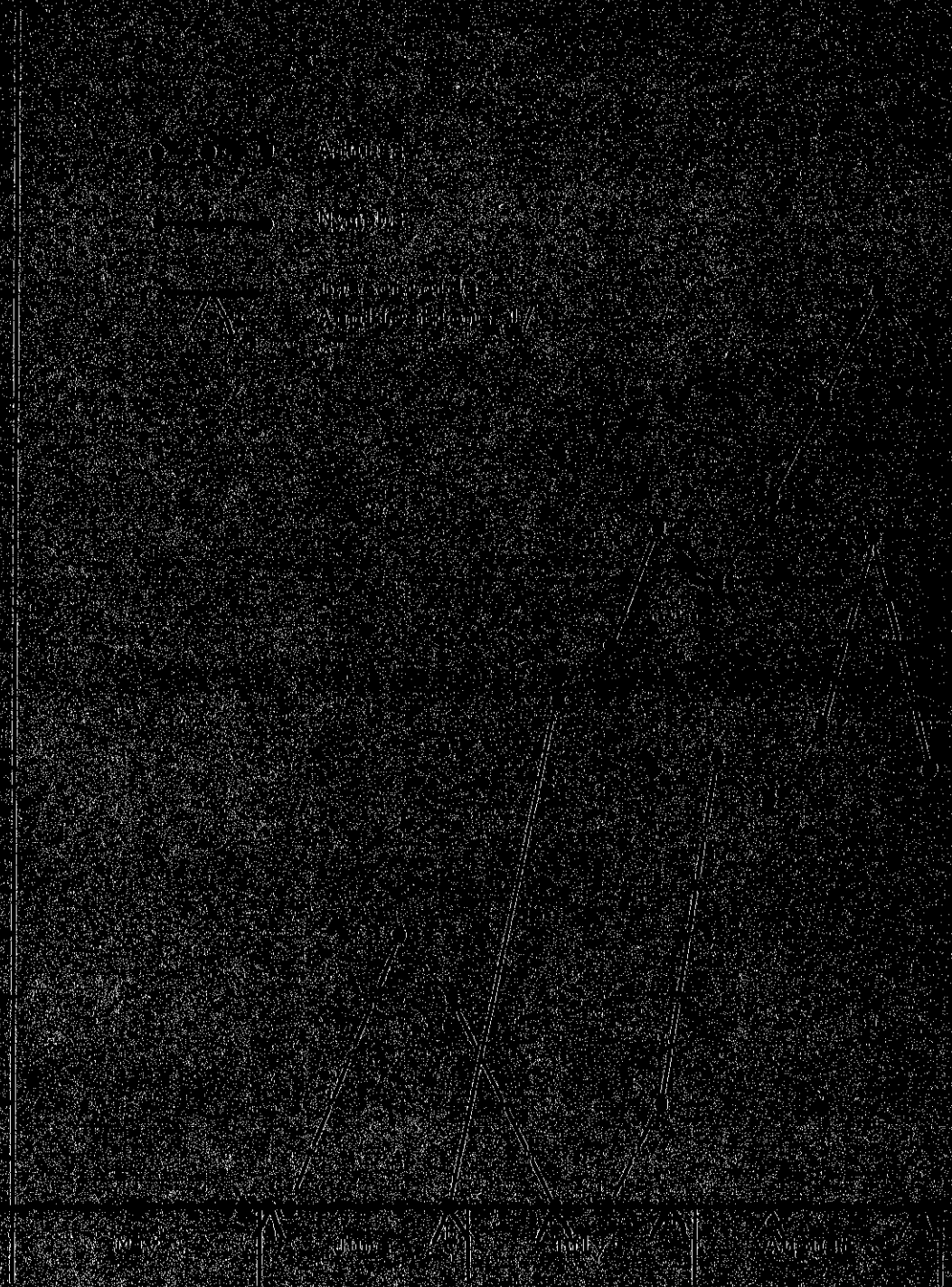
Discolored seed from fungus.

Bad seed from lygus feeding.



Cracked seed from water damage.





Seasonal abundance and numbers of corn earworm adult bug in bead strip canvas traps in Tift County, Georgia, 1973 1/

Date	Number of earworm bugs per 25 sq. ft. of row 2/							
	Adults		Nymphal instars					Total adults and nymphs
Sampled 3/	Males	Females	Total	1	2	3	4	5	Total	
May 17	0	1	1	0	0	0	0	0	0	1
May 17 4/	1	0	1	0	2	20	7	0	29	30
May 31	1	0	1	0	0	1	5	0	6	7
June 6	1	1	2	0	0	0	6	4	10	12
June 20 4/	2	3	5	0	0	1	0	0	1	6
June 27	10	7	17	0	6	1	1	5	13	30
July 5 4/	3	6	9	35	10	0	1	55	101	110
July 11	7	5	12	2	37	60	11	5	115	127
July 18	3	2	5	7	14	45	18	28	112	117
July 25	10	15	25	36	66	92	110	134	466	491
Aug. 1	33	41	74	32	172	148	130	170	652	726
Aug. 8	71	72	143	0	10	51	112	213	386	529
Aug. 15	116	100	216	16	120	45	40	202	423	639
Aug. 22										
Aug. 29										
Sept. 6										

1/ Insecticide applications:

2/ May 17: Cygon 0.5 lb. per acre + Galecron 0.75 lb. per acre.
3/ June 26: Methoxychlor 0.375 lb. per acre + Toxaphene 4.0 lb. per acre.
4/ July 8: Dibrom 1.0 lb. per acre + Toxaphene 4.0 lb. per acre.

2/ 5 bearing per samples on each date.

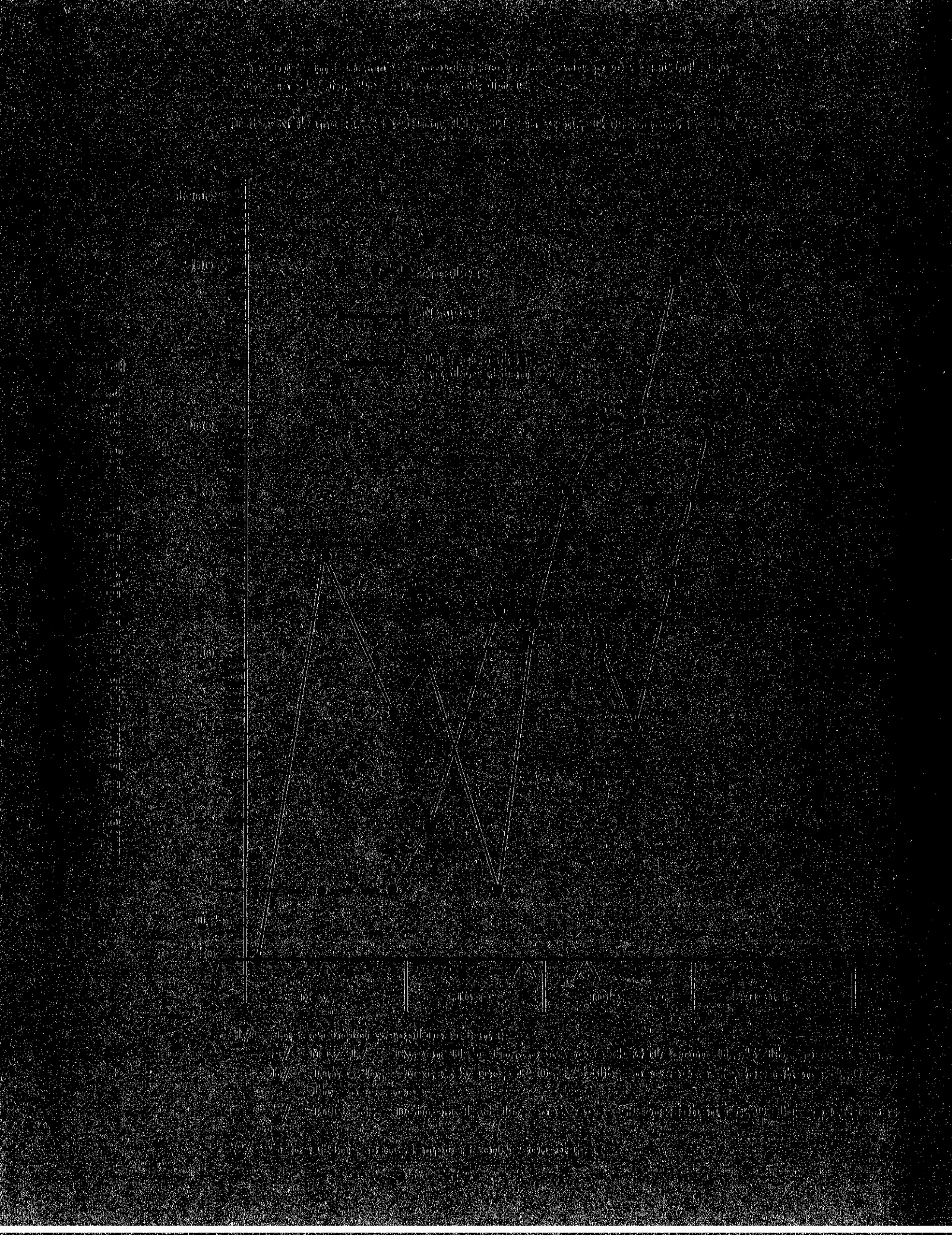


Table 1.--Seasonal numbers of cotton insects on commercial cotton fields treated with insecticides, Shafter Research Farm, Kern County, California, 1972

Date 1/	Number of cotton bugs per 25 row-ft.									
	Adults			Nymphal instars					Total cotton bugs per sample
	Males	Females	Total	1	2	3	4	5	Total	
May										
May 17	0	0	0	0	0	0	0	0	0	0
May 31	0	0	0	0	2	0	0	0	2	2
June 6	0	0	0	0	0	0	0	0	0	0
June 10	0	0	0	0	0	0	0	0	0	0
June 27	0	0	0	0	0	0	0	0	0	0
July										
July 11	1	0	1	0	0	0	0	0	0	1
July 18	0	0	0	0	0	7	3	1	11	11
July 25	0	1	1	0	0	0	0	1	1	2
Aug. 1	0	0	0	0	0	0	1	0	1	1
Aug. 7	2	3	5	1	10	2	2	2	17	22
Aug. 13	1	2	3	0	2	2	0	1	5	8
Aug. 22	9	6	15	3	4	1	2	0	10	25
Aug. 28	13	5	18	8	43	18	0	11	80	98
Sept. 6	0	0	0	0	0	40	0	0	40	40

1/ Insecticide applications:

a/ May 31: Guthion 0.417 lb. per acre.

b/ June 20: Dylox 0.625 lb. per acre + toxaphene 3.0 lb. per acre + DDT 0.75 lb. per acre.

c/ July 14: Methyl Parathion 0.375 lb. per acre + toxaphene 3.0 lb. per acre.

d/ August 11: Carbaryl 0.467 lb. per acre + Thiodan 0.5 lb. per acre.

e/ September 12: Methyl Parathion 1.0 per acre + DDT 0.75 lb. per acre.

2/ 4 beatings per sample on each date.

Table 1.--Insecticide applications on cotton plots for boll weevil control, Tallulah, La., 1972

Treatment	Number of applications	Rate per application	Total rate
Check			
Malathion	4	1.25 lb. per acre	5.0 lb. per acre
Methyl parathion	4	0.375 lb. per acre	1.5 lb. per acre
Toxaphene	4	2.0 lb. per acre	8.0 lb. per acre
Methyl parathion + toxaphene	4	0.375 lb. + 2.0 lb. per acre	1.5 lb. + 8.0 lb. per acre
Dibrom	4	1.0 lb. per acre	4.0 lb. per acre
Azodrin	4	0.5 lb. per acre	2.0 lb. per acre
Methyl parathion + dibrom	4	0.375 lb. + 1.0 lb. per acre	1.5 lb. + 4.0 lb. per acre
Methyl parathion + azodrin	4	0.375 lb. + 0.5 lb. per acre	1.5 lb. + 2.0 lb. per acre

1/ Date of insecticide applications:

2/ Applied: Methyl parathion 0.375 lb. per acre + Delacron 0.75 lb. per acre.

3/ Applied: Methyl parathion 0.375 lb. per acre + Toxaphene 2.0 lb. per acre.

4/ Applied: Dibrom 1.0 lb. per acre + Toxaphene 2.0 lb. per acre.

5/ Applied: Azodrin 0.5 lb. per acre + Toxaphene 2.0 lb. per acre.

6/ Applied: Methyl parathion 0.375 lb. per acre + Dibrom 1.0 lb. per acre.

7/ Applied: Azodrin 0.5 lb. per acre + Methyl parathion 0.375 lb. per acre.

8/ Sampling on August 8 on each date.

Boxing and Mining Periods of Cooperative Stink Bug Infested Soybean Survey Fields in Northern and Western Section [illegible] through Early September 1972

Month	Number of stink bugs per 25 sweep [illegible]									
and [illegible]	Adults		Nymphal instars				Total nymphs		Total adults	
Fields 1/	Males	Females	Total	1	2	3	4	5	Total	and nymphs
May 2										
May 15	0	0	0	0	0	0	0	0	0	0
May 31	0	0	0	0	0	0	0	0	0	0
June 6	0	0	0	0	0	0	0	0	0	0
June 20	0	2	2	0	0	0	0	0	0	2
July 7	1	3	4	0	0	0	0	0	0	4
July 5 2/										
July 21	2	4	6	0	3	30	4	1	43	49
July 28										
July 25 2/	1	0	1	0	3	10	0	1	17	18
Aug 1	2	5	7	0	0	20	3	12	35	42
Aug 8 3/	0	0	0	3	6	4	0	4	17	17
Aug 15	0	0	0	0	0	11	26	0	37	37
Aug 22	0	0	0	0	0	0	0	0	0	0
Aug 29	0	0	0	0	0	0	0	1	1	1
Sept 6										

1/ Insecticide application:

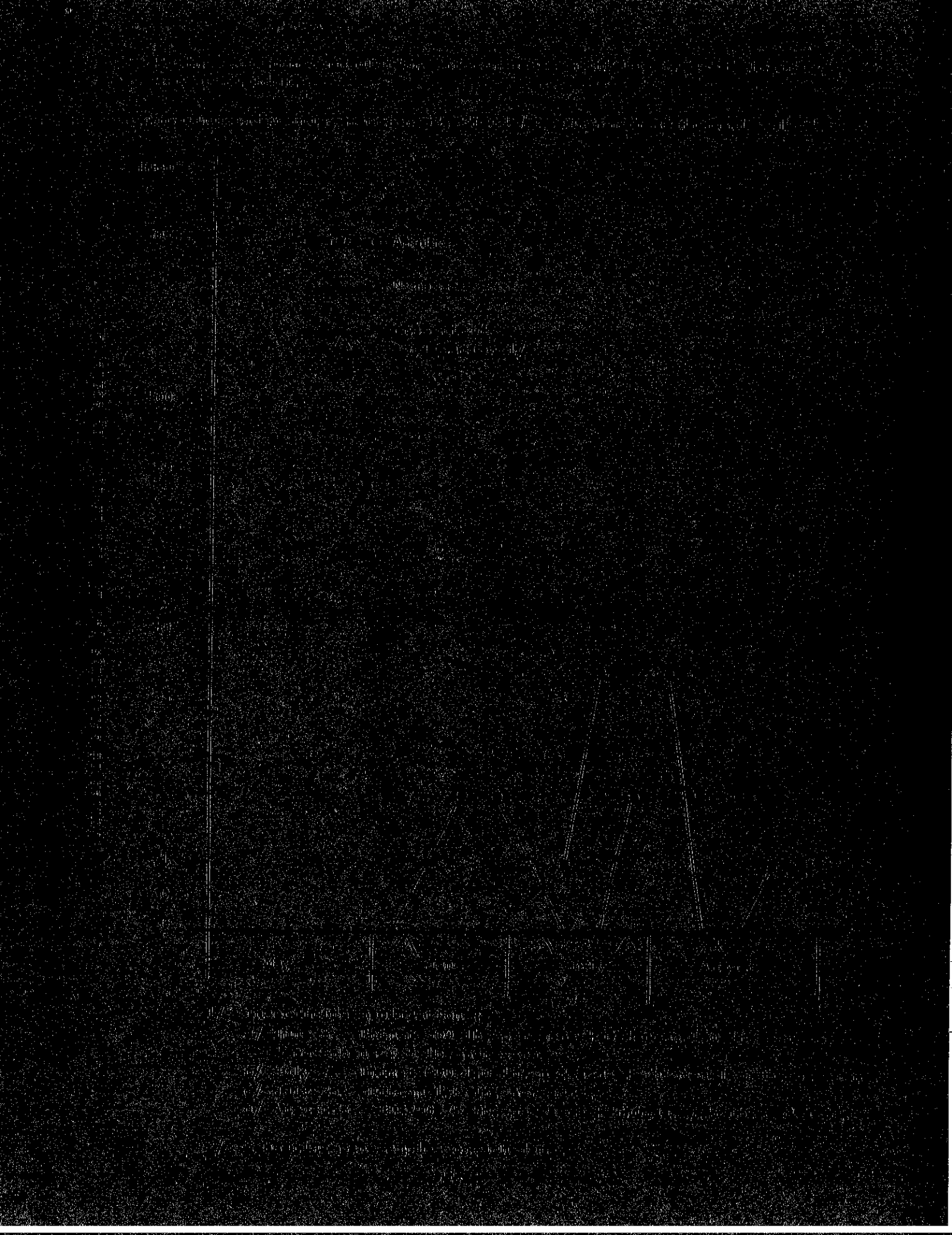
2/ June 28 - Thuma 300 1.0 lb. per acre + Galecron 1.0 lbs. per acre + [illegible] 1.0 lb. per acre.

3/ July 25 - Thuma 300 1.0 lb. per acre + Thiodan 1.5 lb. per acre.

4/ Aug. 26 - Dibrom 1.0 lbs per acre.

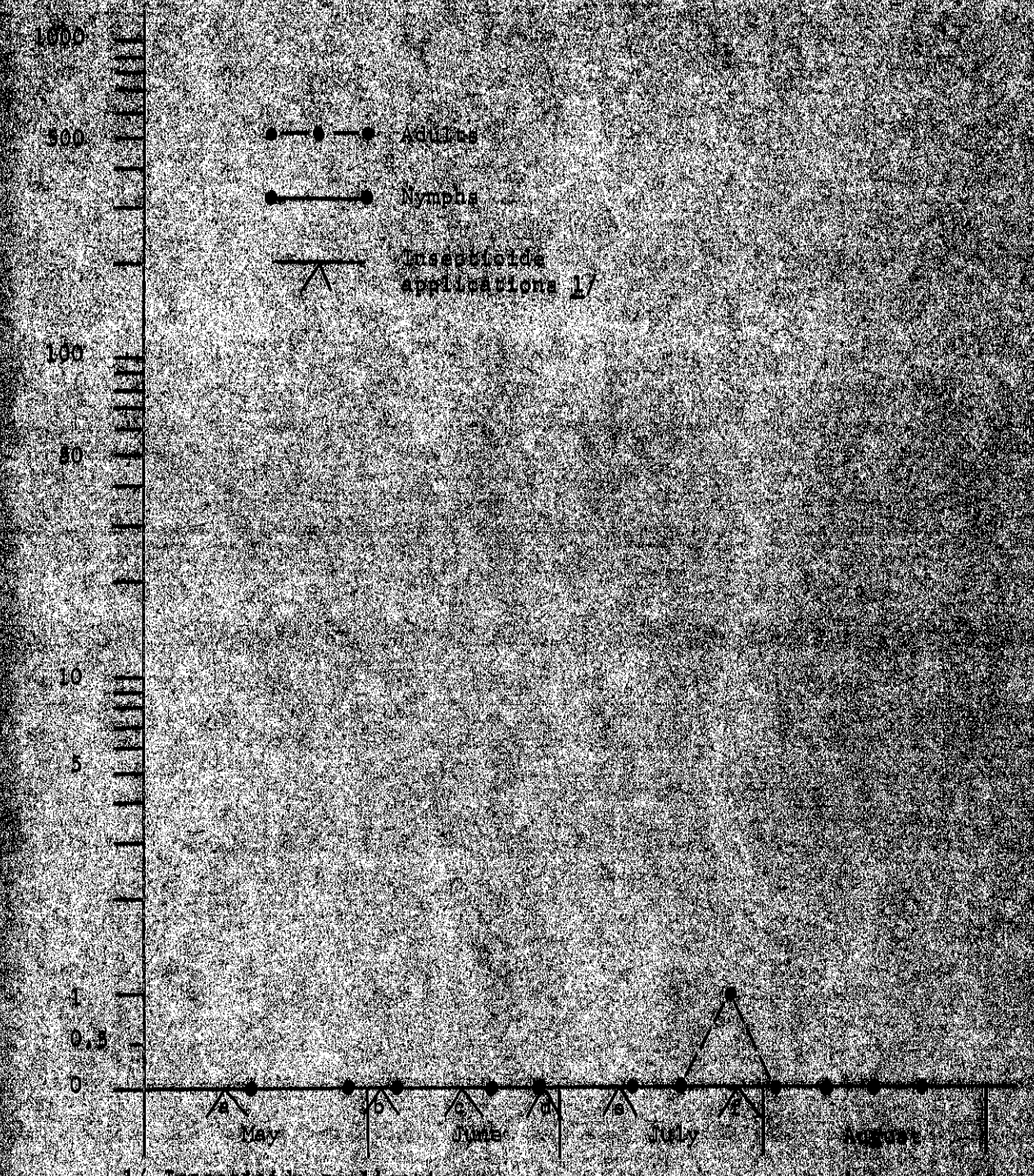
5/ August 8 - Thuma 0.75 lb. per acre + Thiodan 1.5 lb. per acre.

6/ Beginning pan samples on each date.



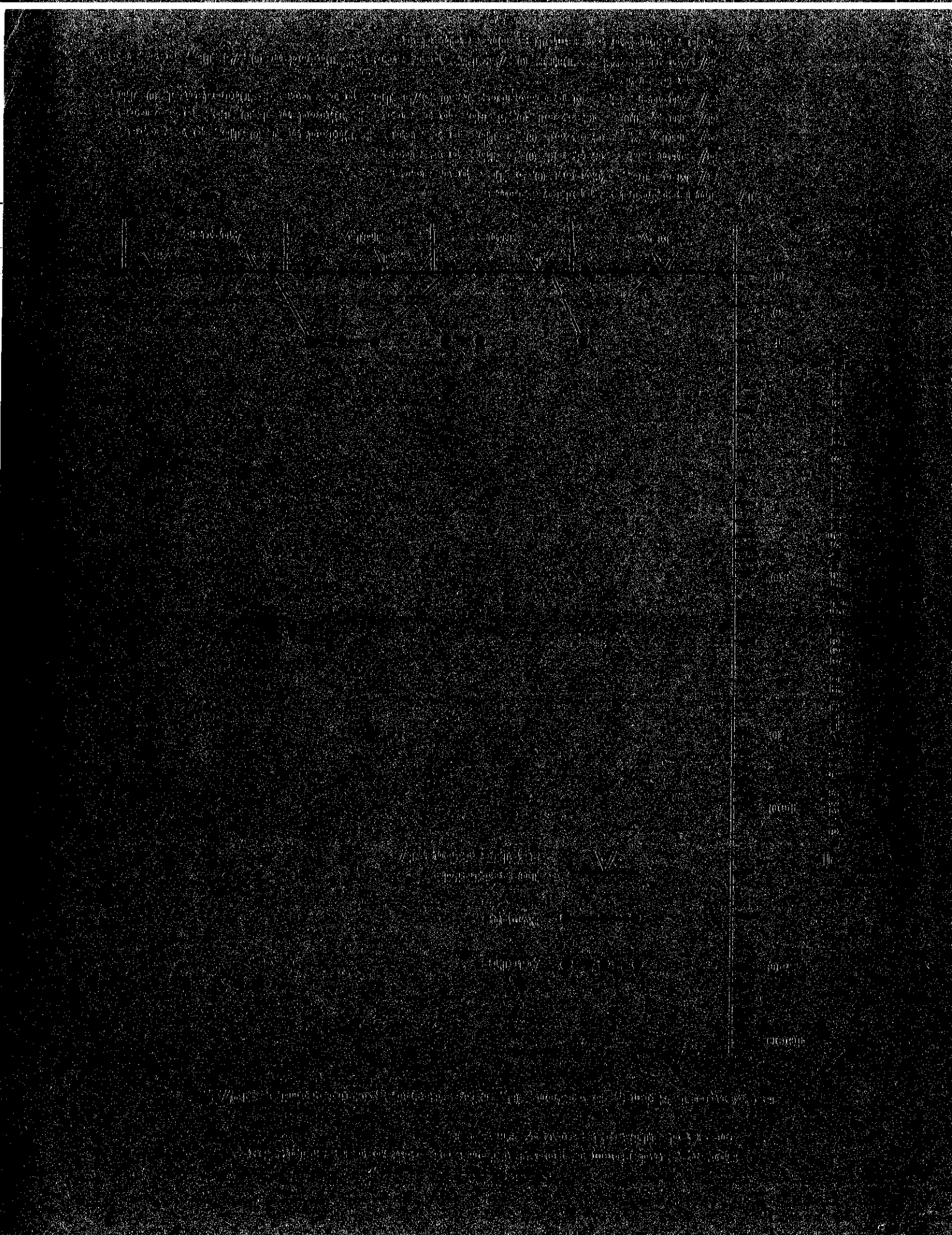
Spring and summer populations of consperse stink bug in seed alfalfa survey Field 1,

Raymond Thomas, Section 31, Five Points, California, 1978.



1/ Insecticide applications:
a/ May 12. Cygon 0.334 lb. per acre.
b/ June 1. Carzol 0.5 lb. per acre.
c/ June 16. Carzol 0.5 lb. per acre.
d/ June 29. Meta-Systocx-R 0.375 lb. per acre.
e/ July 9. Carzol 0.5 lb. per acre.
f/ July 26. Meta-Systocx-R 0.375 lb. per acre + Fundal 0.75 lb. per acre.

2/ 5 beating pan samples on each date.



****
* 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. *
****

CO-OPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS, U. S. Department of Agriculture and University of California co-operating.