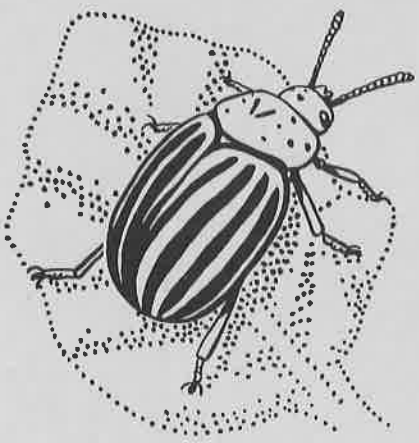
DAVIDSON

1984
INSECT CONTROL TRIALS
HORTICULTURAL CROPS

DEPARTMENT of ENTOMOLOGY

COLORADO STATE UNIVERSITY



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1984 Horticultural Insect Control Trials

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CABBAGE: Brassica oleracea L. 'Late Flat Dutch'

Imported cabbageworm: Artogeia rapae L.

Aphids: primarily Hyadaphis erysimi (Kaltenbach)

False chinch bug: Nysius raphanus Howard

CABBAGE INSECT CONTROL, FT. COLLINS, CO, 1984: 'Late Flat Dutch' cabbage was transplanted at 2-ft spacings (22-in between row) at the C.S.U. Bay Farm on June 8, 1984. Plot size was 4 plants by 2 plants, separated by borders and arranged in a randomized complete block design with 4 replications. Treatments were applied Aug. 7 using a CO_2 compressed air sprayer delivering 90 gals/acre. Plots were evaluated Aug 10 and Aug 27. Cabbageworm larvae and false chinch bugs were counted as totals from the center 4 heads in each plot. Aphids, primarily the turnip aphid, Hyadaphis erysimi (Kaltenbach), were counted from 2 leaves selected from each center head.

All treatments significantly reduced imported cabbageworm 3 days post treatment although only Ambush, Pydrin, PP321, Thiodan, and Sevin maintained significant control 20 days after application. High levels of between-plot variability obscured differences between treatments for control of false chunch bug and aphids, although Thiodan gave the best level of aphid control. No phytotoxicity was observed from any treatment.

		Insects/32 leaves		Insects/16 heads	
		Aphids	False chinch bug	Imported cabbageworm larvae	
Treatment and lbs (A.I.)/A		Aug 10	Aug 10	Aug 10	Aug 27
Ambush 2E	0.1	1780 ab	16 a	3 a	4 a
Ivory Dishwashing Liquid (40:1 dilution)		865 ab	33 a	12 bc	45 ab
Malathion 5E	1.0	443 ab	25 a	3 ab	30 ab
Mavrik 2E	0.06	710 ab	42 a	9 b	31 ab
Mavrik 2E	0.1	2595 ab	25 a	8 b	42 ab
Mavrik 2E	0.15	728 ab	20 a	2 a	30 ab
Nudrin 1.8L	0.75	325 ab	152 a	0 a	42 ab
PP 321	0.005	1969 ab	37 a	1 a	18 a
PP 321	0.01	1085 ab	23 a	0 a	7 a
PP 321	0.015	1010 ab	8 a	5 ab	9 a
Pydrin 2.4E	0.1	1320 ab	147 a	2 a	16 a
Thiodan 3E	1.0	32 a	65 a	2 a	16 a
San 410	1 qt	3707 b	129 a	4 ab	30 ab
San 415	1 qt	1527 ab	14 a	4 ab	27 ab
Sevin 80S	1.0	2420 ab	60 a	3 a	18 a
Untreated check		3045 b	99 a	21 c	68 b

Numbers followed by the same letter are not significantly different ($P = 0.05$).

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ONION: Allium cepa 'X100'

Onion thrips: Thrips tabaci (Lindeman)

CONTROL OF ONION THRIPS, TRANSPLANT ONIONS, PLATTEVILLE, COLORADO, 1984: 'X100' onions were planted as transplants April 15, 1984 in a field with furrow irrigation west of Platteville, Colorado. Plots were 8' x 15' in a complete randomized block design with four replications. Treatments were applied with a CO_2 hand sprayer delivering 48 gallons/A (24 gallons/A in treatments with 1/2 volume) at 30 p.s.i. Applications were made July 3, 1984 (Trial #1) and July 27, 1984 (Trial #2). Evaluations were made June 29, 1984 (pre-spray, Trial #1); July 5, 1984, and July 11, 1984 (post-spray, Trial #1); July 27, 1984 (pre-spray, Trial #2); and July 30, 1984 (post-spray, Trial #2). All evaluations were made by counting the number of nymphs and adults on 15 plants in each plot. Yield was not determined. There was no phytotoxicity observed. Control ranged from 0% to 100%.

Cooperator: Jerry Miller, Platteville, Colorado.

Insecticide History: Field sprayed June 10, 1984 with guthion/parathion aerial application.

Field: transplant onions
Platteville, Colorado
Trial #1: July 3, 2 day count

Insecticide	AI/A		Nymphs Mean•	Nymphs %Control••	Adults Mean	Adults %Control
Nudrin	.45	lb	7.4a	80g	0.1a	98d
PP321	.01	lb	6.8a	79g	0.1a	98d
PP321	.015	lb	7.1a	76fg	0.3a	93d
PP321	.005	lb	10.0ab	69efg	0.5a	87d
Baythroid	20.23	g	16.9abc	66efg	0.6a	89d
Mavrik	.150	lb	7.6a	64efg	0.6a	88d
Mavrik	.100	lb	16.9abc	59def	1.2a	77bcd
Mavrik	.075	lb	16.3abc	54de	0.9a	81cd
Mavrik	.025	lb	19.5bc	46cd	1.4ab	60b
Pydrin	.20	lb	22.0cd	44cd	0.9a	77bcd
Orthene	.75	lb	32.0de	33bc	2.1abc	66bc
Guthion	.75	lb	48.9fg	22b	4.0cd	29a
Orthene	1.00	lb	41.2ef	5a	3.4bcd	57b
San 415	1.00	qt	59.7g	0a	6.3e	25a
Check			46.7f		5.0de	

•Means followed by the same letter are not significantly different at the 5% level.
••Adjusted for mortality by Sun and Shepard's formula (J. Econ. Entomol. 40:710-5).

Field: transplant onions
Platteville, Colorado
Trial #1: July 3, 8 day count

Insecticide	AI/A	Nymphs Mean*	Nymphs %Control**	Adults Mean	Adults %Control
Nudrin	.45 lb	1.8a	95e	0.3a	95f
PP321	.015 lb	5.6ab	84e	1.7ab	80f
PP321	.01 lb	11.7bc	66d	3.4abcd	54e
Baythroid	20.23 g	15.0bcd	62cd	2.0abc	80f
Mavrik	.15 lb	17.0cd	53cd	6.1defg	41cde
Mavrik	.075 lb	17.7cde	53cd	6.7efgh	34cd
PP321	.005 lb	14.7bcd	52cd	5.1cdef	43de
Mavrik	.10 lb	17.8cde	48c	8.1fghi	33cd
Pydrin	.20 lb	27.6ef	28b	4.7bcde	41cde
Orthene	1.00 lb	29.6fg	28b	7.7efghi	38cde
Orthene	.75 lb	32.2fg	25b	9.1ghij	25bc
Mavrik	.025 lb	25.1def	24ab	11.6j	8a
Guthion	.75 lb	44.8h	5a	10.2ij	10ab
San 415	1.00 qt	45.7h	1a	9.6hij	1a
Check		39.2gh		8.9ghij	

*Means followed by the same letter are not significantly different at the 5% level.
**Adjusted for mortality by Sun and Shepard's formula (J. Econ. Entomol. 40:710-5).

Field: transplant onions
Platteville, Colorado
Trial #2: July 27, 3 day count

Insecticide	AI/A	Nymphs Mean*	Nymphs %Control**	Adults Mean	Adults %Control
PP321	.005 lb	2.0a	81f	0.1a	92fgh
Baythroid	20.23 g	1.7a	75f	0.1a	98h
Mavrik	.15 lb	3.0a	72f	0.6abcd	78defgh
PP321	.01 lb	2.5a	71f	0.0a	100h
PP321	.015 lb	1.8a	68ef	0.2abc	66cdefg
Mavrik	.10 lb	2.7a	62def	0.3abc	79defgh
Mavrik	.025 lb	3.9ab	56cdef	0.6abcd	49cd
Mavrik	.075 lb	3.3a	54cde	0.1a	95gh
Nudrin 1/2 volume	.45 lb	4.3ab	43bcde	0.4abc	57cde
Pydrin	.20 lb	3.8a	42bcde	0.1ab	80efgh
Orthene + sticker	1.0 lb 4.0 oz	7.1bc	41bcd	0.8bcd	64cdef
Nudrin + sticker	.45 lb 4.00 oz	3.0a	40abcd	0.3abc	78defgh
Orthene	1.00 lb	4.5ab	38abcd	0.9cd	64cdef
Orthene	.75 lb	8.0c	35abc	1.2de	44bc
Nudrin	.45 lb	2.3a	34abc	0.2abc	37abc
Guthion	.75 lb	10.1c	25ab	2.4g	15a
San 410	1.0 qt	9.6c	16a	2.0fg	20abc
Check		7.0bc		1.6ef	

*Means followed by the same letter are not significantly different at the 5% level.
**Adjusted for mortality by Sun and Shepard's formula (J. Econ. Entomol. 40:710-5).

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ONION: Allium cepa 'Brown Beauty'

Onion thrips: Thrips tabaci (Lindeman)

CONTROL OF ONION THRIPS, SEEDED ONIONS, GREELEY, COLORADO, 1984: 'Brown Beauty' onions were planted April 19, 1984 in a field under furrow irrigation at the North Central Research and Development Center in Greeley, Colorado. Plots were 8' x 30' arranged in a complete randomized block design with four replications. Treatments were applied with a CO_2 hand sprayer delivering 48 gallons/A (24 gallons/A in treatments with 1/2 volume) at 30 p.s.i. on August 21, 1984. Evaluations were made on August 23, 1984 and August 30, 1984 by counting the number of nymphs and adults on 15 plants (August 23, 1984) and 10 plants (August 30, 1984) in each plot. Yield was not determined. There was no phytotoxicity observed. Control ranged from 0% to 95%.

Insecticide History: None prior to test plot application.

Field: seeded onions
NCRDC, Greeley, Colorado
Trial #1: August 23, 2 day count

Insecticide	AI/A	Nymphs Mean*	Nymphs %Control	Adults Mean	Adults %Control
Mavrik	.10 lb	1.9a	92	0.1a	95
PP321	.005 lb	3.0ab	88	0.1a	95
Orthene	.75 lb	3.4abc	86	0.2a	91
Mavrik	.15 lb	4.0abcd	84	0.1a	95
PP321	.01 lb	5.3abcde	79	0.1a	95
Nudrin + stcker	.45 lb 4.00 oz	5.8abcde	76	0.5abc	77
Diazinon	.50 lb	6.3bcdef	74	0.8bcd	64
Mavrik	.075 lb	7.9cdef	68	0.3ab	86
Mavrik	.025 lb	7.9cdef	68	0.2a	91
Orthene	1.00 lb	8.3def	66	0.3ab	62
Baythroid	20.23 g	8.9def	64	0.1a	95
Nudrin 1/2 volume	.45 lb	9.0ef	64	1.1d	50
Mavrik 1/2 volume	.15 lb	9.6efg	61	0.3ab	86
PP321	.015 lb	10.2efg	59	0.3ab	86
Pydrin	.20 lb	12.0fg	51	0.3ab	86
Nudrin	.45 lb	14.5gh	41	0.7bcd	68
Ivory soap	40:1 dil	18.1hi	26	2.7e	0
San 410	1.0 qt	18.2hi	26	1.0cd	54
Guthion	.75 lb	20.4ij	17	1.0cd	54
Check		24.6j		2.2e	

*Means followed by the same letter are not significantly different at the 5% level.

Field: seeded onions
NCRDC, Greeley, Colorado
Trial #1: August 30, 8 day count

Insecticide	AI/A	Nymphs Mean*	Nymphs %Control	Adults Mean	Adults %Control
PP321	.015 lb	6.4a	59	2.5ab	0
PP321	.01 lb	6.7a	57	2.9abc	0
Diazinon	.50 lb	8.9ab	43	2.0ab	17
Mavrik	.075 lb	9.1ab	42	3.6bc	0
PP321	.005 lb	9.2ab	41	2.6ab	0
Nudrin 1/2 volume	.45 lb	10.0ab	35	3.6bc	0
Mavrik	.15 lb	10.6abc	32	3.6bc	0
Orthene	1.00 lb	11.1abc	29	2.4ab	0
Baythroid	20.23 g	11.5abcd	26	4.1bc	0
San 410	1.0 qt	11.8abcde	24	1.1a	54
Nudrin + sticker	.45 lb 4.00 oz	12.3abcde	21	2.4ab	0
Mavrik 1/2 volume	.15 lb	12.4abcde	20	4.8bc	0
Orthene	.75 lb	12.5abcde	20	0.7a	71
Mavrik	.10 lb	13.7abcdef	12	4.4bc	0
Mavrik	.025 lb	15.5bcdef	0	3.7bc	0
Pydrin	.20 lb	18.1def	0	2.6ab	0
Guthion	.75 lb	19.4ef	0	3.1abc	0
Ivory soap	40:1 dil	19.7ef	0	3.2abc	0
Nudrin	.45 lb	21.5f	0	5.7c	0
Check		15.6bcdef		2.4ab	

*Means followed by the same letter are not significantly different at the 5% level.

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PINTO BEANS: Phaseolus vulgaris 'UI-114'
Flower thrips: Frankliniella spp.

CONTROL OF FLOWER THRIPS IN BEANS WITH PLANTING TIME TREATMENTS, FT. COLLINS, 1984: 'UI-114' pinto beans were planted June 1 at the C.S.U. Bay Farm, Ft. Collins, Colorado. Plot size was single row, 25-ft in length, replicated 4 times in a randomized complete block design. One hundred seeds were planted in each plot. Seed treatments were applied by lightly moistening the seed and mixing it with a measured amount of insecticide. Rates of diazinon (Diazinon Seed Protectant) were applied as labelled whereas a 10 X - suggested rate of the experimental acephate treatment (TF3553) was used. Actual rates adhering to seeds were somewhat less than the total amounts applied. Temik treatments were banded over the row and lightly incorporated after planting. Plots were evaluated July 6 by picking 25 flowers/plot and counting all thrips in the blossoms.

A slight depression of flower thrips was observed on the TF 3553 treated plots. No difference was observed between seeds treated with Diazinon Seed Protectant or Temik. None of the treatments were phytotoxic to the plants.

Treatment		Thrips/100 blossoms (July 6)
TF 3553	75oz/100 lbs seed	135a
Temik 15G	13.3 lbs/acre	215b
Diazinon Seed Protectant	2oz/50 lbs seed	218b

Numbers followed by the same letter are not significantly different (P = 0.05; DMRT).

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POTATO: Solanum tuberosum 'Norgold Russet'
Potato psyllid: Paratrioza cockerelli (Sulc)
Green peach aphid: Myzus persicae (Sulzer)

CONTROL OF POTATO INSECTS WITH SOIL APPLIED SYSTEMIC INSECTICIDES, GREELEY, CO, 1984: 'Norgold Russet' potatoes were planted May 15 at the Northern Colorado Research Center, Greeley, CO. Soil type was a sandy clay loam, 1.1% organic matter and a pH of 7.8. Plot size was 25 row-ft (30-in. row spacing), randomized in a complete block design with 4 replications. Insecticides were banded below the seed piece at planting. Insect counts were made July 9 by counting insects on 20 leaves/plot.

Disyston, Temik, and Thimet significantly reduced green peach aphid populations. However, all carbamate treated plots (Temik, Furadan, Lance) had significantly higher potato psyllid populations than the untreated check. This latter phenomena is speculated to be due to poor control of the target pest and a destruction of hemipterous predators. No phytotoxicity was observed from any treatment.

Treatment and lbs (AI)/acre		Insects/80 leaves (July 9) Potato psyllid	Green peach aphid
Disyston 15G	3.0	3a	1a
Furadan 15G	3.0	23ab	54b
Lance 206	3.0	69c	96b
Temik 15G	3.0	45bc	12a
Thimet 15G	3.0	2a	14a
Untreated check		9a	73b

Original data; $\sqrt{x + 0.5}$ used for analysis. Numbers followed by the same letter are not significantly different (P = 0.05; DMRT).

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POTATO: Solanum tuberosum 'Norgold Russet'
Potato psyllid: Paratrioza cockerelli (Sulc)
Green peach aphid: Myzus persicae (Sulzer)
Colorado potato beetle: Leptinotarsa decemlineata (Say)

CONTROL OF POTATO INSECTS WITH FOLIAR INSECTICIDES, GREELEY, CO, 1984: 'Norgold Russet' potatoes were planted May 15 at the Northern Colorado Research Center in Greeley, Colorado. Plot size was single-row, 25-ft. in length separated by border rows and randomized in a complete block design with 3 replications. Treatments were applied July 17 and August 1 using a CO^2 compressed air sprayer delivering 108 gals/acre. Evaluations of potato psyllid and green peach aphid were made on four dates by sampling 20 leaves/plot. Colorado potato beetle larvae were evaluated August 1 by counting all larvae on the plants within a plot.

Under light pest pressure, generally good control was achieved by all treatments, with exceptions. Significantly higher green peach aphid populations occurred on Thiodan treated plots than on the untreated check one week after the first treatment. The Bacillus thuringiensis product San 410 (with exotoxin) appeared to control Colorado potato beetle but San 415 did not. None of the treatments were phytotoxic.

Treatment and lbs (AI)/acre		Green peach aphid/60 leaves 7/25	8/1	8/8	8/15	Colorado potato beetles/75 row ft.
Ambush 2E	0.1	3a	2a	1a	3a	1a
FMC 54800 2E	0.02	0a	1a	2a	5a	1a
FMC 54800 2E	0.04	0a	1a	1a	0a	0a
FMC 54800 2E	0.08	0a	0a	1a	5a	0a
Imidan 50W	2.0	5a	7a	1a	4a	0a
Monitor 4WM	0.75	1a	4a	1a	5a	4a
Pay-off 2.5E	0.1	2a	0a	0a	1a	0a
Pydrin 2.4E	0.1	0a	0a	0a	0a	0a
PP321 1E	0.01	0a	1a	0a	2a	0a
PP321 1E	0.015	5a	0a	0a	5a	0a
San 410	1 qt.	16b	13b	5a	2a	0a
San 415	1 qt.	4a	4a	1a	1a	14bc
Thiodan 3E	1.0	19b	6a	0a	5a	9ab
Untreated check		5a	7a	2a	4a	24c

		Potato psyllid/60 leaves 7/25	8/1	8/8	8/15
Ambush 2E	0.1	3a	0a	2a	0a
FMC 54800 2E	0.02	1a	0a	0a	0a
FMC 54800 2E	0.04	0a	0a	0a	1a
FMC 54800 2E	0.08	0a	0a	0a	0a
Imidan 50W	2.0	0a	2a	0a	0a
Monitor 4WM	0.75	3a	1a	0a	4a
Pay-off 2.5E	0.1	0a	1a	0a	0a
Pydrin 2.4E	0.1	2a	0a	0a	0a
PP321 1E	0.01	1a	0a	0a	1a
PP321 1E	0.015	2a	0a	0a	0a
San 410	1 qt.	4a	3a	2a	1a
San 415	1 qt.	13a	2a	1a	0a
Thiodan 3E	1.0	7a	8a	0a	0a
Untreated check		46b	28b	15b	21b

Numbers followed by the same letter are not significantly different (P = 0.05; DMRT).

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POTATO: Solanum tuberosum 'Norgold Russet'
Potato psyllid: Paratrioza cockerelli (Sulc)
Green peach aphid: Myzus persicae (Sulzer)
Colorado potato beetle: Leptinotarsa decemlineata (Say)

CONTROL OF POTATO INSECTS WITH SOAP SPRAYS, GREELEY, CO, 1984: 'Norgold Russet' potatoes were planted May 15 at the Northern Colorado Research Center, Greeley, CO. Plot size was 3 row (30-in spacing, 25-ft length), arranged in a randomized complete block design with 3 replications. Treatments were applied August 1 using a CO^2 compressed air sprayer delivering 122 gals/acre. Soaps were diluted 40:1. Evaluations were made August 3. Potato psyllid and green peach aphids were counted from 20 leaves selected from the center row of each plot. All Colorado potato beetle larvae on the cnter row of each plot were counted.

Both soap sprays significantly reduced potato psyllid with Ivory Dishwashing Liquid showing superior activity. Neither treatment affected Colorado potato beetle larvae. Green peach aphid numbers were too low to detect treatment differences. None of the treatments were phytotoxic.

Treatment	Insects/60 leaves: Potato psyllid	Green peach aphid	Potato beetle larvae/ 75 ft row
Ivory Dishwashing Liquid (40:1)	6 a	0 a	29 a
Safers Insecticidal Soap (40:1)	28 b	7 a	31 a
Untreated check	57 c	8 a	31 a

Treatments followed by the same letter were not significantly different (P = 0.05; DMRT).

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POTATO: Solanum tuberosum L. 'Norgold Russet'
Potato psyllid: Paratrioza cockerelli (Sulc)
Green peach aphid: Myzus persicae (Sulzer)

CONTROL OF POTATO PSYLLID AND GREEN PEACH APHID, FT. COLLINS, 1984: 'Norgold Russet' potatoes were planted May 25 at the C.S.U. Bay Farm, Ft. Collins, CO. Plots were 5 row, 11-ft in length, separated by unplanted borders and arranged in a randomized complete block with 4 replications. Applications were made July 9 and July 27 using a CO_2 compressed air sprayer delivering 100 gal/acre. A higher rate (200 gals/acre) was used with soap sprays. Primary emphasis of the trial was an evaluation of products for potato psyllid control which were available to homeowners.

High variability between plots obscured differences in early evaluation dates. However, several products, including Ivory Dishwashing Liquid, appeared effective against potato psyllid. Currently recommended insecticides, such as methoxychlor and carbaryl (Sevin), performed poorly for potato psyllid control. Carbaryl also sharply increased populations of green peach aphid throughout the trial. None of the treatments were phytotoxic to the plants.

Treatment and lb (AI)/acre		Potato psyllid/80 leaves[a] July 12	July 23	July 27	August 7
Diazinon AG500	1.0	1 a	10 a	0 a	2 a
Thiodan 3E	1.0	5 a	24 a	0 a	14 a
Pounce 3.2E	0.05	11 a	7 a	7 a	6 a
Orthene 75S	0.5	16 a	18 a	2 a	17 a
Pydrin 2.4E	0.05	29 a	9 a	3 a	0 a
Ambush 25W	0.05	54 ab	16 a	0 a	3 a
Ivory Dishwasing Liquid[b]		57 ab	22 a	7 a	8 a
San 410	1 qt	81 ab	50 a	26 a	4 a
Predalure[c]		95 ab	17 a	6 a	2 a
Untreated check		102 ab	21 a	10 a	4 a
Methoxy chlor 2E	1.0	109 ab	54 a	9 a	1 a
Pyrenone[d]		124 ab	21 a	10 a	5 a
Safers Insecticidal Soap[b]		182 b	25 a	13 a	0 a
Sevin 80S	1.0	183 b	38 a	2 a	2 a
San 415	1 qt	189 b	25 a	19 a	5 a

Treatment and lb (AI/acre		Green peach aphid/80 leaves[a] July 12	July 23	July 27	August 7
Orthene 75S	0.5	13 a	11 a	1 a	4 a
Theidan 3E	1.0	29 ab	51 a	1 a	3 a
Diazinon AG500	1.0	43 ab	34 a	9 a	2 a
Pydrin 2.4E	0.05	55 ab	111 a	5 a	2 a
Pounce 3.2E	0.05	77 ab	104 a	11 a	5 a
Ambush 25W	0.05	189 abc	131 a	9 a	2 a
Untreated check		196 abcd	12 a	3 a	0 a
Predalure[c]		294 abcde	7 a	3 a	3 a
Pyrenone[d]		322 bcd	11 a	3 a	2 a
Ivory Dishwashing Liquid[b]		339 bcdef	14 a	0 a	0 a
Methoxychlor 2E	1.0	461 cdefg	92 a	10 a	5 a
San 410	1 qt	497 defg	39 a	10 a	1 a
San 415	1 qt	544 efg	4 a	2 a	1 a
Safers Insecticidal Soap		634 fg	19 a	0 a	0 a
Sevin 80S	1.0	750 g	3238 b	658 b	532 b

[a]Totals of 4 replications. Numbers followed by same letter are not significantly different ($P = 0.05$; DMRT)

[b]40:1 dilution rate at 200 gals/acre spray volume.

[c]Twice labelled rate, dribbled over plants uniformly.

[d]3 oz. of formulation/acre.

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POTATO: Solanum tubersum 'Russet Burbank'
Potato aphid: Macrosiphum euphorbiae (Thomas)
Green peach aphid: Myzus persicae (Sulzer)
Potato psyllid: Paratrioza cockerelli (Sulc)

POTATO INSECT CONTROL, CENTER, COLORADO, 1984: 'Russet Burbank' potatoes were planted May 17 in an area adjacent to the San Luis Valley Research Center, Center, Colorado. Plots were single row (34-in. row spacing), 25-ft. in length, separated by untreated guard rows. Plot design was a randomized complete block with 4 replications. Soil applied systemic insecticides were banded beneath the seed piece at planting. Foliar insecticides were applied July 12 using a CO_2 compressed air sprayer delivering 81 gals/acre. Plots were evaluated by randomly selecting 20 leaves/plot.

Insect populations were extremely low throughout the season and only 2 potato aphids/100 leaves were detected on untreated potatoes July 12. All foliar treatments, except PP321 and Thiodan effectively suppressed potato aphids for two and a half weeks following the first application. Green peach aphid control with Ambush, Thimet, and PP321 was poor on the final evaluation date (August 23), three weeks after the second foliar application. None of the treatments were phytotoxic to the plants.

Treatment and lbs (AI)/acre		Potato aphids/80 leaves 7/26	7/31	8/9	8/23
DiSyston 15G[a]	3.0	0 a		0 a	1 a
Thimet 15G[a]	3.0	4 a		4 a	2 a
Temik 15G[a]	3.0	0 a		0 a	0 a
Monitor 4WM[b]	0.75		0 a	0 a	8 ab
Thiodan 3E[b]	1.0		20 ab	6 a	37 b
Metasystox-R 2E[b]	0.5		0 a	0 a	3 a
Pydrin 2.4E[b]	0.1		0 a	0 a	1 a
Ambush 2E[b]	0.1		7 a	13 a	37 b
PP321 1E[b]	0.01		69 b	0 a	12 ab
Untreated check		59 b	113 c	119 a	93 c

		Green peach aphids/80 leaves 7/26	7/31	8/9	8/23
DiSyston 15G[a]	3.0	0 a		1 a	1 a
Thimet 15G[a]	3.0	1 a		6 a	35 b
Temik 15G[a]	3.0	0 a		0 a	0 a
Monitor 4WM[b]	0.75		0 a	0 a	2 a
Thiodan 3E[b]	1.0		0 a	3 a	6 a
Metasystox-R 2E[b]	0.5		1 a	0 a	2 a
Pydrin 2.4E[b]	0.1		7 ab	0 a	0 a
Ambush 2E[b]	0.1		1 a	13 ab	42 b
PP321 1E[b]	0.01		0 a	1 a	19 ab
Untreated check		5 a	18 b	49 b	36 b

		Potato psyllid/80 leaves 7/26	7/31	8/9	8/23
DiSyston 15G[b]	3.0	0		0	0
Thimet 15G[b]	3.0	0		0	0
Temik 15 G[b]	3.0	0		0	0
Monitor 4WM[b]	0.75		0	0	3
Thiodan 3E[b]	1.0		1	0	0
Metasystox-R 2E[b]	0.5		0	0	3
Pydrin 2.4E[b]	0.1		0	0	0
Ambush 2E[b]	0.1		2	0	2
PP321 1E[b]	0.01		1	0	0
Untreated check		9	2	3	14

[a]Planting time treatment (May 17).
[b]Foliar treatment (July 12, 31).
Original data; $\sqrt{x + 0.5}$ used for analysis. Numbers followed by the same letter are not significantly different ($P = 0.05$)

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CURRANT: Ribes rubrum 'Red Lake'

Imported currantworm: Nematus ribesii (Scopoli)

CONTROL OF IMPORTED CURRANTWORM ON CURRANT, FT. COLLINS, CO, 1984. Imported currantworm larvae, in late instars, were collected June 11 at the Plant Environmental Research Center, Ft. Collins, CO. Larvae were divided into groups of 5 and placed in Petri dishes, for a total of 55 larvae/treatment. Immediately after collection, foliage was sprayed until point of run-off, with a hand operated compressed air sprayer. After foliage dried, it was collected and fed to larvae. Mortality of larvae was observed 48 hours after treatment.

Sevin, Malathion, and the Bacillus thuringiensis preparation San 415 all gave a high level of control. Methoxychlor performed poorly. No phytotoxicity was observed.

Imported Currantworm

Treatment and lbs (AI)/100 gals		(% mortality)
Sevin 80S	1.0	100 a
Malathion 5E	1.0	100 a
San 415	2 qts	100 a
San 415	1 qt	98 a
Methoxychlor 2E	1.0	56 b
Untreated check		13 c

[a] Original data used in analysis, converted to percentages for final table. Numbers followed by same letter are not significantly different (P = 0.05; DMRT).

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CURRANT: Ribes rubrum 'Red Lake'
Currant borer: Synanthedon tipuliformes (Clerck)

CONTROL OF CURRANT BORER IN CURRANT, FORT COLLINS, COLORADO, 1984: Flights of adult currant borer were observed June 13 at the Plant Environmental Research Center, Fort Collins, Colorado. An insecticide trial was there upon immediately initiated. Plot size was a single plant, replicated 4 times in a randomized complete block. Applications were made by covering the lower 2 ft. of cane and the crown area until point of run-off. Plots were evaluated July 30 by counting the number of dead and dying canes per treatment.

Methoxychlor significantly reduced plant injury, but malathion did not. None of the treatments were phytotoxic to the plants.

Treatments and lbs (AI)/100 gals.		# injured canes/4 plants
Methoxychlor 2E	1.0	27a
Malathion 5E	1.0	74b
Untreated check		76b

Numbers followed by the same letter are not significantly different ($P = 0.05$; DMRT).

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RASPBERRY: Rubus idaeus 'Heritage'
Western flower thrips: Frankliniella occidentalis (Cresson)

CONTROL OF WESTERN FLOWER THRIPS IN RASPBERRIES, GRAND JUNCTION, CO., 1984: 'Heritage' raspberries established at the Orchard Mesa Experiment Station, Grand Junction, Colorado, were divided into plots of 5' of bed. Plot design was a randomized complete block with 3 replications. Applications were made July 25 and August 8 using a CO_2 compressed air sprayer until point of run-off. Plots were evaluated August 22 by examining 10 ripe berries/plot and counting all thrips inside the berry.

There was no significant difference in thrips populations in berries resulting from any treatment. There was also no difference in the incidence of fruit whitening, a disorder which had previously been speculated as thrips injury. No phytotoxicity was observed from any treatment.

Treatment and lbs (AI)/100 gals.		$\bar{X}$ thrips/berry
Diazinon AG 500	1.0	5.6a
Metasystox-R 2E	0.375	4.4a
Nudrin 1.8L	0.75	3.2a
Untreated check		4.0a

Numbers followed by the same letter are not significantly different (P = 0.05; DMRT).

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COTONEASTER: *Cotoneaster* sp.

Pear slug: *Caliroa cerasi* (L.)

PEAR SLUG CONTROL ON COTONEASTER, FT. COLLINS, CO, 1984: Pear slug larvae were collected July 30 from cotoneaster at the Plant Environmental Research Center, Ft. Collins, CO. Larvae were divided into groups of 5 and placed in Petri dishes for a total of 55 larvae/treatment. Immediately after larval collection, foliage was treated with insecticide using a CO_2 compressed air sprayer until point of run-off. A light rain shower followed the application within minutes. After foliage had dried, foliage was collected and fed to larvae. Mortality was observed 24 and 48 hours after exposure of the larvae to treated foliage.

All of the treatments gave a high level of control after 48 hours. Orthene and the *Bacillus thuringiensis* product San 415 gave substantially greater control 48 hours versus 24 hours after treatment whereas Sevin and Pydrin were highly effective within 24 hours. No phytotoxicity was observed although in a parallel study (not reported) Ivory Dishwashing Liquid (40:1 dilution) was phytotoxic.

Treatment and lbs (AI)/100 gals		Pear slug larvae (% mortality) 24 hrs	48 hrs
Sevin 80S	1.0	100 a	100 a
Pydrin 2.4E	0.05	89 a	96 a
Orthene 75 S	0.5	65 b	98 a
San 415	1 qt	62 b	87 b
Untreated check		4 c	22 c

[a]Original data used for analysis, transformed to percentages for final table. Numbers following the same letter re not significantly different (P = 0.05; DMRT).

Treatment and lbs (AI)/100 gals		Pear slug larvae (% mortality) 24 hrs	48 hrs
Sevin 80S	1.0	100 a	100 a
Pydrin 2.4E	0.05	89 a	96 a
Orthene 75 S	0.5	65 b	98 a
San 415	1 qt	62 b	87 b
Untreated check		4 c	22 c

[a]Original data used for analysis, transformed to percentages for final table. Numbers following the same letter re not significantly different (P = 0.05; DMRT).

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COTTONWOOD: Populus deltoides var. occidentalis Rydb.
Cottonwood blackmine beetle: Zengophora scutellaris Suffr.

CONTROL OF COTTONWOOD BLACKMINE BEETLE IN COTTONWOOD, FT. COLLINS, CO, 1984: Shelterbelt cottonwood trees were sprayed July 28 following observance of early mining by the leaf mining beetle Z. scutellaris. Applications were made using a CO_2 compressed air sprayer, covering the lower 12-ft of foliage until point of run-off. Plots were single trees, separated by border trees, arranged in a randomized complete block with 4 replications. Plots were evaluated August 14 by counting all mines greater than 1/4" diameter in leaves in the lower 8-ft of the tree.

Orthene, Diazinon, and Sevimol significantly reduced the number of leaf mines produced, but Pounce and Pydrin did not. No phytotoxicity was observed although Orthene has caused injury to cottonwood in other trials.

Treatment and lb (A.I.)/100 gal		# mines greater than 1/4" diameter
Orthene 75 S	0.5	17 a
Diazinon AG 500	1.0	33 a
Sevimol 4	1.0	65 ab
Pounce 3.2E	0.1	98 bc
Pydrin 2.4E	0.1	109 bc
Untreated check		127 c

Total mined leaves in the lower 8 ft of 4 trees. Numbers followed by the same letter are not significant (P=0.05; DMRT).

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COTTONWOOD: Populus deltoides var. occidentalis Rydb.
Fall webworm: Hyphantria cunea (Drury)

CONTROL OF FALL WEBWORM, FT. COLLINS, CO, 1984: Late instar fall webworm larvae were collected from native populations feeding on choke cherry, Prunus virginiana. Larvae were divided into groups of 100 in Petri dishes each containing 5 larvae. Insecticide treatments were made Aug. 28 to a shelter-belt planting of cottonwood using a CO_2 compressed air sprayer until point of run-off. After spray deposits had dried, leaves were collected, cut into smaller pieces, mixed, and fed to larvae. Mortality of larvae was checked 24 and 72 hours after exposure to treated foliage.

All treatments caused significant mortality within 24 hrs. Greatest mortality was achieved with Ambush (permethrin) after 24 hours. San 415, a Bacillus thuringiensis preparation, gave a high level of control 72 hours after treatment but not 24 hours after treatment. No phytotoxicity was observed from any treatments.

Treatment and lbs (A.I.)/100 gals		% mortality post-treatment 24 hr	72 hr
Ambush 2E	0.1	79 a	97 a
FMC 54800 2E	0.04	50 b	81 b
Pydrin 2.4E	0.1	49 b	89 ab
Spur 2F	0.1	40 bc	73 c
Sevimol 4	1.0	40 bc	74 c
Cymbush 3E	0.1	38 bc	80 bc
PP321 1E	0.01	31 c	77 bc
San 415	1 qt	16 d	88 ab
Untreated check		1 e	13 d

Numbers followed by the same letter are not significantly different (P = 0.05; DMRT). Original data used in analysis.

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HONEYLOCUST: Gleditsia triacanthos L.

Honeylocust pod gall midge: Dasineura gleditschiae (O.S.)

Honeylocust plant bugs: Diaphnocoris chlorionis (Say) and Plagiognathus

A leafhopper: Macropsis fumipennis (G & B)

CONTROL OF HONEYLOCUST INSECTS, AURORA, CO, 1984: Honeylocust trees, 8-12 ft in height, at the City of Aurora Nursery were monitored for the occurrence of the second generation of the honeylocust pod gall midge. Extremely heavy oviposition was observed May 30 and an insecticide trial was initiated on that date. Single tree plots were arranged in a randomized complete block design with 3 replications. Treatments were applied with a hand-operated compressed air sprayer until point of run-off. Evaluations were made June 13. Honeylocust pod gall midge infestations were estimated by counting the number of new galls on 15 terminals/tree. Plant bugs and leafhoppers were counted by shaking two lower branches/tree over a food tray.

Ambush and Pydrin gave the greatest suppression of honeylocust pod gall midge although control of galling by the best treatment was less than 60%. All treatments appeared to control leafhoppers but only Pydrin and Ambush significantly controlled honeylocust plant bugs. None of the treatments were phytotoxic although extreme phytotoxicity from Cygon was observed in an earlier (unreported) trial.

			No. insects/8 shakes	
Treatment and lbs (AI)/100 gals		% galled leaflets	Plant bugs	Leafhoppers
Ambush 2E	0.1	31 a	9 a	4 a
Pydrin 2.4E	0.1	39 ab	6 a	0 a
Spur 2F	0.1	59 bc	13 ab	1 a
Diazinon AG500	1.0	60 bc	30 b	5 a
Orthene 75S	0.75	76 c	21 ab	4 a
Untreated check		77 c	21 ab	22 b

[a] Original data used for analysis. Numbers followed by the same letter are not significantly different ($P = 0.05$; DMRT).

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HONEYLOCUST: Gleditsia triacanthos L.

Honeylocust pod gall midge: Dasineura gleditschiae (O.S.)

CONTROL OF HONEYLOCUST POD GALL MIDGE WITH SOIL APPLIED SYSTEMIC INSECTICIDES, FT. COLLINS, CO, 1984: Recently transplanted honeylocust trees, 6-8 ft in height, were monitored for honeylocust pod gall midge activity at the Fort Collins City Nursery. When oviposition activity of the third generation was observed (June 22) soil systemic insecticides were applied, 3-5 inches deep, around the base of the trees. Rates of insecticides used were equivalent to that for elm leaf beetle control, i.e., 1/3 oz/trunk diameter inch. Plot size was a single tree, replicated 4 times, and arranged in a randomized complete block design. Plots were evaluated July 6 by counting all new galls on the first, third, and fifth lower terminals. A second application was made July 11 for control of the "fourth" generation. This was followed by a July 31 evaluation where all new galls on the tree were counted.

Wide variation in new growth and, consequently, new galls existed between plots independent of treatments. None of the treatments significantly reduced gall formation. No phytotoxicity was observed.

Treatment and oz/diameter inch[a]		No. new galls/ 12 terminals (July 6)	No. new galls/ 4 trees (July 31)[b]
Disyston 15G	1/3	300 a	1588 a
Furadan 15G	1/3	75 a	762 a
Temik 15G	1/3	76 a	2295 a
Untreated check		171 a	1402 a

[a] Treatmemt date June 22, July 11.

[b] Totals of 4 replications; numbers followed by same letter are not significantly different (P = 0.05; DMRT).

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SIBERIAN ELM: Ulmus pumila L.
Western tent caterpillar: Malacosoma californicum (Packard)

CONTROL OF WESTERN TENT CATERPILLAR, FT. COLLINS, CO, 1984: Late instar western tent caterpillar larvae were collected from native populations feeding on mountain-mohagany. Healthy larvae were divided into groups of 55, 5 larvae per Petri dish. Insecticides were applied to elm foliage June 22, using a CO_2 compressed air sprayer, until point of run-off.

Leaves were collected June 26, cut into smaller pieces, mixed and immediately fed to larvae. Mortality of the larvae was observed 24 and 48 hours after exposure to the treated foliage.

All treatments caused high rates of mortality. Effects from the experimental pyrethroid PP321 were observed extremely rapidly, within one-half hour after exposure. No phytotoxicity was observed from any treatment.

Treatment and lb (AI)/100 gal		% mortality following exposure 24 hrs	48 hrs
PP321 1E	0.015	100 a	100 a
Pydrin 2.4E	0.1	92 ab	96 a
Diazinon AG500	1.0	76 c	96 a
San 415	1 qt	80 bc	82 b
Untreated check		12 d	12 c

Numbers followed by the same letter are not significantly different (P = 0.05; DMRT). Original data used in analysis.

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Siberian Elm: Ulmus pumila L.
Elm leaf beetle: Pyrrhalta luteola (Müller)

PERSISTENCE STUDY OF INSECTICIDES USED FOR ELM LEAF BEETLE CONTROL, FT. COLLINS, CO, 1984: Seedling nursery trees at the C.S.U. State Forest Service Nursery were sprayed once on four different treatment dates - June 11, June 18, June 27, and June 25. All applications were made using a CO_2 compressed air sprayer until point of run-off. Treated plots were 10-ft of bed (4 rows) and all trees were in the second year of development (2-3 ft tall). High temperatures and repeated sprinkler irrigation of plots occurred during the trial. Following the last treatment date, foliage was collected from all plots, cut, mixed, and fed to elm leaf beetle larvae. Larvae used were in late instars collected from area trees and confined in Petri dishes at a 10 larvae/dish density. A total of 100 larvae were used for each date x insecticide treatment. Fresh foliage was given larvae, if needed, 48 hours after the experiment began. Percentage mortality was determined 72 hours after the initial exposure of larvae to the treated foliage.

Foliage treated with Pydrin gave highest mortality of elm leaf beetle larvae among treatments applied 2 weeks prior to exposure. Among treatments persisting one week before exposure, Spur had the greatest activity along with the experimental pyrethroid PP321. All treatments, excluding Diazinon, were highly effective when applied 3 days prior to exposure of larvae. The Bacillus thuringiensis preparation, San 415, also showed some activity against elm leaf beetle larvae. No phytotoxicity was observed from any treatments.

Treatment and lbs (AI)/100 gals		% mortality following exposure to foliage June 25 [a]			
		Date foliage treated			
		June 11	June 18	June 22	June 25
Ambush 25W	0.1	16 b	49 ef	98 a	97 a
Diazinon AG500	1.0	22 b	23 gh	46 b	96 a
Imidan 50W	2.0	10 b	57 de	98 a	95 a
Pounce 3.2E	0.1	16 b	42 ef	97 a	97 a
PP321 1E	0.01		94 ab		98 a
Pydrin 2.4E	0.1	63 a	71 cd	99 a	96 a
San 415	1 qt		36 fg		90 a
Sevimol 4	1.0	16 b	23 gh	96 a	99 a
Spur 2F	0.1	25 b	98 a	100 a	96 a
Untreated check		7 b	7 h	7 c	7 b

[a]Treatments were analyzed separately by date. Numbers within a column which are followed by the same letter are not significantly different (P = 0.05; DMRT).

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Experimental note: Evaluation of trunk bands for elm leaf beetle control.

Purpose: To determine if trunk banded insecticide sprays were capable of controlling elm leaf beetle larvae as they moved down the trunk to pupate.

Procedure: Three plots were established; Pueblo (June 14), the Colorado State Forest Service Nursery (July 11), and in a Ft. Collins cemetary (July 4). Treatments were timed to coincide with the onset of the first generagion pupation. Evaluations were made (August 15, Pueblo; August 8, Forest Service Nursery; August 13, Ft. Collins cemetary site) by generally observing the numbers of dead larvae at the base of the tree. Bands were approximately 1-ft in width 3-8 ft above the ground. Granular treatments of Triumph were sprinkled around the base of the tree. Treatments evaluated included the following:

Treatment and rate		Locations
Sevimol 4	2 qts/100 gals	P, C, N
Pydrin 2.HE	5.3 oz/100 gals	P, C, N
Dursban 50W	2 lbs/100 gals	P, C
Diazinon 50W	2 lbs/100 gals	P
Triumph 1G	100 lbs/acre-banded	P

P = Pueblo; C = Ft. Collins City cemetary; N = State Forest Service Nursery

Results: Observations were not quantified because of problems with variation in the numbers and movements of larvae. Pydrin treatments appeared to have the greatest number of dead larvae at the tree base in all sites, and was observed in Pueblo to have retained effectiveness even 2 months after treatment - against the 2nd generation of larvae. Triumph also appeared active for 2 months but large numbers of larvae pupated in lower trunk cracks not treated with the insecticide. Dursban and Sevimol seemed intermediate in effectiveness while Diazinon showed very little activity. There were no apparent differences in the amount of 2nd generation feeding on foliage. This is thought due to considerable interplant flight movement of surviving adults.

The band procedure does look promising for area-wide suppression of this insect and trials will be continued.

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COLORADO BLUE SPRUCE: Picea pungens Engelm.

Spruce spider mite: Oligonychus ununguis (Jacobi)

CONTROL OF SPIDER MITES ON SPRUCE, BIORATIONAL INSECTICIDE EVALUATION, FT. COLLINS, CO., 1984: Nursery stock Colorado blue spruce, 6-8 ft. high, at the Collindale nursery of the City of Fort Collins, were used in a study of spruce spider mite controls. Plot size was a single tree which was replicated 4 times/treatment in a randomized complete block design. Three species of predatory mites (Amblyseius californicus, Metaseiulus occidentalis, and Phytoseiulus longipes) were released July 11 at the rate of 50/tree. Sprays were applied July 20 and August 3, using a CO^2 compressed air sprayer delivering approximately 1 pt. of finished spray/tree. Plots were evaluated July 23, August 7, and August 18 by shaking two terminals/tree over a tray and counting dislodged spider mites.

All of the sprays significantly reduced spider mite populations, although control with Pydrin was poor on the first evaluation date. P. longipes was the most promising predatory mite species for control of spider mites. No phytotoxicity was observed with any treatment.

Treatment and lbs (AI)/100 gals.		Spider mites/8 terminals 7/23	8/7	8/18
Orthene 75S	0.5	10a	3a	7a
Ivory Dishwashing Liquid (40:1)		16a	12a	9a
Malathion 5E	1.0	17a	3a	0a
Kelthane 1.6E	1.0	32ab	8a	0a
P. longipes	50/tree	46abc	8a	11a
M. occidentalis	50/tree	51abc	10a	62b
Pydrin 2.4E	0.1	53abc	3a	6a
A. californicus	50/tree	82bc	35a	24a
Untreated check		95c	108b	34ab

Numbers followed by the same letter are not significantly different (*P* = 0.05; DMRT).

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PHYTOTOXICITY: Seedling trees

NURSERY STOCK PHYTOTOXICITY EVALUATIONS, FT. COLLINS, CO., 1984: Seedling nursery stock, 3 mos. - 1-1/2 years old, at the Colorado State Forest Service nursery were tested for sensitivity to several insecticides used for ornamental/shade tree insect control. Concentrations used were generally 5X that labelled and were applied August 3 to 5 feet of bed (50+ seedlings) until point of run-off. Ivory Dishwashing Liquid was diluted 40:1 with water. Plants were evaluated August 8 and August 17.

Most treatments did not cause any observable phytotoxicity. Ivory Dishwashing Liquid and Spur spotted leaves of plum. Ivory caused widely scattered brown patches on rugose rose and sumac. On the second evaluation date Austrian pine seedlings treated with Ivory and Spur appeared slightly more yellow than untreated plants.

Treatment and lbs.(AI)/100 gals.	
Ambush 2E	1.0
Diazinon AG500	5.0
Dursban 50WP	5.0
Ivory Dishwashing Liquid (40:1)	
Malathion 5E	5.0
Orthene 75S	2.5
Pounce 3.2E	1.0
Pydrin 2.4E	1.0
Sevimol 4	5.0
Spur 2F	1.0

Plants Evaluated	
Cedar, Eastern Red:	*Juniperus virginiana*
Pine, Austrian:	*Pinus nigra*
Pine, Ponderosa:	*Pinus ponderosa*
Pine, Scotch:	*Pinus sylvestris*
Plum:	*Prunus americanum*
Rose, rugose:	*Rosa rugosa*
Sumac:	*Rhus trilobita*

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TURFGRASS: Poa pratensis

Globular springtails: Sminthuridae
Grass thrips: Anophothrips sp. (Müller)
Oribatid mites: Oribatidae

CONTROL OF SMALL TURFGRASS AFTHROPODS WITH SOAPS AND FOLIAR INSECTICIDES, FT. COLLINS, CO, 1984: Plots were established on a lawn at the Colorado State University campus, Ft. Collins, CO. Plot size was 8-ft x 8-ft, arranged in a randomized complete block design with 4 replications. Treatments were applied July 24 using a CO- compressed air boom sprayer delivering 90 gals/acre. Evaluations were made July 22 using a D-vac insect sampler (12-in diameter) at 5 put-downs/plot.

All treatments significantly reduced populations of grass thrips and globular springtails. Ivory Dishwashing Liquid (40:1 dilution) appeared intermediate in effectivess between other insecticides and the untreated check. No phytotoxicity was observed from any treatments.

Treatment and lbs (AI)/100 gals		Insects/15.7 ft^2		
		Globular springtails	Grass Thrips	Oribatid mites
Diazinon AG500	1.0	6 a	8 a	1 a
Sevin 80S	1.0	26 a	12 a	1 a
Ivory Dishwashing Liquid	40:1	58 a	11 a	2 a
Untreated check		119 b	72 b	6 a

Original data; x + 0.5 used for analysis. Numbers followed by the same letter are not significantly different (P = 0.05; DMRT).

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Experimental note: Evaluation of sod webworm irritants.

Purpose: To identify household products that may be useful for homeowners to sample for sod webworms in a lawn.

Procedure: Plot size was 3-ft x 3-ft. Experimental design was a randomized complete block with 3 replications. One gallon of liquid was sprinkled June 3 on each plot. All sod webworm larvae which moved to the surface 10-20 minutes after application were counted.

Results: Pyrethrins (Vegetable Insect Spray) appeared far more effective than any soap or detergent for irritating sod webworm larvae. However, sod webworm populations were very low throughout the plots.

Treatment and rate/gal	No. sod webworms recovered
Vegetable Insect Spray (0.02% pyrethrins) (1 cup)	14
Arm and Hammer Laundry Detergent (1/4 cup)	2
Ivory Dishwashing Liquid (1 oz)	1
Spic 'n' Span (1/4 cup)	0
Electra Sol (1/4 cup)	0
Fantastik (2 oz)	0
Parsons Detergent Amonia (1 oz)	0
Pine Sol (1 oz)	0