TABLE 3. EVALUATION OF SPRAYS FOR CONTROL OF LARVAE OF THE ALFALFA WEEVIL LASSEN COUNTY, 1964

Material (applied June 3)	Application rate of active toxicant	Reduction of larvae as compared with untreated check, after:*	
		12 days	21 days
	lbs per acre	%	%
Bidrin	0.75	91	76
Imidan	0.75	91	76
Union Carbide 10854	0.75	89	91
Union Carbide 20047A	0.75	77	65
Ortho 5353†	0.75	87	85
Bomyl	0.5	87	73
Stauffer B 10046	0.75	85	86
Stauffer B 10119	0.75	82	83
Azodrin	0.75	84	76
Shell Dev. 4072†	0.5	22	23
Malathion	1.0	84	70
Banol	2.0	75	76
Banol	1.0	61	60

* Untreated check averaged 52 and 92 larvae per sweep at 12 and 21 days, respectively, after application.

† Resulted in foliage injury rated "light" 7 days after application.

TABLE 4. EVALUATION OF SPRAYS FOR CONTROL OF LARVAE OF THE ALFALFA WEEVIL SISKIYOU COUNTY, 1965

Material (applied May 17)	Application rate of active toxicant	Reduction of larvae, as compared with untreated check, after:*		
		15 days	22 days	29 days
	lbs per acre	%	%	%
Niagara 10242	0.25	98	96	77
Niagara 10242	0.5	99	98	85
Niagara 10242	1.0	99	99	94
Geigy 13005	0.25	91	89	51
Geigy 13005	0.5	95	93	77
Geigy 13005	1.0	96	98	69
Ortho 5353	0.56	67	79	47
Ortho 5353†	0.75	89	89	70
Ortho 5353‡	1.13	96	92	81
Ortho 5353 + Phosphamidon§	0.56 + 0.125	86	83	53
Ortho 5353 + Phosphamidon§	0.56 + 0.25	91	91	57
Shell Dev. 7438	0.5	88	94	82
Shell Dev. 7438	1.0	92	96	81
Bomyl	0.75	81	84	50
Parathion	0.375	72	78	50

* Untreated check averaged 52, 108, and 118 larvae per sweep at 15, 22, and 29 days, respectively, after application.

† Resulted in foliage injury rated "light" 8 days after application.

‡ Resulted in foliage injury rated "medium" 8 days after application.

§ Resulted in foliage injury rated "severe" 8 days after application.

gave outstanding results 21 days after application, as did Niagara 10242, Geigy 13005, certain dosages of Ortho 5353 and Shell Development 7438 at 22 days after application (table 4). Twenty-nine days after treatment, Niagara 10242 at a dosage of 1.0 lb continued to provide a very high level of control. In these experiments the use of Ortho 5353 (at dosages of 0.75 lb or higher), Ortho 5353 plus phosphamidon, and Shell Development 4072 all caused some foliage injury.

Discussion

The failure with all granulated treatments applied during the dormant season demonstrates the extent of the problem in attempting to replace the formerly used cyclodiene insecticides (such as heptachlor and dieldrin) with other insecticides which do not belong to that chemical group. The lack of sufficient residual activity is basic to this problem but with the distinct trend away from commercial development, as well as usage, of pesticides having lengthy persistence, it is questionable whether replacement of the cyclodienes for weevil control by application during the dormant season can ever be achieved.

Sprays applied to the growing crop for larval control offer the only effective alternative to dormant-season control of the adult weevil. As already stated, a major objection to sprays for larval control is the difficulty in applying the insecticide at precisely the proper time, particularly when larval populations are heavy. Applications made too early do not protect the crop during the entire period when larval numbers exceed economic levels. A loss in hay yield results from treatments applied even a few days after the optimum date for spraying.

Promising materials

Spray materials showing particular promise as replacements for the insecticides presently recommended for use in mountainous northern California include: Niagara 10242, Geigy 13005, and Shell Development 7438. Union Carbide 10854, which also provided excellent larval control, is no longer being developed, according to the manufacturer. While none of these compounds was initially more effective than those now recommended, the residual activity was somewhat superior. Therefore, their use may negate the need for critical timing and the user may be permitted to make application in the very early stages of larval activity and expect protection of the crop during the entire period that larval populations are present in destructive numbers.

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INJURY TO EASTER SYSTEMIC

W. W. ALLEN

GROWERS OF EASTER LILIES have recently been troubled by yellowing of plant foliage. These experiments were conducted to determine whether pesticides used for aphid control might be the cause of this injury. The tests were conducted in commercial greenhouses on

Severe leaf tip injury from systemic insecticides is evident in photo below of Japanese Georgia variety Easter lily. Yellow leaf tips are especially visible about the middle of the plant.

GREENHOUSE LILIES WITH INSECTICIDES

R. H. SCIARONI

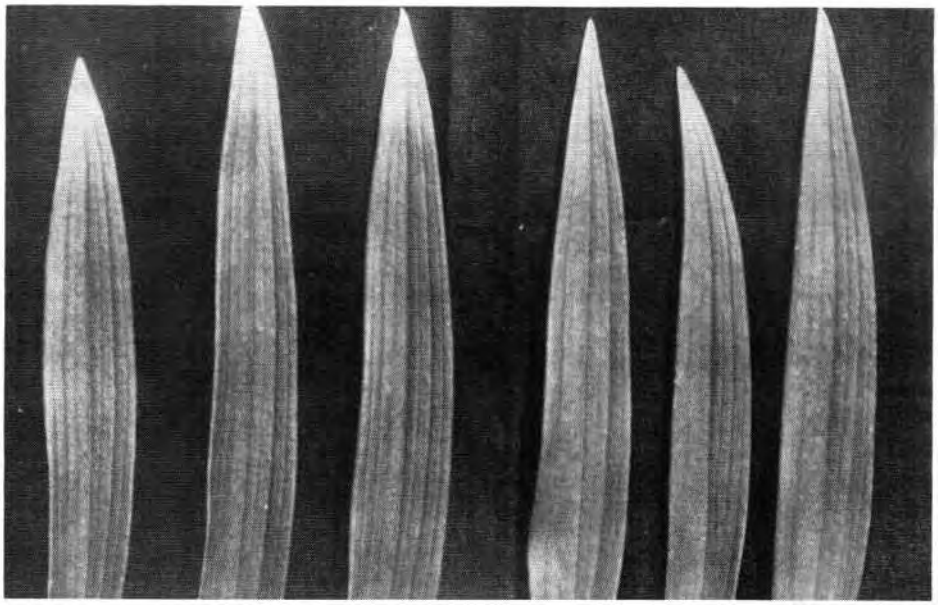

Photo of leaves, above, taken from Harson variety Easter lily plants shows severe leaf tip necrosis resulting from applications of systemic insecticides to plant from which three leaves to left were taken, as compared with three leaves from check plant, to right.

potted lilies that had been "forced" for Easter. Full coverage pesticide sprays were applied with a hand sprayer.

Yellow foliage

In the preliminary test conducted in 1964, applications of the systemic phosphate insecticides Systox, Meta-Systox R, and phosphamidon, produced noticeable yellowing of the foliage of the Croft variety (table 1). The nonsystemic materials lindane, malathion, and Thiodan caused little or no yellowing of the leaves. With Diazinon (a nonsystemic phosphate), there was very slight leaf discoloration.

In the 1965 test, two sprays were applied fourteen days apart. The systemic phosphates Systox, dimethoate, and American Cyanamid 47031 caused slight yellowing of the foliage of the Croft variety and severe leaf tip necrosis to the Harson and Japanese Georgia varieties. However, these materials had little or no effect on the Nellie White variety. Some of the systemic carbamates used in these tests (Niagara 10242 and Union Carbide 20047) produced injuries similar to those produced by the systemic phosphates. These experiments confirmed previous tests indicating that lindane, malathion, and Thiodan do not cause yellowing of the foliage.

It can be concluded that the use of certain insecticides can result in serious damage to the foliage of greenhouse-forced Easter lilies. The typical damage is a progressive yellowing of the leaf tips which, when severe, can cause necrosis of the tips. Although there are marked varietal differences in susceptibility, it appears that none of the systemic phosphate insecticides should be used on greenhouse Easter lilies and new systemic carbamates should be tried with extreme caution.

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TABLE 1. THE EFFECT OF VARIOUS SPRAYS ON CROFT EASTER LILIES, HALF MOON BAY, 1964

Material	Pounds actual per 100 gallons*	Phytotoxicity†
Nonsystemics		
Diazinon	0.5	None
Lindane	0.2	None
Malathion	0.5	None
Thiodan	0.5	None
Systemics		
Dimethoate	0.5	None
Meta-Systox R	0.37	Slight yellowing of leaf tips
Meta-Systox R	0.5	Slight yellowing of leaf tips
Phosphamidon	0.5	Slight yellowing of leaf tips
Systox	0.46	Distinct yellowing of leaf tips
Check	...	None

* Applied January 17 and February 3 as full coverage sprays, wetting agent (Colloidal X-77) added at rate of 2.0 ounces per 100 gallons.

† Based on five plants for each treatment. There were no differences in bud count or plant height.

TABLE 2. INJURY TO EASTER LILIES FROM SPRAY OF SYSTEMIC INSECTICIDES, HALF MOON BAY, 1965

Material	Pounds actual per 100 gallons*	Injury found on†			
		Croft	Harson	Nellie White	Japanese Georgia
Nonsystemics					
Lindane	0.5	None	None	None	None
Malathion	1.0	None	None	None	None
Thiodan	0.5	None	None	None	None
Systemic carbamates					
Nia. 10242	0.5	Slight yellowing	Severe necrosis	None	Maderate necrosis
U. C. 20047	0.5	None	Moderate necrosis	None	Slight necrosis
Systemic phosphates					
A. C. 47031	0.5	Slight necrosis	Severe necros's	None	Severe necrosis
Dimethoate	0.5	Slight yellowing	Severe necrosis	None	Severe necrosis
Systax	0.46	Slight yellowing	Severe necrosis	None	Moderate necrosis
Check	...	None	None	None	None

* Full coverage sprays applied on February 8 and 23. Two ounces per 100 gallons of water of wetting agent (Colloidal X-77) added to the sprays.

† Observations on injury made on March 17 with three replications for each treatment and variety. All injury was on the leaf tips. There were differences in bud count by variety but not by treatment.