CONTROL OF LIGHT-BROWN APPLE MOTH

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SUMMARY

Alternatives to lead arsenate for the control of light-brown apple moth, *Austrotortrix postvittana* (Walk.), were tested in three spray trials in apple orchards in the Stanthorpe district during the 1954-55 season.

Programmes incorporating DDD were generally superior to all others, and at the same time avoided the foliage damage and spray residue problems associated with the use of lead arsenate. Two sprays of DDD 0.1 per cent., one applied in late November and the other in late January, are basic for the control of light-brown apple moth.

I. INTRODUCTION

Light-brown apple moth, *Austrotortrix postvittana* (Walk.), a native insect, was not an important pest in Queensland until the 1947-48 season (May 1948). Since then it has been an important pest of apples and pears, a serious pest of grapes and a minor one of stone fruits. This increase in pest status coincided with the general change to DDT in spray programmes.

May (1952) recommended the inclusion in the DDT programme for apples and pears of two sprays of lead arsenate 3 lb per 100 gal, the first in late November and the other in late January. On early-maturing varieties the second lead arsenate spray was replaced by a nicotine sulphate/white oil mixture.

The three trials set out during the 1954-55 season in the Stanthorpe district, and which are currently described, were prompted by the disadvantages associated with the use of lead arsenate and the advent of new materials.

II. MATERIALS

The materials and active concentrations used were:—

DDT.—An emulsion concentrate containing 25 per cent. w/v *p.p'* isomer: used at 0·1 per cent.

Dieldrin.—An emulsifiable preparation containing 16 per cent. w/v active ingredient: 0·05 per cent.

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Endrin.—An emulsifiable preparation containing 20 per cent. w/v active ingredient: 0·025 and 0·05 per cent.

Lead arsenate.—A powder containing 31 per cent. As_2O_5 as lead arsenate, and 1 per cent. dispersing agent; containing less than 0·5 per cent. water-soluble arsenic compounds: 3 lb per 100 gal.

Nicotine.—A concentrate containing 40 per cent. nicotine as nicotine sulphate: 1¼ pt per 100 gal.

Parathion.—An emulsifiable preparation containing 50 per cent. w/v active ingredient: 0·01 per cent.

DDD (TDE).—An emulsion concentrate containing 30 per cent. w/v *p.p'* isomer: 0·1 per cent.

Thiram.—A dispersible powder containing 80 per cent. w/w active ingredient: 1½ lb per 100 gal.

Urea.—A material containing 46 per cent. nitrogen as urea: 5 lb per 100 gal.

White oil.—An oil containing 80 per cent. w/w mineral oil: 2½ pt per 100 gal.

III. METHODS

An 8 x 4 randomized layout was used with single-tree plots in Trial 1 (variety Delicious), 2-tree plots in Trial 2 (Jonathan), and two separate blocks with single-tree plots in Trial 3 (Granny Smith).

Prior to treatments the trials received uniform applications of sprays. These included:—Trial 1, superior oil 3 in 100 while dormant; Trial 2, superior oil 3 in 100 while dormant, lime sulphur 1 in 30 at "pink" and lead arsenate 3 lb, hydrated lime 3 lb, casein spreader 1 lb, colloidal sulphur 2 lb, lime sulphur ½ gal in 100 gal of water at "calyx"; Trial 3, superior oil 3 in 100 while dormant.

Selection of materials and trial programmes was influenced by the necessity to control other members of the apple pest complex (see May 1952). These programmes are given in Table 1. Treatments were applied at a pressure of 200-250 lb per sq. in. using a small power spray with a hand-operated lance. Complete tree cover was aimed at. Application dates of cover sprays were as follows:

Trial 1: November 8, November 26-27, December 12, January 15 and February 3;

Table 1

TRIAL PROGRAMMES

Programme	Cover Sprays					
	1	2	3	4	5	
	All trials	All trials	All trials	All trials	Trials 1 and 3	Trial 2
A	DDT	DDT plus lead arsenate plus parathion	Parathion	DDT	DDT plus lead arsenate plus white oil	DDT plus white oil plus nicotine
B	DDT	DDT plus DDD plus parathion	Pharathion	DDT	DDT plus DDD	DDT plus DDD
C	Endrin 0·025%	Endrin 0·025% plus lead arsenate plus parathion	Parathion	Endrin 0·025%	Endrin 0·025% plus lead arsenate	Endrin 0·025% plus white oil plus nicotine
D	Endrin 0·025%	Endrin 0·025% plus DDD plus parathion	Parathion	Endrin 0·025%	Endrin 0·025% plus DDD	Endrin 0·025% plus DDD
E	Endrin 0·05%	Endrin 0·05% plus parathion	Parathion	Endrin 0·05%	Endrin 0·05%	Endrin 0·05%
F	Dieldrin	Dieldrin plus parathion	Parathion	Dieldrin	Dieldrin	Dieldrin
Ga Trial 1 and Trial 3 (block 1)	Programme A plus urea	Programme A plus urea	Parathion	Programme A plus urea	Programme A plus urea	..
Gb Trial 2 and Trial 3 (block 2)	Programme A plus thiram	Programme A plus thiram	Parathion	Programme A plus thiram	Programme A plus thiram	..
H	Untreated	Untreated	Untreated	Untreated	Untreated	Untreated

Table 2

PERCENTAGE OF DAMAGED FRUIT

Programme (important materials indicated)	Trial 1 (Delicious)		Trial 2 (Jonathan)		Trial 3 (Granny Smith)			
					Block 1		Block 2	
	Transformed Mean*	Equivalent Mean	Transformed Mean*	Equivalent Mean	Transformed Mean*	Equivalent Mean	Transformed Mean*	Equivalent Mean
A. DDT plus lead arsenate ..	13·3	5·3	20·0	11·7	21·7	13·7	16·8	8·3
B. DDT plus DDD	11·7	4·1	12·6	4·7	10·8	3·5	9·0	2·4
C. Endrin 0·025% plus lead arsenate	12·2	4·5	16·3	7·9	18·7	10·3	14·0	5·9
D. Endrin 0·025% plus DDD ..	9·9	2·9	12·0	4·3	11·1	3·7	9·6	2·8
E. Endrin 0·05%	14·4	6·2	15·5	7·1	20·7	12·5	19·1	10·7
F. Dieldrin 0·05%	19·2	10·9	28·6	23·0	25·5	18·5	27·1	20·8
Ga. Programme A plus urea ..	14·5	6·3	..	..	..	..	18·6	10·1
Gb. Programme A plus thiram ..			22·4	14·5	19·3	10·9		..
H. No treatment	18·2	9·7	37·6	37·2	25·0	17·9	24·3	17·0
Necessary differences for significance 5%	3·0		5·7		4·1		4·1	
Necessary differences for significance 1%	4·1		7·8		5·6		5·5	

* Inverse sine.

Trial 2: November 2, November 23, December 6, January 1 and February 1;

Trial 3: November 6, November 24, December 5-6, January 1 and February 2.

As heavy codling moth, *Cydia pomonella* (L.), stinging was occurring, and at the request of the orchardist, an additional DDT treatment was applied on January 20 to trees concerned with Programmes 3, 4 and 6 in Trial 1.

All fruit, including windfalls, were examined for larval damage, and recorded simply as either damaged or sound.

IV. RESULTS

Results and further details are given in Table 2.

Programmes B and D (Table 1) incorporating DDD gave satisfactory results and were generally superior to all others; these also avoided a residue problem (see Bengtson and Winks 1957), and foliage damage, caused by arsenic, which may result in premature leaf-fall. Programmes A, C and G, incorporating lead arsenate, and E, using endrin 0·05 per cent., were moderately effective. Programme F, based on dieldrin, was of little value. The addition of either urea or thiram (Ga and Gb) to the standard (A) did not lower efficacy.

On the results of these trials May and Bengtson (1955) in a spray programme against pests of apples and pears included two sprays of DDD 0·1 per cent., one in late November and the other in late January, for the control of light-brown apple moth. Experience in commercial orchards has confirmed the efficacy of this programme when spraying is thorough.

V. ACKNOWLEDGEMENTS

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