CONTROL OF PORINA CATERPILLAR WITH FENITROTHION

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Summary

Twenty-five trials are reported in which fenitrothion applied as a spray or granules was compared with other organophosphorus insecticides. Control was assessed in all trials by digging up surviving caterpillars and in seven trials by pasture appearance. The degree of control by fenitrothion varied but was always significant. In a majority of trials fenitrothion gave significantly better control than diazinon or trichlorfon; in no trial was it inferior.

INTRODUCTION

IN PAST YEARS DDT dusted or sprayed on pasture had given usually satisfactory control of porina caterpillar (*Wiseana* spp.). For several years, DDT has been permitted on pasture only in pelleted form with some loss of performance especially against large caterpillars. DDT pellets* should be applied before caterpillars have grown more than ½ in. long; for best control as early as the flight of the parent moths. Caterpillars over ½ in. long are more likely to be controlled satisfactorily with effective organo-phosphorus insecticides. Owing to the difficulty of finding and counting porina caterpillars small enough for DDT pellets to be used reliably, considerable use must now be made of organophosphorus insecticides.

The best organophosphorus insecticide tested by the writer is fenitrothion, a chemical closely related to parathion but much less toxic to mammals. Trials in which fenitrothion has been used are described in this paper.

EXPERIMENTAL

Trial sites in the South Island were chosen to cover a range of soils, grass cover, climate and size of caterpillar. The infestations were typical of those requiring treatment.

Strips were treated across a field in Trials 10, 11, 17 and 20. Small plots with treatments replicated 3 to 6 times were used in the other trials; these were treated either by hand sprayer with 15 gal water per acre or with prills shaken undiluted by hand.

Seven trials were left ungrazed long enough for a fair assessment of pasture response, but the other trials were dug without undue delay to reduce the risk of caterpillar migration. Pasture was rated on an absolute basis by an observer ignorant of treatments—10 corresponding to perfect pasture and 0 to bare ground.

* In this paper the words pellet and prill are used according to Agricultural Chemicals Board definition—i.e., a pellet is not restricted as to size; a prill is a pellet of approximately 16 to 25 mesh per inch. Rates of chemical are given in active ingredient per acre.

Usually five samples totalling 7 sq. ft were dug from each plot. Caterpillars which could not be made to move were classed as dead. The total number of live caterpillars sampled in each plot was recorded, and the square root of (this number + 1) was used in the analysis of deviance.

Dead caterpillars on the surface were counted in several trials, but are not recorded here because such numbers are an erroneous index of performance.

Fenitrothion used was made by Sumitomo Chemical Co. and supplied by Swift & Co. Diazinon 50% was used initially, but from Trial 10 onwards 80% E.C. was used. The fenitrothion and diazinon prills contained 5% a.i. by weight coated on marble. Diazinon prills made at New Plymouth were used in most of the 1965 trials and in Trials 23 and 24; diazinon prills made at Mapua were used in the other trials.

DISCUSSION

Pasture was significantly improved by fenitrothion in all trials in which pasture ratings were recorded. In Trial 7 (Table 4) the improvement was significant at the 0.1% level. In this trial caterpillars had obviously moved from the bare untreated ground into the grassy treated plots. In all other trials caterpillar numbers were significantly reduced by fenitrothion, but this could not be said for diazinon, trichlorphon or chlorfenvinphos.

In Trial 4 (Table 2) all treatments gave a poor kill yet the better ones gave spectacular pasture response. Good improvement following spraying with DDT supports the belief that sub-lethal doses of DDT make caterpillars eat less.

Trial 24 was on dense, very tall, autumn-saved pasture with red clover dominant. As expected, the spray did not get close enough to the ground to kill many caterpillars. It was inferior to both fenitrothion and diazinon granules by a highly significant margin. Better control was obtained in Trial 14 by granules on a site with heavy grass litter than by spray in Trial 15 on adjacent ground. On short pasture, however, Trials 2 to 5 did not indicate any superiority for spray or granules except perhaps in Trial 4 where diazinon spray performed poorly.

It is apparent from Tables 2 and 4 that American-made granules with chlorfenvinphos absorbed in attapulgate clay are much poorer than locally-made granules with the same insecticide coated on a hard core. Trials not reported here have shown the same result with Stauffer N 2790. The mode of action of granules is not fully understood, but it is clear that thoroughly absorbed chemical is not sufficiently available to contact the caterpillars.

Trials reported in this paper reveal a variability of porina control with many chemicals. In several trials control was poor enough for complaint if the treatment had been commercial. It is interesting to note poor control of *W. despecta* in spring.

Daisies (*Bellis perennis*) were numerous on two trial sites. A count of flowers recorded during assessment of porina control supports the belief that pasture weakened by porina will grow more weeds.

ACKNOWLEDGEMENT

Thanks are given to the many people who assisted in trials.

ertson, Wainui	.....	.....	1-2	30/8/65
lder, Bainham	.....	.....	1-1 1/2	8/9/65
ods, Hamama	.....	.....	1-1 1/4	9/9/65
ods, Hamama	.....	.....	1-1 1/4	9/9/65
ods, Hamama	.....	.....	1-1 3/4	3/11/65
chards, Redwoods				
ey	.....	.....	1-1 1/2	1/4/66
ylor, Mariri	.....	.....	1 1/4-1 3/4	1/4/66
ylor, Mariri	.....	.....	1 1/4-1 3/4	4/4/66
rd Farm Training Insti-				
e, Balclutha	.....	.....	3/4-1 1/2	6/4/66
ddenklau, Methven	.....		1 1/2-2 1/4	8/4/66
ay, Otaio	.....	.....	1 1/4-2	14/4/66
ddenklau, Methven	.....		1 1/2-2 1/4	16/4/66
s & Survey, Hindon	.....		1-1 3/4	16/4/66
chards, Redwoods				
ley	.....	.....	1 1/2-2	30/4/66
odder, Harakeke	.....		1-2	1/5/66
rd Farm Training Insti-				
e, Balclutha	.....	.....	3/4-1 1/2	3/5/66
s & Survey, Hindon	.....		3/4-2	5/5/66
M. McLaughlan,				
rfield	.....	.....	1 1/2-2	9/5/66

: NUMBER OF SURVIVING CATERPILL
FOOT AND (PASTURE RATING) IN TRIALS I
BOTH SPRAY AND GRANULES WERE USED

	<i>Trial No.</i>			
<i>ment</i>	2	3	4	5

on spray

TABLE 3: NUMBER OF SURVIVING CATERPILLARS PER SQUARE FOOT AND (PASTURE RATING) IN TRIALS IN WHICH TREATMENTS WERE SPRAYED

Treatment (oz)	1	6	10	11	12	15	17	18	19	20	21	25
Fenitrothion 16 sprayed ..	0.2(7.7)	1.0			0.2(7.0)	1.0	0.8	0.5	2.1	0.6	0.2	2.5
Fenitrothion 12												
Fenitrothion 8			1.3	2.1								
Diazinon 16 sprayed	0.4*(7.3)	5.8**	4.1**	3.8*								
Diazinon 12						1.4	1.5*	1.5**	4.3**	0.7	0.3	
Trichlorphon 16 sprayed									4.2**		0.4	5.9**
Chlorfenvinphos 8												
sprayed		5.3**										
Chlorfenvinphos 6						0.8		1.8**				
Methidathion 16 sprayed	1.4** (6.7)											
Coumithioate 16 sprayed	2.0** (5.3*)											
Cyanimid 52160 16												
sprayed					2.6* (6.7)							
Untreated			4.6**	5.0**	4.0**	2.0*	5.6**	4.8**	6.6**	5.0**	1.4**	7.9**

* Control significantly poorer than by fenitrothion ($p < 0.05$)

** Control significantly poorer than by fenitrothion ($p < 0.01$)

TABLE 4: NUMBER OF SURVIVING CATERPILLARS PER SQUARE FOOT AND (PASTURE RATING) IN TRIALS IN WHICH GRANULES WERE USED

Treatment (lb)	Trial No.						
	7	8	9	13	14	16	22 23
DDT prills 4					2.1**	.....	.....
Fenitrothion prills 1					0.6	0.6	1.0
Diazinon prills 1					0.4(8.7)	0.6	1.2
Staufner N 2790 prills 1					2.7**(7.3)	1.9	.....
Chlorfenvinphos prills 1 (made in U.S.A.)					8.7(4.7**)	0.7	.....
Chlorfenvinphos prills 1 (made in N.Z.)					0.7(7.2)	.....	.....
Untreated					2.5**(7.0)	.....	.....
					7.4(4.3**)	.....	.....
					6.4(3.3**)	.....	.....
					4.4**(6.0*)	.....	.....
					3.2* 1.4**(6.6**)	.....	.....
					0.6(7.2)	.....	.....
					1.7**	5.4**	3.1*
							3.2**

* Control significantly poorer than by fenitrothion ($p < 0.05$)

** Control significantly poorer than by fenitrothion ($p < 0.01$)

TABLE 5: NUMBER OF DAISY (*BELLIS PERENNIS*) FLOWERS PER SQUARE FOOT OF GROUND

	Trial 7	Trial 10
Treated with fenitrothion	.....	.....
Untreated	.....	.....
	1.4*	1.4***
	2.3	5.0

* Significantly less than untreated ($p < 0.05$)

*** Significantly less than untreated ($p < 0.001$)