

## GRASS-GRUB CONTROL IN CANTERBURY, 1965

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### Summary

Fourteen materials formulated as granules or pellets were tested at four sites in Canterbury for control of grass-grub (*Costelytra zealandica*). Fensulfothion, diazinon, trichlorfon, S4400 and methidathion granules at 2 lb a.i./acre were better than DDT formulations, the year of application, to an existing infestation, but not one of eleven organophosphates gave any reduction of grub numbers when the Halswell area became reinfested, whereas all organochlorine materials gave significant reduction when compared with controls; there were, however, no significant differences in pasture cover between the two groups of insecticides. Against DDT-resistant grubs, fensulfothion at 1 lb a.i./acre was better than diazinon and trichlorfon at 2 lb a.i./acre after 2 months on grub counts, but not significantly better on pasture cover, and all three were better than DDT, heptachlor, and lindane. None of the preparations at dosages used (even isobenzan at 1 lb a.i./acre) had an adverse effect on earthworm populations on the sites tested.

### GRASS-GRUB CONTROL, TIMARU — SERIES I

*Applied:* May 3–5, 1965    *Sampled:* September 6–7, 1965  
*Dosages:* All at 2 lb a.i./acre  
*Formulations:* All as granules except drymix  
*Replications:* 5    *Plot size:* 16 ft 6 in. × 16 ft 6 in.  
*Samples:* 6 spade squares per plot

Materials	Grass-grubs		A Signif.	Porina Stat. Means†
	Stat.	Means		
Fensulfothion .....	4.094		***	0.81
Trichlorphon .....	5.124		***	1.32
Diazinon .....	5.160		***	1.27
S4400 .....	6.352		**	1.18
Methidathion .....	7.668		N.S.	1.22
DDT Ammophos .....	7.896		N.S.	1.50
DDT drymix .....	8.288		N.S.	1.80
DDT (Stauffer) .....	6.976		*	2.06
DDT prills .....	7.534		N.S.	2.01
Control .....	8.616		—	2.12

† All N.S.

SUMMARY

- (1) All materials were better at the 0.1% level than controls, on pasture cover.
- (2) No materials at these dosages and site adversely affected earthworms.
- (3) Fensulfothion was not significantly better than trichlorphon or diazinon on either grass-grub reduction or on pasture cover, but was better at the 1% level than S4400, and at the 0.1% level than methidathion, and the rest on grub counts, and at the 5% level than S4400, and 1% level than methidathion, DDT Ammophos and DDT drymix on pasture cover.
- (4) Trichlorphon was better at the 5% level than S4400 and at the 1% level than methidathion, DDT Ammophos, and DDT drymix, and at the 0.1% level than DDT (Stauffer) and DDT prills on pasture cover.
- (5) Diazinon was not significantly better on pasture cover than S4400, methidathion, DDT Ammophos or DDT drymix, but was at the 5% level than DDT (Stauffer) and DDT prills.

Earthworms Stat. Means†	B Pasture Cover %	
	Stat. Means	Signif.
62.2	91.25	***
62.8	91.13	***
67.6	79.38	***
67.8	75.92	***
77.4	71.55	***
66.2	68.28	***
68.4	68.19	***
67.8	62.30	***
78.4	61.24	***
87.0	34.87	—

Differences for significance:

	A Grass-grub	B Pasture Cover
* = 5% level =	1.60	14.58
** = 1% level =	2.15	19.54
*** = 0.1% level =	2.84	25.86
N.S. = not significant		

## GRASS-GRUB CONTROL, HALSWELL — SERIES II

*Applied:* April 4-9, 1964    *Sampled:* September 8-9, 1965  
*Dosages:* All at 2 lb a.i./acre unless specified  
*Formulations:* All as granules except DDT wet- and dry-mixes  
*Replications:* 5.    *Samples:* 6 spade squares per ½ ch × ½ ch plot.  
 This area became reinfested during Nov.-Dec., 1964.

<i>Materials</i>	<i>Grass-grub</i>		<i>Earth-worms</i>
	<i>Stat.</i>	<i>Signif.</i>	
	<i>Means</i>		<i>Stat.</i>
			<i>Means</i> †
Isobenzan 1 lb	0.71	***	100
Isobenzan ¼ lb	0.99	***	103
DDT drymix	0.99	***	104
DDT Ammophos	0.99	***	109
Heptachlor 2 lb	1.09	***	100
DDT wetmix	1.27	***	100
Heptachlor 1 lb	1.31	***	118
DDT gran. E.C.F.F.	1.67	***	98
DDT prills "Special"	2.05	**	100
DDT prills "Standard"	1.97	**	115
DDT 20% (Stauffer)	2.46	*	119
DDT 30% (Stauffer)	2.56	*	121
Trichlorphon 1 lb	2.89	N.S.	115
Azinphos-methyl	3.20	N.S.	99
Dichlofenthion	3.34	N.S.	101
Trichlorphon 2 lb	3.35	N.S.	105
Fenthion	3.38	N.S.	114
Dichlofenthion	3.54	N.S.	117
Diazinon 1 lb	3.94	N.S.	121
Parathion-methyl	3.89	N.S.	118
Diazinon W.P. used dry	4.19	N.S.	113
3562-SD	4.50	*-	113
Diazinon 2 lb	4.76	*-	122
Control (super. only)	3.44	—	115
Control (Sup. + Ammophos)	3.53	—	111

† All N.S.

*Differences for significance (grass-grubs):*

- \* = 5% level = 0.96
- \*\* = 1% level = 1.28
- \*\*\* = 0.1% level = 1.65
- N.S. = not significant.

### SUMMARY

- (1) No significant effects on earthworms by any materials at this site and at above dosages (*c.f.*, Halkett soil of lower organic content — isobenzan).
- (2) All organochlorine materials were significantly better than controls, but none of the organophosphates reached significance over controls, and two of them were significantly worse than controls.

GRASS-GRUB CONTROL, TE PIRITA, 1966 — SERIES III

Applied: March 23, 1966    Sampled: May 13-18, 1966  
 Dosages: All at 2 lb a.i./acre unless specified  
 Formulations: All granules    Replications: 5  
 DDT-susceptible by topical testing.  
 Pre-treatment count: 40-70 per spade square  
 Samples: 9 spade squares per plot.  
 Pasture cover rated by two officers  
 Plot size: 16 ft 6 in × 16 ft 6 in.    Wind at application: 0

Rain since application:

Mar. 27	.....	0.43 in.
Apr. 2	.....	0.18 in.
Apr. 5	.....	0.21 in.
Apr. 17	.....	0.40 in.
Apr. 27	.....	0.40 in.
May 3	.....	0.84 in.
May 4	.....	0.13 in.
Total	.....	2.59 in.

Materials	A		B	
	Grass-grubs Stat. Means	Signif. c.f. Controls	Pasture Cover % Stat. Means	Signif. c.f. Controls
Fensulfothion 1 lb	32.6	***	77.9	***
Diazinon	79.2	***	72.4	***
Trichlorphon	115.2	***	68.7	***
S4400 1 lb	204.6	N.S.	47.9	*
DDT (Ivory's)	195.6	N.S.	42.5	N.S.
DDT prills	218.6	N.S.	42.6	N.S.
DDT (Niagara)	236.4	N.S.	41.4	N.S.
Heptachlor 1 lb	187.0	N.S.	41.1	N.S.
Heptachlor ½ lb	191.4	N.S.	39.5	N.S.
Control	210.8	—	29.1	—

Differences for significance:

	A	B
	Grass-grub	Pasture Cover
* = 5% level =	45.6	16.4
** = 1% level =	61.2	21.9
*** = 0.1% level =	80.7	28.9

SUMMARY

- (1) Fensulfothion, diazinon and trichlorphon were better at the 0.1% level than control on both grub counts and pasture cover, and S4400 was better at the 5% level than control on pasture cover only. Other materials were not significantly better than control by either assessment.
- (2) Fensulfothion was better at the 5% level than diazinon, and at the 0.1% level than trichlorphon and the remainder on grub counts, but was not better than diazinon or trichlorphon on pasture cover.

- (3) Fensulfothion was better at the 1% level than S4400 and at the 0.1% level than the remainder on pasture cover.
- (4) Diazinon was not significantly better than trichlorphon by either method of assessment, but was better at the 0.1% level than S4400 and the remainder on grub numbers, and at the 1% level than S4400, and at the 0.1% level than the remainder on pasture cover.
- (5) Trichlorphon was better at the 0.1% level than S4400 and control on grub counts, and at the 5% level than S4400, and at the 1% level than the three DDT's and heptachlor 1 lb, and at the 0.1% level than heptachlor ½ lb on pasture cover.

#### GRASS-GRUB CONTROL, CAREW, 1966 — SERIES IV

Applied: April 14, 1966 Assessed: May 4-11, 1966

Dosages: All at 2 lb unless specified

Formulations: All granules Wind: 1 to 3 m.p.h.

DDT-resistant grubs by topical testing

Pre-treatment count: 25-86 per spade square Replications: 5

Sampling: 9 spade squares per plot Plot size: 16 ft 6 in. × 16 ft 6 in.

Pasture rated by three officers

#### Rain since application:

Apr. 18	.....	0.66 in.
Apr. 26	.....	0.46 in.
Apr. 27	.....	0.33 in.
Apr. 30	.....	0.07 in.
May 2	.....	0.37 in.
Total	.....	1.89 in.

Materials	A		B	
	Grass-grubs Stat. Means	Signif. c.f. Controls	Pasture Cover % Stat. Means	Signif. c.f. Controls
Fensulfothion	74.8	***	86.2	***
Trichlorphon	179.2	***	72.8	*
Diazinon	116.2	***	70.9	*
Lindane	158.2	***	64.6	N.S.
Fenitrothion	180.0	***	56.1	N.S.
S4400	202.8	***	51.3	N.S.
Heptachlor 1 lb	307.8	*	35.3	N.S.
Heptachlor ½ lb	358.6	N.S.	30.2	N.S.
DDT (Ivory's)	373.6	N.S.	28.7	N.S.
Controls	392.0	—	34.7	—

#### Differences for significance:

	A	B
	Grass-grubs	Pasture Cover
* = 5% level =	80.6	33.9
** = 1% level =	108.2	45.5
*** = 0.1% level =	142.7	60.0

#### SUMMARY

- (1) Fensulfothion was significantly better at the 0.1% level than control by both assessments.
- (2) Diazinon, lindane, trichlorphon, fenitrothion and S4400 were all significantly better at the 0.1% level than controls on grub counts, but trichlorphon and diazinon were better at only the 5% level on pasture cover, and other materials below diazinon were not significantly better than controls on pasture cover.
- (3) Fensulfothion was not significantly better than diazinon, but was better at the 5% level than trichlorphon, lindane, and fenitrothion, at the 1% level than S4400, and at the 0.1% level than the remainder on grub counts.
- (4) Fensulfothion was not significantly better than trichlorphon, diazinon, lindane and fenitrothion on pasture cover, but was better at the 5% level than S4400, and at the 1% level than the rest.
- (5) Diazinon was not significantly better than trichlorphon, lindane, or fenitrothion on grub counts, but was at the 5% level than S4400, and at the 0.1% level than the rest.
- (6) Trichlorphon was not significantly better than diazinon, lindane, fenitrothion or S4400 on pasture cover.

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