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Control of gladiolus thrips, Taeniothrips simplex (Morison), with granular insecticides in south-east Queensland

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Summary

Five field trials were carried out during 1978–80 with soil applications of the granular insecticides aldicarb, disulfoton, ethiofencarb, phorate and thiofanox against the gladiolus thrips, *Taeniothrips simplex* (Morison). Control equivalent to that obtained by a previous reference dosage of 6.9 kg ha^{-1} a.i. of aldicarb, disulfoton or phorate applied before planting was obtained by pre-plant applications of 3.4 kg ha^{-1} a.i. of aldicarb or thiofanox and by side dressings at flower spike emergence of 1.7 and 2.5 kg ha^{-1} a.i. of aldicarb or 2.5 kg ha^{-1} a.i. of thiofanox. Phytotoxic symptoms were not recorded on either plants or blooms.

1. INTRODUCTION

Gladiolus thrips, *Taeniothrips simplex* (Morison), is the major pest of gladioli grown in south-east Queensland. The currently recommended control is repeated cover sprayings of 0.03% dimethoate. Trials by Hargreaves and Cooper (1980) showed that the granular insecticides aldicarb, disulfoton or phorate applied below the corm at planting at 6.9 kg ha^{-1} a.i., or weekly sprays of 0.11% methamidophos or 0.06% omethoate were equally effective and better than dimethoate cover sprays. There has been little grower interest in granules, however, as the costs of materials for control by granular insecticides, at the dosage of 6.9 kg ha^{-1} a.i., are about the same as for cover sprays. The present study therefore was undertaken to determine whether a lower dose or better timing of granular insecticides applications would be effective.

2. MATERIALS AND METHODS

The following insecticides and formulations were used:

Aldicarb	10% w/w granule
Disulfoton	5% w/w granule
Ethiofencarb	10% w/w granule
Phorate	10% w/w granule
Thiofanox	10% w/w granule

Five trials were carried out between December 1978 and December 1980. In Trials 1 to 4 the above granular insecticides were compared as pre-plant dressings. They were mixed with

ground-up fertilizer (NPK = 5:6:4) and applied by hand to the open furrow, 3 to 4 cm below the corms. In Trial 5 the two most effective insecticides from Trials 1 to 4 (aldicarb and thiofanox) were compared as pre-plant treatments and as side dressings just before the flower spike emerged from the sheath. The side dressings were applied by hand in two bands, 3 to 4 cm from the base of the plants, and incorporated into the soil. Details of treatments are given in Table 1.

The trials were carried out as follows: Trials 1 and 2 between 8 December 1978 and 5 March 1979; Trials 3 and 4 between 13 September 1979 and 21 December 1979 and Trial 5 between 12 September 1980 and 17 December 1980. The five trials covered areas of 324, 254, 315, 284 and 527 m^2, respectively. Experimental layouts of four replicates of 9, 7, 10, 9 and 18 treatments in randomized blocks were used.

The work was timed to coincide with expected periods of high *T. simplex* activity.

Table 1. Percentage of marketable spikes harvested from gladioli treated with granular insecticides for control of *T. simplex*

Treatment	Concentration in kg ha^{-1} a.i.	Percentage of marketable spikes								
		Trial 1		Trial 2		Trial 3		Trial 4		Trial 5
		Trans* mean	Equiv. mean	Trans* mean	Equiv. mean	Trans* mean	Equiv. mean	Trans* mean	Equiv. mean	Mean
Aldicarb	6.9	1.49*a*	99.3	..	..	1.34*a*	94.8	..	..	71.0*a*
Aldicarb	5.0	..	..	..	..	..	..	..	..	54.7*abcde*
Aldicarb	3.4	1.39*ab*	96.8	..	..	1.25*ab*	89.8	..	..	52.1*cdef*
Aldicarb	2.5†	..	..	..	..	..	..	..	..	69.4*ab*
Aldicarb	2.2	..	..	..	..	1.16*bc*	83.8	..	..	..
Aldicarb	1.8	1.11*d*	80.2	..	..	..	..	..	..	34.5*g*
Aldicarb	1.7†	..	..	..	..	..	..	..	..	62.9*abc*
Aldicarb	0.9†	..	..	..	..	..	..	..	..	46.1*defg*
Aldicarb	0.5†	..	..	..	..	..	..	..	..	39.8*efg*
Disulfoton	6.9	1.51*a*	99.6	..	..	1.09*cd*	78.4	0.96*b*	67.3	..
Disulfoton	3.4	1.24*bcd*	89.4	1.07*a*	76.8	0.95*d*	66.1	0.83*bc*	54.6	..
Disulfoton	2.2	..	..	..	..	0.73*c*	44.5	..	..	..
Disulfoton	1.8	1.29*bc*	92.3	0.97*ab*	68.2	..	..	..	..	..
Ethiofencarb	6.9	..	..	..	..	..	..	0.67*cd*	38.1	..
Ethiofencarb	3.4	..	..	1.01*ab*	71.4	..	..	0.67*cd*	38.4	..
Ethiofencarb	2.2	..	..	..	..	..	..	0.48*dc*	21.4	..
Ethiofencarb	1.8	..	..	0.89*bc*	60.7	..	..	..	..	..
Phorate	6.9	..	..	..	..	1.16*b*	84.4	..	..	..
Phorate	3.4	..	..	1.10*a*	79.3	0.98*cd*	69.3	..	..	..
Phorate	2.2	..	..	..	..	0.70*e*	41.2	..	..	..
Phorate	1.8	..	..	1.03*a*	73.6	..	..	..	..	..
Thiofanox	6.9	..	..	..	..	..	..	1.18*a*	85.3	69.5*ab*
Thiofanox	5.0	..	..	..	..	..	..	..	..	61.4*abcd*
Thiofanox	3.4	1.17*cd*	84.6	..	..	..	..	1.03*ab*	73.3	53.1*bcdef*
Thiofanox	2.5†	..	..	..	..	..	..	..	..	58.2*abcd*
Thiofanox	2.2	..	..	..	..	..	..	0.95*b*	66.3	..
Thiofanox	1.8	1.13*cd*	82.2	..	..	..	..	..	..	52.5*cdef*
Thiofanox	1.7†	..	..	..	..	..	..	..	..	45.9*defg*
Thiofanox	0.9†	..	..	..	..	..	..	..	..	45.3*defg*
Thiofanox	0.5†	..	..	..	..	..	..	..	..	38.2*fg*
No treatment		0.79*e*	50.7	0.79*c*	50.7	0.59*e*	30.9	0.44*e*	18.0	35.6*g*

*Inverse sine transformation.
†Applied as side dressing.
Values, within columns, followed by the same letter do not differ at the $P = 0.05$ level of probability.

The gladioli cultivars Attraction, Aurora, Elizabeth the Queen, Golden Boy, Lohengrin, Oscar, Professor Gourdrian, Snow Velvet and White Lass were used as a uniform mixture in all trials.

Plots consisted of a single row of 30 plants (3 m long) in Trials 1, 2 and 5, and of 24 plants (2.5 m long) in Trials 3 and 4. Rows were 0.9 m apart. Each alternate row was a guard row. Plots were also separated within the row by a 1 m length of guard plants. Guard plants were not treated with insecticide and high populations of *T. simplex* developed on them.

Flower spikes were harvested daily over the first 4 weeks of flowering. Quality of the spikes was assessed by the method of Hargreaves and Cooper (1980). At each successive harvest, data were bulked and expressed in terms of numbers of blooms and of percentage of marketable spikes.

3. RESULTS AND DISCUSSION

Results are summarized in Tables 1 and 2. They show that *T. simplex* reduces flower quality of gladioli rather than flower yield.

Table 2. Mean numbers of spikes harvested from gladioli treated with granular insecticides for control of *T. simplex*

Treatment	Concentration in kg ha^{-1} a.i.	Mean number of spikes per plot				
		Trial 1	Trial 2*	Trial 3*	Trial 4*	Trial 5*
Aldicarb	6.9	40.0*b*	..	27.0	..	26.5
Aldicarb	5.0	..	..	..	..	24.5
Aldicarb	3.4	38.0*b*	..	29.0	..	24.5
Aldicarb	2.5†	..	..	..	..	29.5
Aldicarb	2.2	..	..	32.25	..	..
Aldicarb	1.8	36.0*b*	..	..	..	29.75
Aldicarb	1.7†	..	..	..	..	28.5
Aldicarb	0.9†	..	..	..	..	31.75
Aldicarb	0.5†	..	..	..	..	28.5
Disulfoton	6.9	46.5*a*	..	28.5	27.5	..
Disulfoton	3.4	39.0*b*	44.75	29.0	25.75	..
Disulfoton	2.2	..	..	34.25	..	..
Disulfoton	1.8	40.0*b*	39.75	..	..	..
Ethiofencarb	6.9	..	..	..	25.75	..
Ethiofencarb	3.4	..	35.75	..	30.75	..
Ethiofencarb	2.2	..	..	..	27.0	..
Ethiofencarb	1.8	..	33.75	..	..	..
Phorate	6.9	..	..	31.5	..	..
Phorate	3.4	..	40.75	25.0	..	..
Phorate	2.2	..	..	29.5	..	..
Phorate	1.8	..	39.75	..	..	..
Thiofanox	6.9	..	..	..	27.0	25.75
Thiofanox	5.0	..	..	..	..	26.75
Thiofanox	3.4	39.25*b*	..	..	27.0	22.75
Thiofanox	2.5†	..	..	..	..	28.25
Thiofanox	2.2	..	..	..	29.75	..
Thiofanox	1.8	36.25*b*	..	..	..	26.75
Thiofanox	1.7†	..	..	..	..	30.25
Thiofanox	0.9†	..	..	..	..	28.5
Thiofanox	0.5†	..	..	..	..	27.0
No treatment		38.25*b*	39.25	34.0	31.0	29.25

*No significant differences. Values followed by the same letter do not differ at the $P = 0.05$ level of probability.
†Applied as side dressing.

Reduction in insecticide dosage of the basal dressings from 6.9 kg ha^{-1} resulted in significant increases in damage to the flowers in most cases. Exceptions were aldicarb (Trials 1, 3 and 5), and thiofanox (Trials 4 and 5), where lower dosages (3.4, 5 kg ha^{-1}) gave equivalent control. Dosages of aldicarb and thiofanox as low as 1.7 kg ha^{-1} when applied as side dressings gave control equivalent to the 6.9 kg basal treatment. Side dressings therefore offer the possibility for more economic *T. simplex* control in gladioli. No adverse effects on plant growth or yield and quality of blooms were recorded following use of granular insecticides in any trials.

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Reference

Hargreaves, J. R., and Cooper, L. P. (1980), 'Control of gladiolus thrips, *Taeniothrips simplex* (Morison), in gladioli fields in south-east Queensland'. *Queensland Journal of Agricultural and Animal Sciences* **37**, 63–66.

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