

TECHNICAL NOTES

TOXICITIES OF INSECTICIDES TO PASTURE WHITE GRUBS IN QUEENSLAND

During 1947, R. C. Cannon (unpublished Departmental records) established large-scale field trials using heavy dressings of BHC to combat white grubs in pastures on the Atherton Tableland. The results indicated that another approach was necessary and as part of further investigations insecticide screenings against larvae in pots were undertaken during 1954 and 1955.

Larvae of *Rhopaea magnicornis* Blkb. and *Lepidiota caudata* Blkb. (see Saunders 1958) were bred (first-stage *R. magnicornis*) (Fig. 1) or collected in the field (second and third stages) and first-stage *Dermolepida albohirtum*



Fig. 1.

Breeding Cages Used for Obtaining Supplies of First-stage Larvae.

Waterh. (bred) were used in one series as this species is controlled in sugarcane fields by applications of BHC (Mungomery 1949, Wilson 1956).

The insecticides were thoroughly mixed with air-dry soil from relevant habitats, but p.p.m. (active) were calculated on oven-dry weights. Either one third-stage, two second-stage, or five first-stage larvae were placed in each pot containing about 1 lb. of soil (and insecticide) kept suitably moist. No fewer than 100 larvae per treatment were used. When examining larvae the pot contents were placed in a scoop, and after adding water, if required, were returned to the pot.

The materials used were:—

BHC.—A 20 per cent. kaolin dust containing 2·6 per cent. gamma isomer.

Aldrin.—A granulated preparation, 2·5 per cent. active.

DDT.—A kaolin dust containing 10 per cent. *p.p'* isomer.

Where necessary these were diluted with kaolin before mixing with soil. Kaolin in controls did not influence larval mortalities.

Results are presented under the Melolonthid species concerned. Those for the series with first stages are summarised only.

RESULTS.

Rhopaea magnicornis.

First-stage Larvae.—A series was set up at Brisbane on Feb. 12, 1955. Treatments were: BHC, 1, 2 and 3 p.p.m.; aldrin, 1, 2, and 3 p.p.m.; DDT 20,

Table 1.

TOXICITY OF INSECTICIDES TO SECOND-STAGE LARVAE OF *Rhopaea magnicornis*.

Treatment.	Percentage Mortality.		
	At 14 Days.	At 28 Days.	At 63 Days.
BHC 10 p.p.m.	28·6	64·3	64·3
BHC 20 p.p.m.	33·2	50·0	50·0
BHC 30 p.p.m.	16·6	64·3	64·3
Control	14·3	57·1	57·1
Aldrin 10 p.p.m.	30·9	52·4	69·0
Aldrin 20 p.p.m.	23·8	40·5	50·0
Aldrin 30 p.p.m.	11·9	24·3	69·0
Control	26·2	38·1	71·4
DDT 200 p.p.m.	35·9	42·9	92·8
DDT 400 p.p.m.	42·9	54·7	85·7
DDT 600 p.p.m.	35·9	52·4	90·5
Control	21·4	45·2	60·5

40 and 60 p.p.m. On examination at 28 days mortality in the controls was 63·3 per cent. The treatments showed an equal or better survival, indicating that there were no effects due to insecticides.

Second-stage Larvae.—A series was set up at Brisbane on Feb. 12, 1955. Details of treatments and results are given in Table 1.

Third-stage Larvae.—A series using 1,200 larvae was set up at Brisbane on Jan. 29, 1954. Details of treatments and results are given in Table 2.

Table 2.
TOXICITY OF INSECTICIDES TO THIRD-STAGE LARVAE OF *Rhopaea magnicornis*.

Treatment.	Percentage Mortality.	
	At 14 Days.	At 28 Days.
BHC 0·5 p.p.m.	2·0	6·5
BHC 1·0 p.p.m.	9·0	9·0
BHC 1·5 p.p.m.	8·0	14·5
BHC 2·0 p.p.m.	3·0	8·0
BHC 2·5 p.p.m.	2·0	7·0
Control	2·0	11·5

Lepidiota caudata.

Third-stage Larvae.—A series was set up at Ayr on Mar. 16, 1955. Details of treatments and results are given in Table 3.

Table 3.
TOXICITY OF INSECTICIDES TO THIRD-STAGE LARVAE OF *Lepidiota caudata*.

Treatment.	Percentage Mortality at 28 Days.
BHC 5·0 p.p.m.	72·1
BHC 10·0 p.p.m.	75·0
BHC 15·0 p.p.m.	100·0
BHC 20·0 p.p.m.	81·5
BHC 50·0 p.p.m.	87·0
Aldrin 0·5 p.p.m.	5·0
Aldrin 1·0 p.p.m.	6·0
Aldrin 2·0 p.p.m.	9·0
Aldrin 4·0 p.p.m.	10·0
Aldrin 6·0 p.p.m.	5·0
DDT 40·0 p.p.m.	24·0
DDT 120·0 p.p.m.	36·0
Control	11·0

Dermolepida albohirtum.

First-stage Larvae.—A series was set up at Ayr on Feb. 3, 1955. Treatments were BHC 0.5, 1.0, 2.0, 3.0 and 4.0 p.p.m.; aldrin 0.25, 0.5, 1.0, 2.0 and 4.0 p.p.m. On examination at 12 days mortality in the controls was 65.0 per cent. All insecticide treatments resulted in 100 per cent. kills.

DISCUSSION.

All larvae in BHC treatments came to the soil surface, indicating the deterrent effect of this soil insecticide.

As mortalities in the controls were often high, better methods for obtaining technically sound data are required. Placing the larvae in simulated tunnels did not improve results, and some exploratory work was undertaken with squares set in the ground (Fig. 2). This promising approach was not

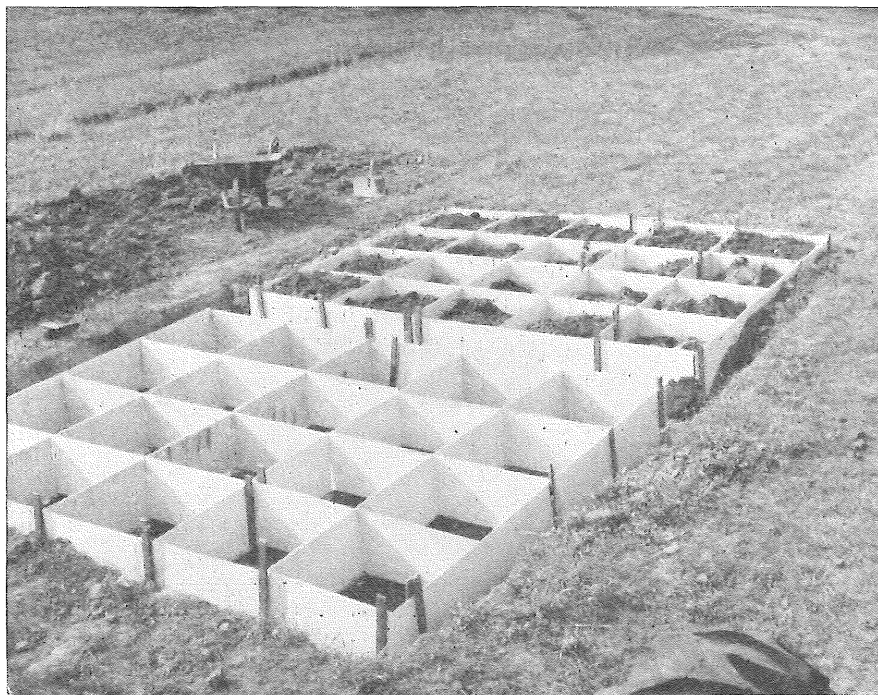


Fig. 2.

Establishing Squares for White Grub Toxicity Studies.

persevered with, as results from the pot series indicated that BHC, aldrin and DDT are much more toxic to *D. albohirtum* than to *R. magnicornis* and *L. caudata*, and accordingly these materials would be of little value in the commercial control of pasture white grubs.

REFERENCES.

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