# TECHNICAL NOTES

# INSECTICIDAL CONTROL OF HELIOTHIS IN LINSEED

Two species of Heliothis attack linseed in Queensland; *Heliothis punctigera* Wallengr. predominates in southern districts, and occurs in about equal numbers with *H. armigera* (Hubn.) on the Central Highlands.

Three trials, with plot size of 1/100 ac, were carried through; two at Capella, Central Highlands, during 1957 and 1959, and one on the Darling Downs in 1958. Randomized block designs of 5 × 5 and 8 × 3 were used for the first two, and a factorial block of 4 DDT and 3 diazinon levels with 3 replications in the third trial. Materials used were an emulsion concentrate of DDT containing 25 per cent. w/v $\rho.\rho'$ isomer, and a diazinon concentrate containing 20 per cent. active ingredient. Sprays were applied with a hand-operated power unit at 200 gal/ac in the 1957 trial, and at 100 gal/ac in the others. Additional details are given in tables of results.

These results demonstrate that treatments of 1 lb and $\frac{1}{2}$ lb of DDT per ac, when applications are thorough, give comparable kills. Results of Trials 1 and 2 (Tables 1 and 2) point out the importance of correct timing of insecticide application; Table 2 stresses the value of early treatment. In Trial 1 reinfestation occurred after treatment and the crop was practically a total loss (Table 1—column headed 12.xi.57). Reinfestation seldom occurs in southern districts.

There is no evidence that the presence of two species of Heliothis in linseed is a factor in control.

### Table 1

RESULTS OF 1957 TRIAL, CAPELLA

(*Pest Survivals and Boll Damage*)

| Treatment | Mean Number of Larvae (30 ft of row per plot) | | | Mean Number of Damaged Bolls in a 300 Random Sample per Plot | |
|---|---|---|---|---|---|
| | Pre-treatment | Post-treatment | | 7.x.57 | 12.xi.57 |
| | 26.ix.57 | 27.ix.57 | 7.x.57 | | |
| DDT 1 lb/ac | 21·8 | 0·6 | 13·4 | 100·8 | 266·8 |
| DDT $\frac{3}{4}$ lb/ac | 20·0 | 1·0 | 13·0 | 105·2 | 268·4 |
| DDT $\frac{1}{2}$ lb/ac | 17·4 | 1·0 | 34·4 | 121·4 | 285·6 |
| DDT $\frac{1}{4}$ lb/ac | 15·8 | 2·6 | 54·0 | 144·6 | 276·0 |
| Check | 24·4 | 25·0 | 42·6 | 281·4 | 297·2 |

**Table 2**

RESULTS OF 1958 TRIAL, DARLING DOWNS

*(Pest Survivals and Yields)*

| Treatment | Mean Number of Larvae (36 ft of row per plot) | | Yield |
|---|---|---|---|
| | 21.x.58 | 28.x.58 | Mean (lb/plot) |
| DDT 1 lb/ac on Oct. 15 (10 days after peak flowering) | 0 | 1·5 | 4·11 |
| DDT ½ lb/ac on Oct. 15 .. .. .. .. | 1·0 | 5·0 | 3·80 |
| DDT 1 lb/ac on Oct. 21 .. .. .. .. | 37·0* | 1·0 | 3·36 |
| DDT ½ lb/ac on Oct. 21 .. .. .. .. | 36·5* | 1·8 | 3·17 |
| DDT 1 lb/ac on Oct. 21 and repeated on Oct. 28 .. | 34·8* | 1·0 | 3·48 |
| DDT ½ lb/ac on Oct. 21 and repeated on Oct. 28 .. | 35·5* | 2·3 | 3·31 |
| Check—mean of two .. .. .. .. .. | 36·5* | 41·5 | 2·87 |
| Necessary differences for significances among treatments  5% | | | 0·61 |
| 1% | | | 0·83 |
| Necessary differences for significance for comparison involving check  5% | | | 0·53 |
| 1% | | | 0·72 |

\* Pre-treatment counts.

**Table 3**

RESULTS OF 1959 TRIAL

*(Pest Survivals and Boll Damage)*

Mean number of larvae (30 ft of row per plot)

48 hr after treatment—Sept. 18

| | | Transformed mean $\left(\sqrt{x+\frac{1}{2}}\right)$ | | | | | Actual Mean | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DDT (lb/ac) | | | | | DDT (lb/ac) | | | | |
| | | 0 | ⅓ | ⅔ | 1 | Mean | 0 | ⅓ | ⅔ | 1 | Mean |
| Diazinon (oz/ac) | 0 | 3·16 | 1·56 | 1·35 | 1·00 | 1·77 | 9·5 | 1·9 | 1·3 | 0·5 | 2·6 |
| | 2 | 2·43 | 1·55 | 1·97 | 1·47 | 1·85 | 5·4 | 1·9 | 3·4 | 1·7 | 2·9 |
| | 4 | 3·16 | 2·26 | 1·34 | 1·17 | 1·98 | 9·5 | 4·6 | 1·3 | 0·9 | 3·4 |
| Mean .. .. .. | | 2·92 | 1·79 | 1·55 | 1·21 | 1·87 | 8·0 | 2·7 | 1·9 | 1·0 | 3·0 |

| — | | DDT | Diazinon | Individual |
|---|---|---|---|---|
| Necessary differences for significance  5% | | 0·61 | 0·53 | 1·06 |
| 1% | | 0·83 | 0·72 | 1·44 |

DDT : ⅓, ⅔, 1 ⟨⟨ 0

**Table 3**—*continued*

ONE WEEK AFTER TREATMENT—SEPT. 22

| | | Transformed mean $\left(\sqrt{x+\frac{1}{2}}\right)$ | | | | | Actual Mean | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DDT (lb/ac) | | | | | DDT (lb/ac) | | | | |
| | | 0 | $\frac{1}{3}$ | $\frac{2}{3}$ | 1 | Mean | 0 | $\frac{1}{3}$ | $\frac{2}{3}$ | 1 | Mean |
| Diazinon (oz/ac) | 0 | 1·94 | 1·27 | 1·00 | 0·71 | 1·23 | 3·3 | 1·1 | 0·5 | 0·0 | 1·0 |
| | 2 | 1·56 | 1·05 | 1·05 | 0·88 | 1·13 | 1·9 | 0·6 | 0·6 | 0·3 | 0·8 |
| | 4 | 1·93 | 0·88 | 1·10 | 1·05 | 1·24 | 3·2 | 0·3 | 0·7 | 0·6 | 1·0 |
| Mean  ..  ..  .. | | 1·81 | 1·07 | 1·05 | 0·88 | 1·20 | 2·8 | 0·6 | 0·6 | 0·3 | 0·9 |

| — | | DDT | Diazinon | Individual |
|---|---|---|---|---|
| Necessary differences for | 5% | 0·38 | 0·33 | 0·65 |
| significance | 1% | 0·51 | 0·44 | 0·89 |

DDT : $\frac{1}{3}$, $\frac{2}{3}$, 1<<0

**Table 4**

RESULTS OF 1959 TRIAL

(Mean number of damaged bolls in a 100 random sample per plot)

Eight weeks after treatment—Sept. 18

| | | Transformed mean (inverse sine) | | | | | Equivalent (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DDT (lb/ac) | | | | | DDT (lb/ac) | | | | |
| | | 0 | $\frac{1}{3}$ | $\frac{2}{3}$ | 1 | Mean | 0 | $\frac{1}{3}$ | $\frac{2}{3}$ | 1 | Mean |
| Diazinon (oz/ac) | 0 | 21·53 | 18·33 | 12·73 | 5·40 | 14·50 | 13·5 | 9·9 | 4·9 | 0·9 | 6·3 |
| | 2 | 21·87 | 14·13 | 17·43 | 15·30 | 17·18 | 13·9 | 6·0 | 9·0 | 7·0 | 8·7 |
| | 4 | 26·87 | 22·50 | 13·07 | 13·33 | 18·94 | 20·4 | 14·7 | 5·1 | 5·3 | 10·5 |
| Mean  ..  ..  .. | | 23·42 | 18·32 | 14·41 | 11·34 | 16·88 | 15·8 | 9·9 | 6·2 | 3·9 | 8·4 |

| — | | DDT | Diazinon | Individual |
|---|---|---|---|---|
| Necessary differences for | 5% | 5·81 | 5·03 | 10·07 |
| significance | 1% | 7·90 | 6·84 | 13·68 |

DDT : $\frac{2}{3}$, 1>>0

1>>$\frac{1}{3}$

These trial results and field experience are the basis for the extension article by Passlow and May (1960), which differs only slightly from that by Passlow (1952). These differences are due partly to the increased acreage of linseed on the Central Highlands during the past few years.

A point of interest is the inclusion of diazinon in the 1959 trial. In Queensland, when hot, dry springs occur the commercial control of Heliothis with insecticides is difficult, and a common approach under these conditions is to try insecticides other than DDT or additional to DDT. The 1957 season was of this type and a DDT–diazinon mixture was suggested; results (Tables 3 and 4) clearly demonstrate that diazinon has no value in the control of Heliothis in linseed.

## REFERENCES

PASSLOW, T. (1952).—Heliothis control in linseed. *Qd Agric. J.* 75: 240-4.

PASSLOW, T. and MAY, A. W. S. (1960).—Heliothis control in linseed. *Qd. Agric. J.*

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