US EPA ARCHIVE DOCUMENT

MULTIPLE

DATA EVALUATION RECORD

CHEMICAL: TERBUFOS

BRANCH: EEB

FICHE/MASTER ID NUMBER: 05008149

AUTHOR: TITLE: Gholson, L.E., C.C. Beegle, R.L. Best, and J.C. Owens. 1978. Effects of Several commonly-used insecticides on Cornfield carabids in Iowa. J. Econ. Entomol. 71(3):416-418

START DATE 11-18-82 END DATE 11-18-82

REVIEWED BY: Allen W. Vaughan

TITLE: Entomologist

ORG: EEB/HED

LOC/TEL: Crystal Mall # 2/79307

SIGNATURE: Allen W. Vaughan DATE: 11/29/82

APPROVED BY: X

TITLE: X

ORG: X

LOC/TEL: X

SIGNATURE: DATE:

5 pages

1. CHEMICAL

Multiple chemicals. See tables.

2. FORMULATION:

See tables.

3. CITATION:

Gholson, L.E., C.C. Beegle, R.L. Best, and J.C. Owens. 1978. Effects of several commonly used insecticides on cornfield carabids in Iowa. J. Econ. Entomol. 71(3):416-418. FICHE/MASTER ID 05008149

4. REVIEWER:

Allen W. Vaughan
Entomologist
EEB/HED

5. DATE REVIEWED:

November 18, 1982

6. TEST TYPE:

Toxicity to insect predator
A. Test species: Carabid beetles (see tables)

7. REPORTED RESULTS:

Exposure to terbufos-treated soil resulted in 100% mortality of all five test species (see TABLE 1.) For numerical data and data on other pesticides, see tables.

8. REVIEWER'S CONCLUSIONS:

This study is scientifically sound, and shows terbufos to be highly toxic to several species of carabids exposed to treated soil.

Materials and Methods

Beetles were exposed to insecticides in 3 different trials.

Trial 1

Pans of soil were treated with various granular formulations or baits, at recommended field rates. Beetles were placed in the pans and mortality was evaluated after 5 days.

Trial 2

Pans of soil were treated with various spray formulations and a carbaryl bait. Evaluation was conducted as in Trial 1.

Trial 3

Black cutworm larvae were exposed to the various test pesticides for 24 hr., then dead larvae were fed to the beetles. Mortality was recorded after 4 days.

Statistical Analysis

Data were analyzed by using 2-way ANOVA and Duncan's multiple range test.

Discussion/Results

Terbufos was highly toxic to five carabid species exposed to treated soil (1 lb AI/acre). For numerical data on terbufos and other pesticides, see tables.

Reviewer's Evaluation

A. Test Procedures

Procedures were sound.

B. Statistical Analysis

ANOVA and DMRT performed. Analyses as performed by authors were assumed to be valid. No validation performed by EEB.

C. Discussion/Results

This study is scientifically sound.

First Trial

The 1st trial, conducted in the summer of 1974, tested the following insecticides at recommended field rates: carbofuran 10G, 0.84 kg AI/ha; phorate 15G, 1.12 kg AI/ha; terbufos 15G, 1.12 kg AI/ha; aldrin 20G, 1.12 kg AI/ha; Carbaryl 5% bait, 1.12 kg AI/ha; leptophos 5% bait, 1.12 kg AI/ha; and an untreated check.

Table 1. - Effect of soil insecticides and baits on various carabid species[a] tested in the laboratory, summer 1974, as measured by mean % mortality.

Species	Carbofuran 10G	Phorate 15G	Terbufos 15G	Aldrin 20G	Carbaryl bait (5%)	Leptophos bait (5%)	Control
Scarites substriatus	3.58 ef[b]	100.00a	100.00a	96.42a	3.58ef	0.00 f	0.00
Pterostichus chalcites	6.25ef	100.00a	100.00a	8.33ef	3.13ef	9.38ef	4.17ef
Bembidion quadrimaculatum	14.10e	100.00a	100.00a	46.90b	54.73b	6.28ef	3.15ef
Bembidion rapidum	0.00f	100.00a	100.00a	30.00c	7.50ef	2.50ef	2.50ef
Harpalus pensylvanicus	5.35ef	100.00a	100.00a	55.35b	82.15b	0.00f	0.00f

a Four replications/mean; 7 carabids/replication for S. substriatus; 8/replication for P. chalcites; 16/replication for B. quadrimaculatum; 10/replication for B. rapidum; 14/replication for H. pensylvanicus.

b Numbers followed by the same letter are not significantly different at the 5% level when using a 2-way analysis of variance and Duncan's multiple range test.

Second Trial

Methomyl (24%, EC, 0.56 kg AI/ha), trichlorfon (80 WP, 1.12 kg AI/ha), carbaryl (80 WP, 2.24 kg AI/ha), toxaphene (6E, 2.24 kg AI/ha), carbofuran (4 Flowable, 2.24 kg AI/ha), carbaryl (5% bait 1.12 kg AI/ha), and an untreated check.

Table 2. - Effect of insecticides surface sprayed on soil upon various carabid species[a] tested in the laboratory during summer, 1975, as measured by mean % mortality.

Species	Methomyl 24% EC	Trichlorfon 80 WP	Carbaryl 80 WP	Toxaphene 6E	Carbofuran 4F	Carbaryl bait (5%)	Contrc
Scarites substriatus	14.30f[b]	100.00a	53.60c	21.40c	100.00a	14.30f	7.10g
Pterostichus chalcites	100.00a	100.00a	100.00a	67.50b	100.00a	10.00fg	5.00g
Bembidion rapidum	100.00a	97.50a	100.00a	95.00a	100.00a	12.50f	5.00g
Harpalus pensylvanicus	100.00a	50.00cd	100.00a	45.70d	100.00a	50.00cd	2.50h

a Four replications/mean; 10 carabids/replication.
b Numbers followed by the same letter are not significantly different at the 5% level when using a 2-way analysis of variance and Duncan's multiple range test.

Third Trial

Table 3. - Effects of insecticide poisoned black cutworm larvae on 4 carabid species,[a] summer 1975, as measured by mean % mortality.[b]

Insecticide	% mortality
Carbofuran 4F	82.50a[c]
Carbaryl 80 WP	61.75b
Carbaryl bait (5 %)	10.00c
Trichlorfon 80 WP	7.75c
Methomyl 24% EC	3.75c
Toxaphene 6E	2.50c
Control	0.00c

a S. substriatus, H. pensylvanicus, P. chalcites, B. rapidum.
b Overall mean for 4 species carabids with 20 carabids/species/ insecticide treatment.
c Numbers ~~are~~ followed by the same letter are not significantly different at the 5% level when using Duncan's multiple range test.