

US EPA ARCHIVE DOCUMENT

12-14-83

SHAUGHNESSEY NO.  
012301

REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 12-2-83 OUT 12-14-83

FILE OR REG. NO. 3125-425

PETITION OR EXP. PERMIT NO. \_\_\_\_\_

DATE OF SUBMISSION 10-3-83

DATE RECEIVED BY HED 12-1-83

RD REQUESTED COMPLETION DATE 1-2-84

EEB ESTIMATED COMPLETION DATE 1-2-84

RD ACTION CODE/TYPE OF REVIEW 400/Data

TYPE PRODUCT(S): I, D, H, F, N, R, S Herbicide

DATA ACCESSION NO(S). 251374

PRODUCT MANAGER NO. R. Taylor (25)

PRODUCT NAME(S) Bromacil

COMPANY NAME Not Given

SUBMISSION PURPOSE Submission of honeybee toxicity study  
for review

SHAUGHNESSEY NO. CHEMICAL, & FORMULATION % A.I.

012301 Bromacil technical

1. CHEMICAL: Bromacil
2. FORMULATION: Technical
3. CITATION: Atkins, E.L., Jr., L.D. Anderson, D. Kellum, and K.W. Neuman. 1976. Protecting honey bees from pesticides. Univ. of California, Div. of Agric. Sci Leaflet 2883.
4. REVIEWER: Allen W. Vaughan  
Entomologist  
EEB/HED
5. DATE REVIEWED: December 13, 1983
6. TEST TYPE: Bee Toxicity
  - A. Test species: Honey bee (Apis mellifera)
7. REPORTED RESULTS: When test bees were exposed to direct application, LD<sub>50</sub> for bromacil was greater than 11 micrograms per bee (relatively non-toxic)
8. REVIEWER'S CONCLUSIONS: This study is scientifically sound, and shows bromacil to be relatively non-toxic to honey bees.

## Materials and Methods

### Test Procedure

Technical material was mixed with a non-toxic diluent dust and applied directly to bees in a vacuum dusting apparatus. Mortality was evaluated 48 hours after application.

### Statistical Analysis

Data were subject to probit analysis.

## Discussion/Results

Bromacil tested relatively non-toxic to honey bees. LD<sub>50</sub> level was not attained.

## Reviewer's Evaluation

### A. Test Procedure

Procedure is sound.

### B. Statistical Analysis

Analysis as performed by the authors was assumed to be valid. No analysis was performed by EEB.

### C. Discussion/Results

This study is scientifically sound.

Bromacil - Toxicity to honey bees

Based on information submitted by the registrant, bromacil is not toxic to honey bees.

*Allen W. Vaughan* 12/15/83

Allen W. Vaughan  
Entomologist  
Ecological Effects Branch

*Norman Cook* 12.15.83

Norman Cook  
RD Coordinator  
Ecological Effects Branch

*Clayton Bushong* 12/15/83

Clayton Bushong  
Chief  
Ecological Effects Branch

EDMS0030

DATA EVALUATION RECORD

012301

BROMACIL

PAGE 1 OF 5

CASE GS0014

ENDOSULFAN

EM 110 08/12/79

CHEM 079401

Endosulfan (Hexachlorcyclohexane)

BRANCH EEB

DISC 40 TOPIC 05103545

FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC CE E)

FIGURE/MASTER ID 05004003

CONTENT CAT C3

Davies, R.A.H.; McLaren, I.W. (1977) Tolerance of *Aphytis melinus* DeBach (Hymenoptera: Aphelinidae) to 20 orchard chemical treatments in relation to integrated control of red scale, *Aonidiella aurantii* (Maskell) (Homoptera: Diaspididae). Australian Journal of Experimental Agriculture and Animal Husbandry 17(85):323-328.

SUBST. CLASS = S.

OTHER SUBJECT DESCRIPTORS

SEC: EEB -35-05251045

DIRECT REV TIME = 3 hr. (MH) START-DATE 1/21/80 END DATE 1/22/80

REVIEWED BY: Allen W. Vaughan  
TITLE: Entomologist  
ORG: EEB/HED  
LOC/TEL: Crystal Mall #2/71405

SIGNATURE: *Allen W. Vaughan*

DATE: 2/14/80

APPROVED BY:  
TITLE:  
ORG:  
LOC/TEL:

SIGNATURE:

DATE:

5

1. CHEMICAL: Multiple chemicals. See appendix.
2. FORMULATION: Multiple formulations. See appendix.
3. CITATION: Davies, R.A.H., and I.W. McLaren. 1977. Tolerance of Aphytis melinus DeBach (Hymenoptera: Aphelinidae) to 20 orchard chemical treatments in relation to integrated control of red scale, Aonidiella aurantii (Maskell)(Homoptera: Diaspididae). Australian J. Exper. Agric. and Animal Husbandry. 17(85):323-328. FICHE/MASTER ID 05004003
4. REVIEWER: Allen W. Vaughan  
Entomologist  
EEB/HED
5. DATE REVIEWED: January 21, 1980
6. TEST TYPE: Toxicity to insect parasite
  - A. Test species: Parasitic wasp  
(Aphytis melinus)

7. REPORTED RESULTS:

The following products were either non-toxic or low in toxicity to both juvenile and adult A. melinus: dimazide, zinc nutrient, Bordeaux mixture, copper oxychloride, gibberellic acid, diuron, dalapon + surfactant, endosulfan, B. thuringiensis + surfactant, pirimicarb, and cyclosulfyne. Products which tested highly toxic included azinphosmethyl, white oil, cyhexatin, and malathion. For details on other chemicals tested and presentation of numerical data, see table.

8. REVIEWER'S CONCLUSIONS:

This study is scientifically sound.

TABLE

e toxicity of various chemical treatments at 25°C to juvenile *A. melinus* and virgin 3rd instar d scale, four days after treatment, and to emerging adult *A. melinus* 14-27 days after treatment.

Treatment	Rate	Juvenile Aphytis		Adult Aphytis				Toxicity rating
		Live Aphytis	Toxicity rating†	Total adult emergence (e)	Mean no. active adults observed (a)	Ratio a/e	a/e as a percentage of mean control and water treatments	
Control	p.p.m. ---	% 100.0	nil	73	8.71	0.119	100	nil
Control	---	100.0	nil	98	14.86	0.152	100	nil
Inphos-methyl	380	100.0	nil	55	1.0	0.018	13	H
Mazide	1070	100.0	nil	28	3.14	0.112	78	L
Complete nutrient	---	100.0	nil	76	14.29	0.188	131	nil
Redeaux mixture	---	99.8	L	34	4.71	0.139	97	L
Propoxychloride	880	99.7	L	40	8.71	0.218	132	nil
Terbufos	---	99.6	L	36	5.71	0.159	100	nil
Benzoic acid	59.4	99.6	L	45	13.86	0.308	215	nil
Carbaryl	2400	98.6	L	26	3.71	0.143	100	nil
Dieldrin	530	97.6	L ‡	1	0	0	---	---
Surfactant	20170	90.4	L	35	6.29	0.180	126	nil
White oil B	20000	61.7	H	2	0	0	---	---
White oil B	10000	53.9	H	2	0	0	---	---
White oil A	10000	46.0	H	3	0	0	---	---
Surfactant	56.4	39.7	H	25	4.29	0.172	120	nil
Dosanol	658	100.0	nil	37	8.86	0.240	76	L
Terbufos	---	100.0	nil	18	5.71	0.317	100	---
Thuringiensis +								
Surfactant	3760	100.0	nil	64	16.0	0.250	79	L
Dimethoate	300	100.0	nil	32	10.57	0.330	104	nil
Hexachlorocyclopentadiene	1880	100.0	nil	82	3.0	0.037	12	H
Chlorpyrifos	300	99.1	L	51	11.86	0.233	74	L
Surfactant	56.4	98.9	L	66	2.86	0.043	14	H
Chlorpyrifos	4000	97.5	L	41	7.29	0.178	56	M
Carbaryl	328	84.5	M ‡	0	0	0	---	---
Dieldrin +								
Surfactant	1000	55.2	H	2	0	0	---	---
White oil A	20000	45.1	H	4	1.14	0.285	---	---

Data were analyzed after transformation to arcsin ( $\sqrt{\text{proportion}}$ ), and toxicity ratings based on Duncan's multiple range test (P = 0.05).

High mortality occurred after juvenile assessment but prior to adult emergence.

## Materials and Methods

### Test Procedure

Mature lemons were infested with red scale in the laboratory. Adult A melinus were then allowed to parasitize the scales. For treatment, lemons bearing parasitized scales were immersed in the test solutions for 1 second.

Toxicity was evaluated through dissection of the scales, and through recording of the degree of emergence of adult parasites.

### Statistical Analysis

Significance of treatment differences on juvenile mortality was evaluated using Duncan's multiple range test. Data were analyzed after transformation to arcsin ( $\sqrt{\text{proportion}}$ ) and toxicity ratings were based on differences at the 5% level.

### Discussion/Results

Based on the data, the authors conclude that a number of the test pesticides would be useful in an integrated program for control of red scale. See table for toxicity data.

### Review's Evaluation

#### A. Test Procedure

Procedure is sound.

#### B. Statistical Analysis

Analysis as performed by the authors was assumed to be valid. No validation was performed by EEB.

#### C. Discussion/Results

This study is scientifically sound.

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## APPENDIX

## Products and formulations.

## Surfactant

60% w/v nonyl phenol ethoxylate (9 Eto)

## Insecticides

Azinphos-methyl 50% W.P.

Bacillus thuringiensis Berliner

Endosulfan 35% E.C.

Hydroprene 53% E.C.

Maldison 25% D.P.

Parathion (ethyl) 40% E.C.

Pirimicarb 50% W.P.

White oil A 80% w/v: 71% w/v hydrocarbon oil

White oil B 96% w/v: 81% w/v paraffinic oil

## Miticides

Cyclosulfyne 30% W.P.

Cyhexatin 50% W.P.

## Herbicides and plant growth regulators

Bromacil 80% W.P.

Dalapon 74% W.P.

Dimazide 85% W.P.

Diuron 80% W.P.

Gibberellic acid 90% W.P.

## Fungicides and nutrients

Bordeaux mixture 2-2-80 (2.5g copper sulfate + 2.5g hydrated lime/l).

Copper oxychloride 50% W.P.

Zinc nutrient (2g zinc oxide + 4g manganese sulfate + 7g urea/l).

TDMS0030

DATA EVALUATION RECORD

PAGE 1 OF 1

CASE GS0041

BROMACIL & SALTS

PM 000 11/21/80

CHEM 012301

Bromacil ( 5-bromo-3-sec-butyl-6-methyl

BRANCH EER

DTSC 40 TOPIC 05000046

FORMULATION 00 - ACTIVE INGREDIENT

FICHE/MASTER ID 0501947A

CONTENT CAT 01

Ishibashi, N.; Muraoka, M.; Kondo, E.; Yamasaki, H.; Kai, H.;  
Iwakiri, T.; Nakahara, M. (1978) Onshu mikan en ni okeru  
josoza no renyo ga senchu, dani, nado ni oyobosu eikyo.  
Effect of annual application of herbicides on nematodes, soil  
mites, and springtails in satsuma mandarin orchards. Saga  
Daigaku Nogaku Iho. Agricultural Bulletin of the Saga  
University. 1 (44):43-55.

SUBST. CLASS = M; OTHER CHEMS: 061601

DIRECT RWV TIME = 1/2 hr. (MH) START-DATE 7-30-81 END DATE 7-30-81

REVIEWED BY: Allen W. Vaughan  
TITLE: Entomologist  
ORG: EEB/HED  
LOC/TEL: Crystal Square #4/75641

DATE: 7-30-81

SIGNATURE: Allen W. Vaughan

APPROVED BY:

TITLE:

ORG:

LOC/TEL:

SIGNATURE:

DATE:

Study not relevant to Registration Standards.  
Study only evaluated effects of bromacil  
as part of a mixture.

012301

**BROMACIL**  
MULTIPLE

TDMS0030

DATA EVALUATION RECORD

PAGE 1 OF 8

CASE GS0016

AMMONIUM SULFAMATE

PM 210 09/10/80

CHEM 005501

Ammonium sulfamate

BRANCH EEB DISC 40 TOPIC 05050045

FORMULATION 90 - FORMULATION NOT IDENTIFIED

FICHE/MASTER ID 00018842

CONTENT CAT 02

Atkins, E.L., Jr.; Anderson, L.D.; Greywood, E.A. (1969) Effect of Pesticides on Apiculture: Project No. 1499; Research Report CF-7501. (Unpublished study received May 8, 1971 under 1F1174; prepared by Univ. of California--Riverside, Dept. of Entomology, submitted by Ciba Agrochemical Co., Summit, N.J.; CDL:090973-B)

SUBST. CLASS = S.

DIRECT RVW TIME = 2 Hrs. (MH) START-DATE 10/16/80 END DATE 10/16/80

REVIEWED BY: Allen W. Vaughan  
TITLE: Entomologist  
ORG: EEB/HED  
LOC/TEL: Crystal Mall #2 557-0268

SIGNATURE: *Allen W. Vaughan*

DATE: 2-4-81

APPROVED BY:  
TITLE:  
ORG:  
LOC/TEL:

SIGNATURE:

DATE:

*[Handwritten signature]*

CONCLUSIONS: This study is scientifically sound. See Table 1 for results.

METHODS AND MATERIALS:

Test Type: Toxicity to bees.

A. Test Species: Honey bees, (Apis mellifera)

Test Procedures: A bell-jar vacuum duster is used to apply the pesticide, mixed with a pyrolite dust diluent, to the test bees. Dosages of dust are weighed, bees are aspirated into dusting cages and treated, and bees are then transferred into holding cages. Observations are recorded at 12, 24, 48, 72, and 96 hours.

REPORTED RESULTS: Results are reported in Table 1. Pesticides are grouped according to their relative toxicity to honey bees. Ammonium sulfamate (AMS) is relatively non-toxic to honey bees.

Discussion/Results

See table for LD<sub>50</sub> values, slope values, and toxicity categories.

Statistical Analysis

Analysis of the data was performed to enable the authors to determine LD<sub>50</sub> values of pesticides from either dosage-mortality curves or from LC<sub>50</sub> values. The slope value was also obtained from the dosage-mortality curve.

Table 1.--1969 Laboratory Comparative Toxicity Tests on Honey Bees (cont.)

Pesticide	ug/ bee	LD value	Slope value	Type of Activity 1/
Trefmid <sup>®</sup> (trifluralin, 50% + diphenamid, 3.1%	120.86/ 7.49	2.7		H
cacodylic acid (Phytar <sup>®</sup> )	157.12	5.6		H
Dikar <sup>®</sup> (Dithane M-45 <sup>®</sup> , 74% + Karathane <sup>®</sup> , 6%)	178.87/ 15.03	14.6		F, A
Vitavax <sup>®</sup> (D-735)	181.29	2.0		F
dithianon (Thynon <sup>®</sup> )	181.29	2.1		F
RH-315	181.29	4.9		H
Plantvax <sup>®</sup> (F 461)	181.29	5.9		F
✓ bromacil (Hyvar <sup>®</sup> -X)	193.38	1.2		H
terbacil (Sinbar <sup>®</sup> )	193.38	2.4		H
pyramin (PCA, Pyrazon <sup>®</sup> )	193.38	3.3		H
fluometuron (Cotoran <sup>®</sup> )	193.38	3.8		H
Tandex <sup>®</sup> (NIA-11092)	193.38	8.5		H
Alar <sup>®</sup>	205.46	5.8		H
methar (DSMA, Ansar <sup>®</sup> 184)	217.55	9.8		H
DCPA <sup>®</sup> -T (DCPA)	229.63	3.2		H
GS-14254	234.47	8.8		H
GS-16068	235.68	6.2		H
GS-14260	236.40	2.9		H
MCPB sodium salt (Can-Trol <sup>®</sup> , Thistrol <sup>®</sup> )	238.58	3.2		H

*Jan*  
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MULTIPLE

DATA EVALUATION RECORD

CHEMICAL: BROMACIL

BRANCH: EEB

FICHE/MASTER ID NUMBER: 00018842

AUTHOR: Atkins, E.L., Jr., L.J. Anderson, and E.A. Greywood. 1969. Effect of pesticides on apiculture. Dept. of Entomol., Univ. of Calif.,  
TITLE: Riverside. Project No. 1499, Ann. Report.

DIRECT RVW TIME= 10 min.

START DATE 7-31-81

END DATE 7-31-81

REVIEWED BY: Allen W. Vaughan

TITLE: Entomologist

ORG: EEB/HED

LOC/TEL: Crystal Square 4 / 75641

SIGNATURE:

*Allen W. Vaughan*

DATE:

7-31-81

APPROVED BY:

TITLE:

ORG:

LOC/TEL:

SIGNATURE:

DATE:

This study is identical to FICHE/MASTER  
ID # 00009181.

MULTIPLE

DATA EVALUATION RECORD

CHEMICAL: BROMACIL

BRANCH: EEB/HED

FICHE/MASTER ID NUMBER: ~~00018872~~ 00009181

AUTHOR: Atkins, E.L. Jr., L.D. Anderson, and E.A. Greywood. 1969. Effect of Pesticides on apiculture. Dept. of Entomol., Univ. of Calif.,

TITLE: Riverside Project No. 1499, Ann. Report.

DIRECT RVW TIME= 1 hr.

START DATE 8-3-81

END DATE 8-3-81

REVIEWED BY: Allen W. Vaughan

TITLE: Entomologist

ORG: EEB/HED

LOC/TEL: Crystal Square #4/75641

SIGNATURE:

*Allen W. Vaughan*

DATE: 8-10-81

-----  
APPROVED BY:

TITLE:

ORG:

LOC/TEL:

SIGNATURE:

DATE:

1. CHEMICAL: Bromacil
2. FORMULATION: Technical
3. CITATION: Atkins, E.L., Jr., L.D. Anderson, and E.A. Greywood. 1969. Effect of pesticides on apiculture. Dept. of Entomol., Univ. of Calif., Riverside. Project No. 1499, Ann. Report. FICHE/MASTER ID ~~00018842~~ 00009181 ✓
4. REVIEWER: Allen W. Vaughan  
Entomologist  
EEB/HED
5. DATE REVIEWED: August 3, 1981
6. TEST TYPE: Toxicity to honey bee  
Test Species: Honey Bee (Apis mellifera)
7. REPORTED RESULTS: In a test of acute contact toxicity, bromacil was relatively non-toxic to honey bees.
8. REVIEWER'S CONCLUSIONS: This study is scientifically sound, and shows bromacil to be relatively non-toxic to honey bees.

## Materials and Methods

### Test Procedures

Technical material was mixed with a non-toxic diluent dust and applied directly to bees in a vacuum dusting apparatus. Mortality was evaluated 48 hours after application.

### Statistical Analysis

Probit Analysis Performed.

### Discussion/Results

Bromacil tested relatively non-toxic to honey bees. LD50 dosage was not attained.

### Reviewer's Evaluation

#### A. Test Procedure

Procedure is sound.

#### B. Statistical Analysis

Analysis as performed by the authors was assumed to be valid. No analysis was performed by EEB.

#### C. Discussion/Results

This study is scientifically sound.

TDMS0030

DATA EVALUATION RECORD

PAGE 1 OF 1

CASE GS0041

BPOMACIL & SALTS

PM 000 11/21/80

CHEM 012301

Bromacil ( 5-bromo-3-sec-butyl-6-methyl

BRANCH EEB DISC 40 TOPIC 05000046

FORMULATION 06 - WETTABLE POWDER (WP OR W)

FICHE/MASTER ID 05020972 CONTENT CAT 03

Kiyota, H.; Mitsuda, M. (1978) Josozai renryo kankitsuen ni okeru dolodobutsuso ni kansuru kenkyu: dai 2-ho. Dani, tobimushi so ni ataeru eikyo. (Studies on the soil fauna of citrus orchards treated with herbicides: II. Effects on soil mites and Collembola.) Pages 164-167, "In" Kyushu Bvogaichu Kenkyukaiho. (Proceedings of the Association for Plant Protection of Kyushu.) Vol. 24, Fukuoka-ken, Japan: Association for Plant Protection of Kyushu.

SUBST. CLASS = S.

DIRECT RVW TIME = 1/2 hr. (MH) START-DATE 7-31-81 END DATE 7-31-81

REVIEWED BY: Allen W. Vaughan  
TITLE: Entomologist  
ORG: EEB/HED  
LOC/TEL: Crystal Square #4/ 75641

SIGNATURE: *Allen W. Vaughan*

DATE: 7-31-81

APPROVED BY:  
TITLE:  
ORG:  
LOC/TEL:

SIGNATURE:

DATE:

Information provided is insufficient to complete the evaluation.