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


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$_{50}$ 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$_{50}$ 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 10/15/83
Entomologist
Ecological Effects Branch

Norman Cook 12/15/83
RD Coordinator
Ecological Effects Branch

Clayton Bushong
Chief
Ecological Effects Branch
FORMULATION 12 - EMULSIFIABLE CONCENTRATE (EC C6 E)

1. **CHEMICAL:** Multiple chemicals. See appendix.

2. **FORMULATION:** Multiple formulations. See appendix.


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 cyclosulfyn. 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>
<thead>
<tr>
<th>Treatment</th>
<th>Rate</th>
<th>Juvenile Aphytis</th>
<th>Adult Aphytis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p.p.m.</td>
<td>%</td>
<td>Live Aphytis</td>
</tr>
<tr>
<td>nitrold</td>
<td>---</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>nitrold</td>
<td>---</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>phosph-methyl</td>
<td>380</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>mazine</td>
<td>1070</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>nC nutrient</td>
<td>---</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>reaexx mixture</td>
<td>---</td>
<td>99.8</td>
<td>L</td>
</tr>
<tr>
<td>piper oxochloride</td>
<td>880</td>
<td>99.7</td>
<td>L</td>
</tr>
<tr>
<td>ter</td>
<td>---</td>
<td>99.6</td>
<td>L</td>
</tr>
<tr>
<td>bberolic acid</td>
<td>59.4</td>
<td>99.6</td>
<td>L</td>
</tr>
<tr>
<td>uron</td>
<td>2400</td>
<td>98.6</td>
<td>L</td>
</tr>
<tr>
<td>dropene</td>
<td>530</td>
<td>97.6</td>
<td>L ‡</td>
</tr>
<tr>
<td>lapon + surfactant</td>
<td>20170</td>
<td>90.4</td>
<td>L</td>
</tr>
<tr>
<td>ole oil B</td>
<td>20000</td>
<td>61.7</td>
<td>H</td>
</tr>
<tr>
<td>olate oil B</td>
<td>10000</td>
<td>53.9</td>
<td>H</td>
</tr>
<tr>
<td>olate oil A</td>
<td>10000</td>
<td>46.0</td>
<td>H</td>
</tr>
<tr>
<td>rfactant</td>
<td>56.4</td>
<td>39.7</td>
<td>H</td>
</tr>
<tr>
<td>dosan</td>
<td>658</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>ter</td>
<td>---</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>thuringiensis + surfactant</td>
<td>3760</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>rimicarb</td>
<td>300</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>hexatin</td>
<td>1880</td>
<td>100.0</td>
<td>nil</td>
</tr>
<tr>
<td>closulfynye</td>
<td>300</td>
<td>99.1</td>
<td>L</td>
</tr>
<tr>
<td>rfactant</td>
<td>56.4</td>
<td>98.9</td>
<td>L</td>
</tr>
<tr>
<td>omacil</td>
<td>4000</td>
<td>97.5</td>
<td>L</td>
</tr>
<tr>
<td>rathion</td>
<td>328</td>
<td>84.5</td>
<td>M ‡</td>
</tr>
<tr>
<td>lidson + surfactant</td>
<td>1000</td>
<td>55.2</td>
<td>H</td>
</tr>
<tr>
<td>olate oil A</td>
<td>20000</td>
<td>45.1</td>
<td>H</td>
</tr>
</tbody>
</table>

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.
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

Cyclosulfonyne 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).
Ishibashi, N.; Muraoka, M.; Kondo, E.; Yamasaki, H.; Kai, H.;
josozai no renyo ga senchu, dani, nado ni oyo su eikyo;
Effect of annual application of herbicides on nematodes, soil
mites, and springtails in satsuma mandarin orchards. Saga
Dai-gaku Negaku Iho. Agricultural Bulletin of the Saga
University, 1 (44): 43-55.

SUBST. CLASS = M; OTHER CHEMS: 061601
DIRECT REVW 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
SIGNATURE: Allen W. Vaughan DATE: 7-30-81

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.
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$_{50}$ values, slope values, and toxicity categories.

Statistical Analysis

Analysis of the data was performed to enable the authors to determine LD$_{50}$ values of pesticides from either dosage-mortality curves or from LC$_{50}$ values. The slope value was also obtained from the dosage-mortality curve.
<table>
<thead>
<tr>
<th>Pesticide</th>
<th>ug/bee</th>
<th>LD value</th>
<th>Slope value</th>
<th>Type of Activity 1/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trefmid\textsuperscript{®} (trifluralin, 50% + diphenamid, 3.1%)</td>
<td>120.86/7.49</td>
<td>2.7</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>cacodylic acid (Phytar\textsuperscript{®})</td>
<td>157.12</td>
<td>5.6</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Dikar\textsuperscript{®} (Dithane M-45\textsuperscript{®}, 74% + Karathane\textsuperscript{®}, 6%)</td>
<td>178.87/15.03</td>
<td>14.6</td>
<td>F, A</td>
<td></td>
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<tr>
<td>Vitavax\textsuperscript{®} (D-735)</td>
<td>181.29</td>
<td>2.0</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>dithianon (Thyon\textsuperscript{®})</td>
<td>181.29</td>
<td>2.1</td>
<td>F</td>
<td></td>
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<tr>
<td>RH-315</td>
<td>181.29</td>
<td>4.9</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Plantvax\textsuperscript{®} (F 461)</td>
<td>181.29</td>
<td>5.9</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="bromacil (Hyvar\textsuperscript{®}-X)" /></td>
<td>193.38</td>
<td>1.2</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>terbacil (Sinbar\textsuperscript{®})</td>
<td>193.38</td>
<td>2.4</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>pyramin (PCA, Pyrazon\textsuperscript{®})</td>
<td>193.38</td>
<td>3.3</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>fluometuron (Cotoran\textsuperscript{®})</td>
<td>193.38</td>
<td>3.8</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Tandex\textsuperscript{®} (NIA-11092)</td>
<td>193.38</td>
<td>8.5</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Alar\textsuperscript{®}</td>
<td>205.46</td>
<td>5.8</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>methar (DSMA, Ansar\textsuperscript{®} 184)</td>
<td>217.55</td>
<td>9.8</td>
<td>H</td>
<td></td>
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<tr>
<td>DCPA-T (DCPA)</td>
<td>229.63</td>
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<td>H</td>
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<td>GS-14254</td>
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<td>GS-16068</td>
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<td>6.2</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>GS-14260</td>
<td>236.40</td>
<td>2.9</td>
<td>H</td>
<td></td>
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<tr>
<td>MCPB sodium salt (Can-Trol\textsuperscript{®}, Thistrol\textsuperscript{®})</td>
<td>238.58</td>
<td>3.2</td>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>
DATA EVALUATION RECORD

CHEMICAL: BROMACIL

BRANCH: EEB

FICHE/MASTER ID NUMBER: 00018842


TITLE: Riverside Project No. 1499, Ann. Report

DIRECT REVW 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 1/75641

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.
DATA EVALUATION RECORD
CHEMICAL: BROMACIL

BRANCH: EEB/HED

FICHE/MASTER ID NUMBER: 0009181


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


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.