194472
RECORD NO.

~~106201~~ 29047
SHAUGHNESSEY NO.

REVIEW NO.

EEB REVIEW

DATE: IN 9-24-90 OUT JAN 14 1991

FILE OR REG. NO. 000100-EUP-092

PETITION OR EXP. NO.

DATE OF SUBMISSION

DATE RECEIVED BY EFED 9-11-90

RD REQUESTED COMPLETION DATE 11-30-90

EEB ESTIMATED COMPLETION DATE 11-30-90

RD ACTION CODE/TYPE OF REVIEW 202

TYPE PRODUCT(S) growth regulator

DATA ACCESSION NOS. 415639-01,-02,-03,-04,-05,-06 and-28

PRODUCT MANAGER NO. Steven Robbins (23)

PRODUCT NAME(S) CGA -163935 PRIMO/VISION TURF GROWTH REGULATOR

COMPANY NAME CIBA-GEIGY

SUBMISSION PURPOSE Proposed EUP for used on 4000 acres of for 27 states for 2 years

SHAUGHNESSEY NO.	CHEMICAL AND FORMULATION	% AI
129047	CGA 163935	22.8%

EEB REVIEW

Chemical: CGA163935 Product: PRIMO OR VISION TURF GROWTH REGULATOR

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

(Excerpted from submission)

"1991 - Research EUP

1. The program will evaluate the efficacy of CGA-163935 in large plot tests on various turfgrasses throughout the United States. The tests will evaluate turfgrass tolerances to CGA-163935, susceptibility to environmental factors and pests, and the duration of growth retardation.

2. The large plot tests will evaluate the efficacy of CGA-163935 applied by commercial application equipment used in the turf industry.

3. The program will train CIBA-GEIGY research personnel on the performance of CGA-163935 under typical use conditions.

1992 - Sales/Marketing EUP

1. The second year program will continue to evaluate the efficacy of CGA-163935 in a broader array of tests which will collect information on turfgrass tolerance to CGA-163935, susceptibility to environmental factors and pests , duration of growth retardation, and capability of commercial application equipment.

2. The program will extend training of CGA-163935's uses and performance to sales and marketing personnel in CIBA-GEIGY."

100.2 Formulation Information

(Excerpted from supplemental labeling)

"Active Ingredient:
4-(cyclopropyl-a-hydroxy-methylene)-
3,5-dioxo-cyclohexanecarboxylic acid ethyl ester..22.8%

"Primo or Vision are emulsifiable concentrates containing 2 lbs. active ingredient per gallon."

100.3 Application Methods, Directions, Rates

(See attached proposed EUP labeling)

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100.4 Target Organism

(See attached proposed EUP labeling)

100.5 Precautionary Labeling

(Excerpted from supplemental labeling)

"Environmental Hazards
Do not apply directly to lakes, streams, ponds. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water when disposing of equipment wash water."

101. Risk Assessment

101.1 Discussion

101.2 Likelihood of Adverse Effects on Nontarget Organisms

Mammalian Species

No data available on mammalian species.

Avian Species

The avian data indicates low toxicity. The bobwhite quail LD_{50} was >2000 mg/kg or practically nontoxic. The lowest dietary LC_{50} was for the bobwhite quail of >5200 ppm which also indicates a practically nontoxic chemical. Therefore the potential for adverse effects is minimal.

Aquatic Species

Supplemental aquatic organisms data indicates minimal potential for adverse effects. These studies show that in a static renewal test with the addition of sodium hydroxide that CGA-163935 is practically nontoxic to all three of the basic test species. Without the addition of the sodium hydroxide however the pH may have dropped significantly increasing the likelihood of adverse effects. The EEC for a 1 A. pond (ave. depth of 6') with a 10 A is 27.5 ppb. The lowest LC_{50} for any for the three tests is 65700 ppb with rainbow trout. This is approximately 2400 times the EEC value.

101.3 Endangered Species Considerations

Available data indicate that minimal adverse effects are expected to animal species. However, CGA-163935 is a plant growth regulator and endangered plants may be at risk. To determine if any endangered species are in the treated areas EEB must know the location of each test site.

101.4 Adequacy of Toxicity Data

Due to questions concerning the effects of sodium hydroxide on the toxicity of the submitted aquatic studies additional information on the following three studies has been requested. Upon reviewing this information EEB will decide if additional studies are needed.

72-1 Freshwater fish 96-hour LC_{50} on one warmwater and one coldwater species

72-2 Freshwater invertebrate 48-hour LC_{50}

Additional studies may be required based on the information requested in connection with these tests.

102 Adequacy of Labeling

The submitted labeling is as follows:

"Environmental Hazards
Do not apply directly to lakes, streams, ponds. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water when disposing of equipment wash water."

Based on the guidelines the Environmental Hazard section is required to bear the following:

Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water when disposing of equipment washwater.

103 Conclusions

EEB has reviewed the proposed EUP of CGA-163935 for use on turf. Based on the available data, endangered species plant species may be at risk. Therefore the location of each test plot is necessary to determine if the plot and surrounding area have any endangered plant species before the EEB review can be completed.

The labeling should bear the following Environmental Hazards statement, "Do not apply directly to water or swamps, bogs, marshes, and potholes.", rather than, "Do not apply directly to lakes, streams, ponds."

Dennis J. McLane, Wildlife Biologist
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)
Date: 12-26-90

Les Touart, Acting Head, Section 1
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)
Date: 1-7-91

James W. Akerman, Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)
Date: 1/8/91

DATA EVALUATION RECORD

1. CHEMICAL: 4-(cyclopropyl-a-hydroxy-methylene)-3,5-dioxo-cyclohexanecarboxylic acid ethyl ester

2. TEST MATERIAL: CGA 163935 96.6%

3. STUDY TYPE Acute Oral Toxicity (LD50) to the Mallard Duck

4. STUDY IDENTIFICATION

Hakin, B. Rogers, M., 1989. Acute Oral Toxicity (LD50) of CGA-163935 to the Mallard Duck, Laboratory Report No. CBG 479/89145, Conducted by Huntingdon Research Centre, Ltd., Ciba-Geigy Corporation, post office box 18300, Greensboro, NC 27419, MRID No. 415639-01

5. REVIEW BY:

Dennis J. McLane
Wildlife Biologist
Ecological Effects Branch/EFED

Signature: Dennis McLane
Date: 12-14-90

6. Les Touart
Acting Section Head
Ecological Effects Branch/EFED

Signature: Les Touart
Date: 12-26-90

7. CONCLUSION:

This study meets the guideline requirements. The mallard duck LD_{50} is greater than 2000 mg/kg which would place this compound in the practically nontoxic range.

8. RECOMMENDATION:

N/A

9. BACKGROUND

This and 6 other studies (6 basic + 1 honeybee studies) were submitted in connection with a request for an EUP with Primo/Vision Turf Growth Regulator in 27 states.

10. DISCUSSION OF INDIVIDUAL TEST: - N/A

11. MATERIALS AND METHODS:

A. Species- Anas platyrhynchos

Source- The County Game Farms, Ashford, Kent, England.

Weight- On Day 0 group mean weights ranged from 74 to 63 grams.

Age- 11 months old at the start of the study

B. Dose- 1 control level and 3 treatment levels:500 mg/kg, 1000 mg/kg, 2000 mg/kg.

C. Design- 10 animals per level; 3 dose levels

D. Statistics- N/A

12. REPORTED RESULTS (excerpted from citation)

"During Days 1 and 2 birds in Group 4 (CGA 163935 at 2000 mg/kg) were quiet, recovering by Day 3. There were no other clinical signs of toxicity in any bird following dosing and all birds remained in good health throughout the study.

"There were no mortalities. Therefore it was not possible to calculated the LD_{50} of CGA 163935 to the Mallard duck. This value must lie in excess of 2000 mg/kg, the maximum dose level used."

13. STUDY AUTHOR'S CONCLUSION/QA MEASURES

HRC provided their schedule for quality assurance inspections which indicated an inspection initial 28-6-89 and audit of the final report (5-10-89).

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14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY

A. Test Procedures:

The following items did not follow the guidelines:

1. The report did not indicate that the test birds were all from the same hatch.

2. Four rather than 5 dosage levels were used.

3. The birds were not randomly assigned to the test group. "The birds were allocated to four treatment groups on the basis of bodyweight, with the aim of all treatment groups having similar initial bodyweight means."

4. The photoperiod was 7 hours light and 17 dark rather than 10 light and 14 dark.

B. Statistical Analysis:

N/A

C. Discussion Result:

The study established that the LD_{50} is greater than 2000 mg/kg. Therefore the lack of 5 dosage groups is allowed by the guidelines. The remaining problems are not expected to change the toxicity value significantly.

D. Adequacy of Study

1. Category: Core

2. Rationale: N/A

3. Repair: N/A

15. COMPLETION OF ONE-LINER FOR STUDY yes

16. CBI APPENDIX

N/A

DATA EVALUATION RECORD

1. CHEMICAL: 4-(cyclopropyl-a-hydroxy-methylene)-3,5-dioxo-cyclohexanecarboxylic acid ethyl ester

2. TEST MATERIAL: CGA 163935 96.6%

3. STUDY TYPE Dietary Toxicity (LC50) for the Bobwhite Quail

4. STUDY IDENTIFICATION

Hakin, B., Norman, A.J., Anderson, A., Dawe, I.S., 1989. The Dietary Toxicity (LC50) of CGA-163935 to the Bobwhite Quail, Laboratory Report No. CBG 478/89284, Conducted by Huntingdon Research Centre, Ltd.,England, For Ciba-Geigy Corporation, post office box 18300, Greensboro, NC 27419, MRID No. 415639-02

5. REVIEW BY:

Dennis J. McLane
Wildlife Biologist
Ecological Effects Branch/EFED

Signature: Dennis McLane
Date: 12-26-90

6. Les Touart
Acting Section Head
Ecological Effects Branch/EFED

Signature: L T
Date: 1-7-91

7. CONCLUSION:

This study is scientifically sound and meets the guidelines requirements. The LC50 greater than 5200 ppm indicates that this pesticide is practically nontoxic to bobwhite quail.

8. RECOMMENDATION:

N/A

9. BACKGROUND

This and 6 other studies (6 basic + 1 honeybee studies) were submitted in connection with a request for an EUP with Primo/Vision Turf Growth Regulator in 27 states.

10. DISCUSSION OF INDIVIDUAL TEST: - N/A

11. MATERIALS AND METHODS:

A. Species- Colinus virginianus

Source- The County Game Farms, Ashford, Kent, England.

Weight- On Day 0 group mean weights ranged from 18.8 g to 22.3 g.

Age-14 days prior to the start of treatment

B. Dose- 3 control level and 6 treatment levels: 163, 325, 650, 1300, 2600, and 5200 ppm.

C. Design- 10 animals per level; 6 dose levels

D. Statistics-N/A

12. REPORTED RESULTS (excerpted from citation)

"All surviving birds remained in good health throughout the study and showed no clinical signs of toxicity."

"A total of two mortalities occurred: on Day 4, one bird died in each of Group 1 (Control) and 5 (CGA 163935 at 325 ppm)".

"Under the conditions of this study, it was not possible to determine an LC_{50} value for CGA 163935 to the Bobwhite quail. This value must lie in excess of 5200 ppm, the maximum dose level used."

13. STUDY AUTHOR'S CONCLUSION/QA MEASURES

HRC provided their schedule for quality assurance inspections which indicated an inspection initial 9-2-89 and audit of the final report (18- 7-89).

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY

A. Test Procedures:

The following items did not follow the guidelines: the brooder temperature ranged between 19-24 rather than the 35 as indicated in the guidelines and "The birds were allocated at random to treatment groups on the basis of bodyweight with the aim of achieving similar initial bodyweights means in all groups."

B. Statistical Analysis:

N/A

C. Discussion Result:

The items mentioned in Part A above are not expected to change the toxicity category for this compound to the extent that risk assessment would be affected.

D. Adequacy of Study

1. Category: Core

2. Rationale: N/A

3. Repair: N/A

15. COMPLETION OF ONE-LINER FOR STUDY yes

16. CBI APPENDIX

N/A

DATA EVALUATION RECORD

1. CHEMICAL: 4-(cyclopropyl-a-hydroxy-methylene)-3,5-dioxo-cyclohexanecarboxylic acid ethyl ester

2. TEST MATERIAL: CGA 163935 96.6%

3. STUDY TYPE Dietary Toxicity (LC50) for the Mallard Duck

4. STUDY IDENTIFICATION

Hakin, B., Rogers, M., Norman, A.J., Anderson,A., Dawe, I.S. 1989. The Dietary Toxicity (LC50) of CGA-163935 to the Mallard Duck, Laboratory Report No. CBG 477/891195, Conducted by Huntingdon Research Centre, Ltd.,England, For Ciba-Geigy Corporation,post office box 18300, Greensboro, NC 27419, MRID No. 415639-03

5. REVIEW BY:

Dennis J. McLane
Wildlife Biologist
Ecological Effects Branch/EFED

Signature: Dennis McLane
Date: 12-26-90

6. Les Touart
Acting Section Head
Ecological Effects Branch/EFED

Signature:
Date: L. Touart 1-7-91

7. CONCLUSION:

This study is scientifically sound and meets the guidelines requirements. The LC50 greater than 5200 ppm indicates that this pesticide is practically nontoxic to mallard ducks.

8. RECOMMENDATION:

N/A

9. BACKGROUND

This and 6 other studies (6 basic + 1 honeybee studies) were submitted in connection with a request for an EUP with Primo/Vision Turf Growth Regulator in 27 states.

10. DISCUSSION OF INDIVIDUAL TEST: - N/A

11. MATERIALS AND METHODS:

A. Species- Anas platyrhynchos

Source- The County Game Farms, Ashford, Kent, England.

Weight- On Day 0 group mean weights ranged from 1004 g to 1091 g.

Age- 6 days prior to the start of treatment

B. Dose- 3 control level and 6 treatment levels: 163, 325, 650, 1300, 2600, and 5200 ppm.

C. Design- 10 animals per level; 6 dose levels

D. Statistics- No mortalities occurred. Hence, no statistical interpretation was necessary.

12. REPORTED RESULTS (excerpted from citation)

"On Day -1, Bird 90d Pink (Group 1 - control) was found dead and was immediately replaced by spare Bird 20E Blue.

"On Day 1, one mortality occurred in Group 8 (CGA 163935 at 2600 ppm).

"No further mortalities occurred. It was therefore not possible to calculate an LC_{50} value for CGA 163935 to the Mallard duck, which must lie in excess of 5200 ppm, the maximum dose level used."

13. STUDY AUTHOR'S CONCLUSION/QA MEASURES

HRC provided their schedule for quality assurance inspections which indicated an inspection initial 18-1-89 and audit of the final report (11-10-89).

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY

A. Test Procedures:

The following items did not follow the guidelines:

1. The brooder temperature ranged between 28-31 rather than the 35 as indicated in the guidelines.

2. The amount of corn oil used was not indicated.

B. Statistical Analysis:

Statistical analysis was not needed since no mortality occurred.

C. Discussion Result:

The problems mentioned in Part A above are not expected to change the toxicity category for this compound to the extent that risk assessment would be affected.

D. Adequacy of Study

1. Category: Core

2. Rationale: N/A

3. Repair: N/A

15. COMPLETION OF ONE-LINER FOR STUDY yes

16. CBI APPENDIX

N/A

DATA EVALUATION RECORD

1. CHEMICAL: 4-(cyclopropyl-a-hydroxy-methylene)-3,5-dioxo-cyclohexanecarboxylic acid ethyl ester

2. TEST MATERIAL: CGA 163935 96.6%

3. STUDY TYPE Static renewal acute 96-hour toxicity of CGA-163935 to Bluegill Sunfish

4. STUDY IDENTIFICATION

Smith, G.J., Yancey, M.F., Pate, H.O., Martin, D.L., 1990. Static Renewal Acute 96-Hour Toxicity of CGA-163935 to Bluegill Sunfish. Conducted by Battelle Columbus Division, Columbus, Ohio 43201-2693, Laboratory Report No. SC900020, Agricultural Division, Ciba-Geigy Corporation, Post Office Box 18300, Greensboro, NC 27419, MRID No. 415639-04

5. REVIEW BY:

Dennis J. McLane
Wildlife Biologist
Ecological Effects Branch/EFED

Signature: Dennis J. McLane
Date: 12-14-90

6. Les Touart
Acting Section Head
Ecological Effects Branch/EFED

Signature: L. Touart
Date: 12-26-90

7. CONCLUSION:

This study does not meet the guidelines requirements.

8. RECOMMENDATION:

Submit the following items for a potential upgrade of the study.

1. An explanation which quantifies how the CGA-163935 produces lower dissolved oxygen concentrations. Also address any effects on fish respiration.

2. Report the pH at each test level before the sodium hydroxide was added and the amount of sodium hydroxide needed to raise the pH to 7 for each, as well as, the pKa (disassociation constant) of the test compound.

3. Explain the use of a solvent with a water soluble material.

9. BACKGROUND

This and 6 other studies (6 basic + 1 honeybee studies) were submitted in connection with a request for an EUP with Primo/Vision Turf Growth Regulator in 27 states.

10. DISCUSSION OF INDIVIDUAL TEST: - N/A

11. MATERIALS AND METHODS:

A. Species- Lepomis macrochirus

Source- Osage Catfisheries, Osage Beach, Missouri

Size- range 0.53 to 0.99 g with a mean of 0.74 g.

B. Dose- 1 control level, 1 solvent control (0.5 ml/L acetone), and 5 treatment levels: 18, 30, 50, 84, and 140 mg/L.

C. Design- 20 animals per level; 5 dose levels

D. Statistics-N/A

12. REPORTED RESULTS (excerpted from citation)

"Observations of mortalities and the symptoms of toxicity are reported in Table 2. The general symptoms of toxicity noted in this study were immobilization and sluggish reaction to stimuli."

"The LC_{50} values and 95 percent confidence intervals are shown below as mg of CGA-163935 per liter based on corrected mean measured concentrations."

" TIME	EC50	95%CONFIDENCE INTERVAL	CALCULATION METHOD
96 hour	>130.1 mg/L	Not Applicable	Not applicable"

13. STUDY AUTHOR'S CONCLUSION/QA MEASURES

Page 6 of the study reports the dates of inspect, a statement that the data has been accurately represented and signature of the Quality Assurance Officer

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY

A. Test Procedures:

The following items did not follow the guidelines:

1. The dissolved oxygen level at the 140 mg/L after 24 hours (old solution) was 4.8 mg/L and 4.5 mg/L after 48 hours (old solution). (4.8 mg/L is 56% saturation and 4.5 mg/L is 53% saturation).

2. "The temperatures in replicates A and B of the 18 mg/L nominal concentration and replicate A of the 30 mg/L nominal concentration were 20.7, 20.6, and 20.7°C, respectively."

3. The mean total hardness level was 62.3 mg/L.

4. Sodium hydroxide was added to the 50, 84 and 140 mg/L levels to raise their pH value.

5. The solvent acetone was used, however, the water solubility is 27,000 mg/L.

B. Statistical Analysis:

N/A

C. Discussion Result:

The material appears to effect the water chemistry in two ways. It lowers the amount of oxygen in the water and the pH. As a result the study protocol was changed to adapt to these characteristics. Static renewal procedure was used to address potential for low dissolved oxygen, and the pH was buffered by adding sodium hydroxide. The toxicity of the compound can be affected by the pH of the test solution (Rand and Petrocelli,1985). The presence of sodium hydroxide can not always be assured in nature. In addition the water solubility of 27,000 mg/L is sufficient for the highest level tested 140 mg/L, however, acetone was used as a solvent. The study does not provide enough information for the EEB to decide if these changes are appropriate.

D. Adequacy of Study

1. Category: Supplemental

2. Rationale: The toxicity of the compound and sodium hydroxide were determined, not the toxicity of compound. The static renewal method was used rather than the static method but not fully explained as to why it was needed. The use of a solvent when it apparently not necessary.

3. Repair:

In order to change the category of this study Ecological Effects Branch needs the following information:

1. An explanation which will allow EEB to quantify the lower dissolved oxygen concentration produced by CGA163935. Also address any effects on fish respiration.

2. Report the pH at each test level before the sodium hydroxide was added and the amount of sodium hydroxide needed to raise the pH to 7 each level as well as the pKa (disassociation constant) of the test compound.

3. Explain why a solvent was necessary with a water soluble material.

15. COMPLETION OF ONE-LINER FOR STUDY yes

16. CBI APPENDIX

N/A

17. References

Rand, G.M.,and S. R. Petrocelli (eds) Fundamentals of Aquatic Toxicology. Hemisphere Publishing Corporation

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DATA EVALUATION RECORD

1. CHEMICAL: 4-(cyclopropyl-a-hydroxy-methylene)-3,5-dioxo-cyclohexanecarboxylic acid ethyl ester

2. TEST MATERIAL: CGA 163935 96.6%

3. STUDY TYPE Static renewal acute 96-hour toxicity of CGA-163935 to Rainbow Trout

4. STUDY IDENTIFICATION

Smith, G.J., Yancey, M.F., Pate, H.O., Martin, D.L., 1990. Static Renewal Acute 96-Hour Toxicity of CGA-163935 to Rainbow Trout. Conducted by Battelle Columbus Division, Columbus, Ohio 43201-2693, Laboratory Report No. SC900019, Agricultural Division, Ciba-Geigy Corporation, Post Office Box 18300, Greensboro, NC 27419, MRID No. 415639-05

5. REVIEW BY:

Dennis J. McLane
Wildlife Biologist
Ecological Effects Branch/EFED

Signature: Dennis McLane
Date: 12-14-90

6. Les Touart
Acting Section Head
Ecological Effects Branch/EFED

Signature: L. Touart
Date: 12-26-90

7. CONCLUSION:

This study does not meet the guidelines requirements. The information described under the following heading is needed to determine the adequacy of the study.

8. RECOMMENDATION:

Submit the following items for a potential upgrade of the study.

1. An explanation which will allow EEB to quantify the lower dissolved oxygen concentrations produced by CGA 163935. Also does CGA 163935 cause abnormally high respiration?

2. Report the pH at each test level before the sodium hydroxide was added and the amount of sodium hydroxide needed to raise the pH to 7; as well as, the pKa (disassociation constant) of the test compound.

3. Explain why a solvent was necessary with a water soluble material.

9. BACKGROUND

This and 6 other studies (6 basic + 1 honeybee studies) were submitted in connection with a request for an EUP with Primo/Vision Turf Growth Regulator in 27 states.

10. DISCUSSION OF INDIVIDUAL TEST: - N/A
11. MATERIALS AND METHODS:

A. Species- Salmo gairdneri

Source- The Trout Lodge, McMillin, Washington

Size- range 0.48 to 0.84 g with a mean of 0.73 g.

B. Dose- 1 control level, 1 solvent control (0.5 ml/L acetone), and 5 treatment levels: 18, 30, 50, 84, and 140 mg/L.

C. Design- 20 animals per level; 5 dose levels

D. Statistics- Probit available on the TOXSTAT computer program; Peltier, W.H., and C.I. Weber (eds). 1985. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. Third edition. EPA-600/4-85-013. Environmental Monitoring and Support Laboratory. U. S. Environmental Protection Agency, Cincinnati, Ohio. 231pp.

12. REPORTED RESULTS (excerpted from citation)

"Observations of mortalities and the symptoms of toxicity are reported in Table 2. The general symptoms of toxicity noted in this study were immobilization erratic swimming and sluggish reaction to stimuli."

"The LC_{50} values and 95 percent confidence intervals are shown below as mg of CGA-163935 per liter based on corrected mean measured concentrations.

" TIME	EC50	95%CONFIDENCE INTERVAL	CALCULATION METHOD
24 hour	109.4 mg/L	94.5 to 130.4	Probit
48 hour	92.0 mg/L	79.9 to 106.1	Probit
72 hour	84.4 mg/L	73.3 to 97.5	Probit
96 hour	68.0 mg/L	58.6 to 79.0	Probit"

13. STUDY AUTHOR'S CONCLUSION/QA MEASURES

Page 7 of the study reports the dates of inspect, a statement that the data has been accurately represented and signature of the Quality Assurance Officer

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY

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A. Test Procedures:

The following items did not follow the guidelines:

1. The mean total hardness level of 66.9 mg/L.

2. Sodium hydroxide was added to the 18, 30, 50, 84 and 140 mg/L levels to raise their pH value.

3. "The pH of the 140 mg/L nominal test solution (old solution, replicate A) on Day 3 of the study was 6.9, which was outside the 7.0 to 8.0 pH range specified in the study specific protocol."

4. The solvent acetone was used, however, the water solubility is 27,000 mg/L.

B. Statistical Analysis:

The EEB TOXANAL probit value was 65.7 (56.6 and 76.3)mg/L.is in agreement with the reported values of 68 (58.6 and 79) mg/L.

C. Discussion Result:

The material appears to effect the water chemistry in two ways. It lowers the amount of oxygen in the water and the pH. As a result the study protocol was changed. Static renewal procedure was used to address the low dissolved oxygen, and the pH was buffered by adding sodium hydroxide. The toxicity of the compound can be affected by the pH of the test solution (Rand and Petrocelli,1985). The presence of sodium hydroxide can not always be assured in nature. In addition the water solubility of 27,000 mg/L is sufficient for the highest level tested 140 mg/L, however, acetone was used as a solvent. The study does not provide enough information for the EEB to decide if these changes are appropriate.

D. Adequacy of Study

1. Category: Supplemental

2. Rationale: The toxicity of the compound and sodium hydroxide were determined, not the toxicity of compound. The renewal method was used rather than the static method ~~was~~ but not fully explained as to why it was necessary. The use of solvent when it is apparently not necessary or explained.

3. Repair: To consider changing the category of this study Ecological Effects Branch (EEB) needs the following information:

1. An explanation which will allow EEB to quantify the lower dissolved oxygen concentrations produced by CGA 163935.

2. Report the pH at each test level before the sodium hydroxide was added and the amount of sodium hydroxide needed to raise the pH to 7 for each level as well as the pKa (disassociation constant) of the test compound.

3. Explain why a solvent was necessary with a water soluble material.

15. COMPLETION OF ONE-LINER FOR STUDY yes

16. CBI APPENDIX

N/A

17. References

Rand, G.M.,and S. R. Petrocelli (eds) Fundamentals of Aquatic Toxicology. Hemisphere Publishing Corporation

DATA EVALUATION RECORD

1. CHEMICAL: 4-(cyclopropyl-a-hydroxy-methylene)-3,5-dioxo-cyclohexanecarboxylic acid ethyl ester

2. TEST MATERIAL: CGA 163935 96.6%

3. STUDY TYPE Static renewal acute 48-hour toxicity of CGA-163935 to Daphnia magna.

4. STUDY IDENTIFICATION

Smith, G.J., Yancey, M.F., Johnson, M.V., and Martin, D.L., 1990. Static Renewal Acute 48-Hour Toxicity of CGA-163935 to Daphnia magna.Conducted by Battelle Columbus Division, Columbus, Ohio 43201-2693, Laboratory Report No. SC900018 Agricultural Division, Ciba-Geigy Corporation, Post Office Box 18300, Greensboro, NC 27419, MRID No. 415639-06

5. REVIEW BY:

Dennis J. McLane
Wildlife Biologist
Ecological Effects Branch/EFED

Signature: Dennis J. McLane
Date: 12-14-90

6. Les Touart
Acting Section Head
Ecological Effects Branch/EFED

Signature: L. Touart
Date: 12-26-90

7. CONCLUSION:

This study does not meet the guidelines requirements.

8. RECOMMENDATION:

Submit the following items for a potential upgrade of the study.

1. An explanation which will allow EEB to quantify the lower dissolved oxygen concentrations produced as a result of CGA 163935. Also does CGA 163935 cause abnormally high respiration?

2. Report the pH at each test level before the sodium hydroxide was added and the amount of sodium hydroxide needed to raise the pH to 7 ; as well as, the pKa (disassociation constant) of the test compound.

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3. Explain why a solvent was necessary with a water soluble material.

9. BACKGROUND

This and 6 other studies (6 basic + 1 honeybee studies) were submitted in connection with a request for an EUP with Primo/Vision Turf Growth Regulator in 27 states.

10. DISCUSSION OF INDIVIDUAL TEST: - N/A

11. MATERIALS AND METHODS:

A. Species- Daphnia magna

Source- Battelle's in=house cultures were originally obtained from U. S. EPA Environmental Research Laboratory, Duluth, MN.

Age- Young daphnids less than 24 hours old

B. Dose- 1 control level, 1 solvent control (0.5 ml/L acetone), and 5 treatment levels: 18, 30, 50, 84, and 140 mg/L.

C. Design- 20 animals per level; 5 dose levels

D. Statistics- N/A

12. REPORTED RESULTS (excerpted from citation)

"Observations of mortalities and the symptoms of toxicity are reported in Table 2. The general symptoms of toxicity noted in this study were immobilization, erratic swimming and floating on the surface of the water."

"The EC_{50} values and 95 percent confidence intervals are shown below as mg of CGA-163935 per liter."

"TIME METHOD	EC50	95%CONFIDENCE INTERVAL	CALCULATION
24 hour Applicable	>142.5 mg/L	Not Applicable	Not
48 hour applicable"	>142.5 mg/L	Not Applicable	Not

13. STUDY AUTHOR'S CONCLUSION/QA MEASURES

Page 7 of the study reports the dates of inspect, a statement that the data has been accurately represented and signature of the Quality Assurance Officer

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF THE STUDY

A. Test Procedures:

The following items did not follow the guidelines:

1. The mean total hardness level was 85.3 mg/L.

2. Sodium hydroxide was added to the 30, 50, 84 and 140 mg/L levels to raise their pH value.

3. The solvent acetone was used, however, the water solubility is 27,000 mg/L.

4. The loading factor grams of Daphnia per liters of test solution was not provided.

B. Statistical Analysis:

Statistical analysis was not needed because of the lack of mortality at any dose.

C. Discussion Result:

The material appears to effect the water chemistry in two ways. It lowers the amount of oxygen in the water and the pH. As a result the study protocol was changed. Static renewal procedure was used to address the low dissolved oxygen and the pH was buffered by adding sodium hydroxide. The toxicity of the compound can be affected by the pH of the test solution (Rand and Petrocelli,1985). In addition the water solubility of 27,000 mg/L is sufficient for the highest level tested 140 mg/L, however, acetone was used as a solvent. The study does not provide enough information for the EEB to decide if these changes are appropriate.

D. Adequacy of Study

1. Category: Supplemental

2. Rationale: The toxicity of the compound and sodium hydroxide were determined, not the toxicity of compound. The static renewal method was used rather than the static method, it was not fully explained as to why it was necessary. The use of solvent when it is apparently not necessary or explained.

3. Repair:

To consider changing the category of this study Ecological Effects Branch (EEB) needs the following information:

1. An explanation which will allow EEB to quantify the lower dissolved oxygen concentrations produced by CGA 163935. Also address any effects on fish respiration.

2. Report the pH at each test level before the sodium hydroxide was added and the amount of sodium hydroxide needed to raise the pH to 7 for each level as well as the pKa (disassociation constant) of the test compound.

3. Explain why a solvent was necessary with a water soluble material.

15. COMPLETION OF ONE-LINER FOR STUDY yes

16. CBI APPENDIX

N/A

17. References

Rand, G.M.,and S. R. Petrocelli (eds) Fundamentals of Aquatic Toxicology. Hemisphere Publishing Corporation

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DATA EVALUATION RECORD

1. Chemical: CGA-163935

2. Test Material: Technical, 96.2% ai

3. Study Type: Honey bee acute contact LD50

   Species tested: Apis mellifera

4. Study ID: Hoxter, K. 1990. CGA-163935 : An acute contact toxicity study with the honey bee. Wildlife International Ltd. Project No. 108-307. Submitted by Ciba Geigy Corp., Greensboro, NC. EPA Reg. No. 100-EUP-092. EPA Acc. No. 415639-28.

5. Reviewed By:

   Allen W. Vaughan
   Entomologist
   EEB/EFED

   Signature: Allen W. Vaughan
   Date: 10.9.90

6. Approved By

   Norman J. Cook
   Supervisory Biologist
   EEB/EFED

   Signature: Norman J. Cook
   Date: 10.9.90

7. Conclusions:

   This study is scientifically sound, and shows CGA-163935 to be practically nontoxic to honey bees. In an acute contact test, the LD50 was determined to be approximately 47 micrograms per bee. This study fulfills the guideline requirement for an acute contact toxicity test on honey bees.

8. Recommendations: N/A

9. Background: This study was submitted in support of an EUP for CGA-163935.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:

Apparently healthy worker bees, less than eight days of age, were used as test animals. Test chambers were rolled paper containers. Each container was covered with a plastic petri dish through which a glass vial containing 50% sugar water was inserted. This food source was available to the test bees throughout the study.

Test bees were maintained in the dark except during dosing and daily observations. Test temperatures ranged from 21 to 22° C.

Five treatment levels, 13, 22, 36, 60, and 100 micrograms per bee, were tested along with a solvent control and a negative control. Two replicates were tested at each dosage, with 25 bees per replicate. The solvent control bees received a volume of acetone equal to the largest volume used during the test.

Recently collected bees were immobilized with N_2 to facilitate handling. Each bee was individually dosed with the appropriate test solution. Solvent control bees were dosed with acetone.

Observations on mortality and signs of toxicity were made twice on the day of initiation and once on Day 1 and Day 2 after dosing.

An LD50 was calculated using the computer program of C.E. Stephan. For this study, probit analysis was used.

12. Reported Results:

The study author found that CGA-163935 was practically nontoxic to honey bees, with an LD50 of 47 ug per bee.

13. Study Authors' Conclusions/ QA Measures

48-hr. LD50 = 47 ug per bee (practically nontoxic).

14. Reviewer's Discussion and Interpretation of the Study

A. Test Procedures: Procedures were in accordance with protocols recommended in the guidelines. There were no problems in this regard.

B. Statistical Analysis: EEB validation showed that the analysis was appropriate and its results reflected the actual outcome of the study.

C. Discussion/Results: CGA-163935 is practically nontoxic to honey bees.

D. Adequacy of Study:

1. Classification: Core

2. Rationale: Guidelines protocol

3. Reparability: N/A

15. Completion of One-Liner for Study: N/A

16. CBI Appendix: N/A

NOTE: BECAUSE THERE WAS CONTROL MORTALITY, AND NONE OF THE LOWER CONCENTRATIONS PRODUCED ZERO MORTALITY, THE DATA HAS BEEN SUBJECTED TO ABBOTT'S CORRECTION.

VAUGHAN CGA-163935 Honey Bee Acute

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
100	43	32	74.4186	0
60	43	25	58.1395	0
36	43	8	18.6047	0
22	43	6	13.9535	0
13	50	5	10	0

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 54.31954

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	.131554	57.96707	48.51496	68.54117

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	ODNESS OF FIT PROBABILITY
3	7.316583E-02	1	.1342691

SLOPE = 2.430691
95 PERCENT CONFIDENCE LIMITS = 1.773209 AND 3.088173

LC50 = 57.28025
95 PERCENT CONFIDENCE LIMITS = 47.73971 AND 72.16213

LC10 = 17.19966
95 PERCENT CONFIDENCE LIMITS = 11.63375 AND 22.08042

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