Shaughnessy No. 121301

Date out of EFGWB: JUN 29 1989

TO: Stubbs/Asbury
Product Manager #41
Registration Division (H7505C)

FROM: Emil Regelman, Supervisory Chemist
Environmental Chemistry Review Section #2
Environmental Fate and Groundwater Branch/EFED (H7507C)

THRU: Hank Jacoby, Chief (Acting)
Environmental Fate and Groundwater Branch
Environmental Fate and Effects Division (H7507C)

Attached, please find the EFGWB review of:

Reg./File #: 100-ALA

Common Name: Cyromazine

Chemical Name: M-cyclopropyl-1, 3, 5-triazine-2, 4, 6-triamine

Product Name: Armor

Type of Product: Insecticide

Company Name: Ciba-Geigy Corporation

Date Received: 1/4/89 Action Code: 101

EFGWB #: 90250

Total Reviewing Time: 2.5

Deferrals to: _____ Ecological Effects Branch/EFED

_____ Science Integration & Policy Staff/EFED

_____ Non-Dietary Exposure Branch/HED

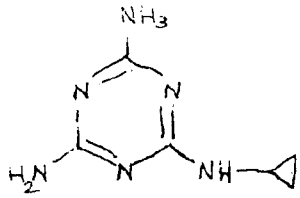
_____ Dietary Exposure Branch/HED

_____ Toxicology Branch I/HED

_____ Toxicology Branch II/HED

1. CHEMICAL:
Common Name: Cyromazine
Chemical Name: M-cyclopropyl-1, 3, 5-triazine-2, 4, 6-triamine
Trade Name: Armor
Type of Product: Insecticide

Chemical Structure:



2. TEST MATERIALS:
Not applicable.

3. STUDY/ACTION TYPE:
Waiver request for terrestrial field dissipation data to support the registration of cyromazine for use on mushrooms.

4. STUDY IDENTIFICATION:
Honeycutt RC. 1988. Additional information on the environmental fate of cyromazine in field soil amended with compost containing cyromazine.

5. REVIEWED BY:
Henry Nelson, Ph.D., Chemist
Environmental Chemistry Review Section #2
Environmental Fate and Groundwater Branch/EFED

H Nelson
Date: 6/27/89

6. APPROVED BY:
Emil Regelman, Supervisory Chemist
Environmental Chemistry Review Section #2
Environmental Fate and Groundwater Branch/EFED

Date: JUN 29 1989

7. CONCLUSIONS:

(1) The metabolism of cyromazine in soils with widely varying organic content has already been well studied. EFGWB believes that remaining questions concerning the mobility and possible accumulation of cyromazine and its major degradate melamine in soil resulting from continual annual application can best be answered by one or more multiple year application prospective groundwater studies rather than additional terrestrial field dissipation studies.

(2) Accumulation in rotational crops data are required to support the registration of Armor for use on mushroom compost because the treated compost is used to fertilize soil in which crops subject to rotation are grown.

8. RECOMMENDATIONS:

EFGWB recommends that the accumulation in rotational crop data requirement(s) be imposed, but the terrestrial field dissipation data requirement to support the use of Armor on mushrooms be waived. However, EFGWB continues to be concerned about the mobility and possible accumulation of cyromazine and particularly melamine in soil associated with all multiple year uses of cyromazine. Therefore, EFGWB recommends that the prospective groundwater study currently being planned to study the effects of cyromazine use on tomatoes in Florida be extended

to include the maximum label allowed annual application of cyromazine over a minimum of 3 consecutive years. Depending upon the results of the prospective groundwater study, EFGWB may also recommend that the study be extended to include applications over more than 3 years, that one or more additional prospective groundwater studies be run, and/or that one or more retrospective groundwater studies be conducted in areas where cyromazine has been used on lettuce for several years.

9. BACKGROUND

On 2/1/85, EFGWB (EFB #5101) did not concur with registering Armor for use on mushroom compost to control flies, because field dissipation data were not submitted. On 2/7/86, EFGWB (EAB #5571) reviewed calculations submitted by the registrant to show that a field terrestrial dissipation study in support of the registration of Armor for use on mushrooms was unnecessary. EFGWB did not concur with the submitted calculations nor the conclusions drawn from them by the registrant, and indicated that field dissipation data was still required. This review is of calculations and supporting data the registrant has re-submitted along with additional computations derived from the PRZM model to support their contention that field dissipation data are not needed to support the registration of Armor for use on mushroom composts.

On 6/6/89, P. Mastradone and C. Eiden met with the registrant. C. Eiden agreed that all remaining terrestrial field dissipation data requirements to support the registration of cyromazine on lettuce, celery, peppers, and tomatoes could be waived if the registrant agreed to conduct a prospective groundwater study on the effects of cyromazine use on tomatoes in Florida. A study on tomatoes in Florida is considered worst case for other crops (except possibly mushrooms) because most Florida tomatoes are grown in sandy soils over shallow unconfined aquifers. P. Mastrodone deferred a decision on whether to still require terrestrial field dissipation data to support registration of cyromazine on mushrooms to H. Nelson of EFGWB.

The available environmental data indicate that cyromazine and it's major degradate in soil (melamine) are persistent and mobile in soil. Therefore, they have a high potential for groundwater contamination.

10. DISCUSSION:

(1) The rotational crop data requirements were not discussed in previous reviews concerning the use of Armor on mushroom composts. However, the application of 10 tons of 5 ppm cyromazine/melamine contaminated mushroom composts to soil (as fertilizer) used to grow crops such as corn is comparable to the direct application of 0.1 lb ai/acre of cyromazine/melamine to the soil. Therefore, data on the accumulation of cyromazine/melamine in crops rotated with crops grown in soil amended with cyromazine/melamine contaminated mushroom compost are needed to derive rotational crop intervals.

(2) On 2/7/86, EFGWB (EAB #5571) rejected the registrant's waiver request for terrestrial field dissipation data to support the registration of Armor for use on mushroom compost for the following reasons:

(a) the registrant assumed a 10" incorporation depth instead of a 6" incorporation depth.

(b) the registrant assumed a 7 month half-life for cyromazine (observed in one soil) instead of the 16 month half-life observed for cyromazine observed in a soil/chicken manure mixture (EFGWB believes that the soil/chicken manure mixture may more closely resemble a soil/mushroom compost mixture than just soil).

(c) based upon the stability of cyromazine/melamine in soils, a build-up of cyromazine/melamine residues with repeated applications is possible.

(d) cyromazine/melamine appear to have high leaching potential

(3) In the resubmission, the registrant has assumed an incorporation depth of 6" for calculations. Also, one of the scenarios input into PRZM to model the effects of applying cyromazine treated mushroom compost to soil once a year for 5 straight years assumes a cyromazine half-life of 16 months.

(4) The data submitted by the registrant in this submission is essentially the same as previously submitted except for additional data from the Florida and Nebraska terrestrial field dissipation studies showing the effect of applying cyromazine a second time at the beginning of the second year of the study. The registrant claims that the second application at the beginning of the second year does not result in the build-up of residues. Although there is no build-up of cyromazine in any of the studies or in melamine in the Vera Beach FL study, there is substantial build-up of melamine in the Nebraska and South Bay FL studies. In the Nebraska study, melamine residues from 0" down to 18" depth totaled less than 1.4 ppm at 362 days after the first application of cyromazine at 5 lbs ai /acre. At 362 days after the second 5 lbs ai/acre application of cyromazine at the beginning of the second year, total melamine residues (at 0-18") had essentially doubled to 2.92 ppm. In the South Bay FL study, total melamine residues totaled 3.8 ppm 365 days after the first application and 6.9 ppm 364 days after the second application.

(5) PRZM was used to model the effects of applying ten tons/acre of 5 ppm cyromazine treated mushroom compost to soil for 5 consecutive years. However, several factors make the results of the modeling questionable. Cyromazine was assumed to be present in the mushroom compost at 5 ppm (which corresponds to the initial nominal concentration of cyromazine in the mushroom compost) when the compost is applied to the soil. However, a study the registrant submitted on the degradation of cyromazine, and formation/degradation of melamine in mushroom compost (Honeycutt 1985) indicates that most of the cyromazine applied to mushroom compost will have degraded to melamine by the time the

compost is applied to soil. In addition, neither scenario input into the PRZM model assumed a longer half-life for melamine than cyromazine despite data indicating that melamine is generally substantially more stable than cyromazine in soil. Finally, as the study authors indicate, PRZM is not designed to handle more than one chemical species so the cyromazine and melamine were modeled as total residues using average input values for the pair.

(6) The results of the PRZM model indicate that there will be some build-up of total cyromazine/melamine residues to a maximum of 1.8 ppb dissolved leaving the assumed 185 cm soil profile after 5 years under the worst of the 2 scenarios tested, but that the annual build-up rate decreases with each suceeding year. Continual decreases in the annual build-up rate should eventually lead to the establishment of a steady state. However, as previously pointed out, melamine was not assumed to be in the compost when it is applied to the soil, and no scenario in which the half-life of melamine was assumed to be much longer than that of cyromazine was input into the model. Therefore, the build-up of melamine may be worst than indicated by the model results.

(7) The metabolism of cyromazine in soils with widely varying organic content has already been well studied. EFGWB believes that remaining questions concerning the mobility and possible accumulation of cyromazine and its major degradate melamine in soil resulting from continual annual application can best be answered by one or more multiple application prospective groundwater studies rather than additional terrestrial field dissipation studies. Therefore, EFGWB recommends that the terrestrial field dissipation data requirement to support the use of cyromazine on mushrooms be waived. However, EFGWB continues to be concerned about the mobility and possible accumulation of cyromazine and particularly melamine in soil associated with all multiple year uses of cyromazine. Therefore, EFGWB recommends that the prospective groundwater study currently being planned to study the effects of cyromazine use on tomatoes in Florida be extended to include the maximum label allowed annual multiple application of cyromazine over a minimum of 3 consecutive years. Depending upon the results of the prospective groundwater study, EFGWB may also recommend that the study be extended to include applications over more than 3 years, that one or more additional prospective groundwater studies be run, and/or that one or more retrospective studies be conducted in areas where cyromazine has been used on lettuce for several years.

(8) The current status of environmental fate data requirements to support the registration of Armor for use on mushrooms is as follows assuming EFGWB's recommendations in this review are adopted:

(a) Satisfied:
161-1. Hydrolysis
161-2. Photodegradation in Water
161-3. Photodegradation on Soil
162-1. Aerobic Soil Metabolism
162-2. Anaerobic soil Metabolism

163-1. Leaching and Adsorption/Desorption
165-4. Laboratory Accumulation in Fish

(b) Not Satisfied
165-1. Confined Accumulation in Rotational Crops
Prospective Groundwater Study (Tomatoes in Florida)

(c) Reserved
165-2 Field Accumulation in Rotational Crops
Additional Prospective Groundwater study(ies)
Retrospective Groundwater Study(ies)

(d) Waived:
164-1. Terrestrial Field Dissipation
164-5 Long Term Terrestrial Field Dissipation

11. COMPLETION OF ONE-LINER:
Not applicable.

12. CBI INDEX:
Not applicable.