8-9-79

Date Out EFB:

To: Product Manager
TS-767
Jacoby (21)

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch

From: Review Section No. 1 RLCook
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 21137-4

Chemical: triforine N,N[1]-(1,4-piperazinedylbis[2,2,2-trichloroethylidene])
bis (formamide)]

Type Product: Fungicide

Product Name: Funginex EC

Company Name: EM Laboratories Inc.

Submission Purpose: ~~resubmission - blueberries and peaches~~

ZBB Code:

ZBB 111 B
Date in: 3/6/79

Date Completed: 8-9-79

Deferrals To:

☐ Ecological Effects Branch

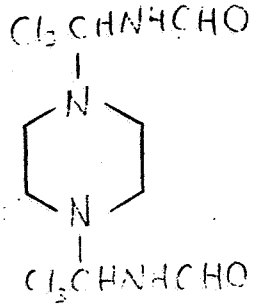
☐ Residue Chemistry Branch

☐ Toxicology Branch

1. INTRODUCTION

1.1 The registrant has resubmitted data in support of the proposed use of the fungicide triforine on blueberries and peaches. For a history of this submission, see the previous environmental fate reviews of 21137-4 (7F1921) dated October 18, 1977 and July 6, 1978 and of 21137-402 dated July 6, 1978.

1.2 Structure



1.3 The following volumes make up this submission - 237402, 097022 and 095812.

1.4 Another chemical name for triforine is N,N[1]-bis (1-formamido-2,2,2-trichloroethyl) piperazine.

2. Directions for use

2.1 Highbush blueberry - Apply 0.3 lb ai/A in 20-50 gallons water by ground or in 5 gallons water by air. Make first application at leaf bud break and repeat in 7-10 days at pink bud stage and repeat in 7-10 days at early bloom. For final application, apply 0.2 lb ai/A between full bloom and early petal fall. Do not make more than 5 applications from leaf bud break to early petal fall. The above directions are for Pacific and Mid-Western States. On the Eastern Seaboard States (for primary infection only) apply 0.3 lb ai/A by ground or air as a first application at leaf bud break and repeat in 7-10 days. Make the last application at pink bud stage. Do not apply more than 3 times from leaf bud break to pink bud stage.

2.2 Peaches - For full coverage ground sprays, apply 0.15-0.2 lb ai/A as a first application 2-3 weeks before harvest and repeat in 7-10 days. Apply the last spray just prior to harvest. Do not make more than 3 pre-harvest applications. In California, apply 0.15 lb ai/A as a full coverage ground spray 3 weeks before harvest and repeated 7-10 days later.

2.3 See previous review of 21137-4 (7F1921) dated October 18, 1977 for pesticide and container disposal (sections 2.3 and 2.4 on page 2).

2.4 Keep out of lakes, ponds and streams. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not graze animals in treated orchards.

3. DISCUSSION OF DATA

3.1 The Influence of Triforine on Selected Microbiological Processes in Soils, Domsch, K., Anderson, J. and Jagnow,G., acc. #237402

Procedure and methods

Three German soils, a parabrown soil (C_{total} = 1.26%, N_{total} = 0.12%, pH = 5.4) a chernosem (C_{total} = 2.3%, N_{total}=0.20%, pH = 7.5) and an organic compost, were sieved to 2 mm and used to determine the effects of triforine at 1 and 10 ppm in the soil, on nitrogen fixation, ammonification, starch degradation and cellulose degradation. Triforine as the EC dissolved in acetone was applied to the soils to fortify them.

(a) Anaerobic nitrogen fixation - Soil samples were supplemented with phosphate buffer (pH =7.2) containing trace elements, glucose, sodium molybdate and water resulting in 200% of the soils water capacity. Nitrogen fixation was monitored by incubation under nitrogen at 30 °C under light by the acetylene reduction method.

(b) Aerobic nitrogen fixation - Soil samples were supplemented with the nutrient solution used in the anaerobic test in (a) above and with a cell suspension of Azotobacter chroococcum (o.d. = 0.3 - 0.4 at 540 nm) incubated under light and 30 °C and monitored for nitrogen fixation by the acetylene reduction method.

(c) Ammonification - Soil samples were supplemented with gelatin - N to 0.1% (dry wt) in the soil and incubated at 22 °C. At sampling, the soil was extracted with acidic 0.1 N KCl and the NH_4^+ quantitated by the Berthelot reaction (ammonia plus sodium phenate plus sodium hypochlorite yields a blue indophenol complex).

(d) Soluble starch and cellulose degradation - Soils were treated with soluble starch at 2 mg starch/gm (dry wt) soil and an organic compost soil was treated with cellulose powder at 20 mg/g (dry wt). The soils were incubated in closed systems for 100 hours through which moist CO_2 -free air air was drawn carrying CO_2 into traps for analysis.

Results

1) There is no negative effect on soil nitrogen fixation under aerobic or anaerobic conditions at 1 ppm triforine in the soil. At 10 ppm, nitrogen fixation is inhibited for 7-14 days before recovery to normal levels.

2) There was no effect on soil ammonification at 1 or 10 ppm triforine.

3) There was no effect on the mineralization of soluble starch or cellulose.

Conclusions

At recommended use rates, no effect is expected on soil nitrogen fixation, ammonification or starch and cellulose mineralization.

4. CONCLUSIONS

4.1 At recommended use rates, no effect is expected on soil nitrification, ammonification or starch and cellulose mineralization. This information, plus the results from the previously reviewed study on the effects of triforine on soil microbes (see our evaluation of 21137 -4, 7F1921 dated October 18, 1977) shows triforine to have no effect on soil microbes at use rates and satisfies the requirement for an effects on microbes study.

4.2 An outstanding data requirement has been a field dissipation study. In a meeting with the registrant (November 30, 1977), it was stated that existing field dissipation studies conducted on German soils would be considered towards satisfying the data requirement if the registrant would show that the ratios between the soil bacteria, actinomycetes, fungi and algae in the German soils are comparable to those ratios in U.S. soils. Data on those ratios have not been submitted with the submissions received in response to that meeting.

However, since the effects on microbes data reviewed above shows triforine to have no effect on soil microbes and our August 19, 1975 review of 239-EUGL, page 5, states that triforine is degraded under aseptic conditions and also states on page 19 that the route of soil degradation is probably chemical rather than microbial, soil microbes can be considered as contributing negligibly towards the soil degradation of triforine. Also, the soil profiles of the German soils are comparable to the U.S. soils in the peach and blueberry growing regions.

Therefore, the comparative data requested on the German and U.S. soil microbes is no longer a prerequisite to accepting the German field dissipation data.

5. RECOMMENDATIONS

5.1 The fate of triforine is understood and the data support the the proposed use on peaches and blueberries.

5.2 Additional uses may require additional data.

Samuel M. Creeger
August 7, 1979
Review Section #1
Environmental Fate Branch