109702
SHAUGHNESSEY NO.

12
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 11-2-83 OUT 2/14/84

FILE OR REG. NO. 10182-AL

PETITION OR EXP. PERMIT NO.

DATE OF SUBMISSION 10-13-83

DATE RECEIVED BY HED 10-27-83

RD REQUESTED COMPLETION DATE 2-16-84

EEB ESTIMATED COMPLETION DATE 2/9/84

RD ACTION CODE/TYPE OF REVIEW 106/New Chemical

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

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. T. Gardner (17)

PRODUCT NAME(S) Cymbush 3E

COMPANY NAME ICI Americas, Inc.

SUBMISSION PURPOSE Proposed registration of pecans use

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

Pesticide Name: Cymbush 3E

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

Proposed registration for use in pecans

100.2 Formulation Information

Cypermethrin*	35.6%
Inert Ingredients	64.4%
	100.0%

*Cis/trans ratio 45/55 ± 10
Cymbush 3E contains 3 pounds active ingredient per gallon.

100.3 - 100.4 Application Methods, Directions, Rates, and Target Organisms.

Pest	lb ai/A (pints/A)
Hickory Shuckworm	0.06 - 0.10
Yellow Pecan Aphid	(6.16-0.27)
Black Pecan Aphid	
Pecan Nut Casebearer	

Apply by ground equipment using sufficient water to obtain uniform coverage. Can be applied up to shuck split. Do not exceed 8 applications per season.

100.5 Precautionary Labeling

ENVIRONMENTAL HAZARDS:

Do not contaminate water by cleaning of equipment or disposal of wastes. This product is toxic to fish. Do not apply directly to water. Do not apply when weather conditions favor drift from target area. Apply this product only as specified on this label.

101.1 Hazard Assessment

The use of cypermethrin for pecans is similar to a cotton application. The maximum application rate for pecans is 0.10 lb/A with a limit of 8 applications per season. Cypermethrin is not registered for cotton, but based using experimental use data, an application rate of 0.125 lb/A with 10 to 15 applications is not an unreasonable estimate. On this basis, field residue studies submitted to EFB can be used as a rough approximation of residues than can be expected.

The report that is of most concern is the study "'Cypermethrin Residue Samples from a 1980 Alabama Run-Off Study' Ussay, J. P. [I.C.I. Americas Inc. Report No. TMU 05411B Revised February 1981]." A cotton field was treated 16 times at 0.125 lb/A. There were the following collection sites: one from a rivulet running out of the field towards the stream, two were in small streams that run parallel to the cotton field, one at the confluence of the stream and Little Mulberry Creek, another two miles down stream, and lastly, one eight miles from the cotton field, one mile from the junction of Little Mulberry Creek and the Alabama River. The excerpted results are taken from the EFB review.

"Runoff Water

Runoff water including the suspended solids, collected from the rivulet running towards the test streams contained residues ranging from 1.17 to 12.7 ppb.

Sediment Samples

Sediment samples collected at the point the runoff entered the stream on 2 of 3 sampling dates each contained 2 ppb cypermethrin. The other samples contained no detectable residues at a limit of determination of 2 ppb. One sample collected 165 meters from the point of runoff had 2 ppb cypermethrin while samples collected at the same site on two other sampling days did not have detectable residues.

Water Samples

Water samples collected on three sampling dates from the stream at the point of runoff had 0.014 ppb to 0.094 ppb cypermethrin. Samples collected 165 meters downstream had cypermethrin concentrations ranging from less then 0.001 ppb to 0.024 ppb. Two miles downstream the residues ranged from less than 0.001 ppb to 0.013 ppb. Eight miles downstream the cypermethrin concentration range was less than 0.001 ppb to 0.003 ppb.

The results of this runoff study which is not a guidelines data requirement clearly show that cypermethrin when applied under actual use conditions to a cotton field can be transported via runoff to adjacent aquatic sites. Although the maximum concentration detected in the aquatic environment (sediment) did not exceed 2 ppb the residue determined represented cypermethrin per se and did not include its degradation products....

Therefore, considering the spraying and sampling schedule for this experiment with spraying commencing on July 6 and continuing at 5 day intervals and with soil sampling for residues continuing until September 26th it is possible that the parent cypermethrin detected in soil, water and sediment at or near the test site represents only a small

fraction of the total residue impacting on both the soil and aquatic environment."

The report did not state whether any biological observations were made. However, on the basis of this data inferences can be made. At the point of runoff the sediment and water concentrations exceed all aquatic invertebrate LC_{50}'s and approach or exceeded the fish LC_{50}'s. The importance the dilution and degradation of the product should be taken into consideration. Two miles downstream apparently no sediment residues were detected, but water residues ranged from 0.001 to 0.013 ppb. Even at these low levels the 96 hr. LC_{50} values of many aquatic invertebrates are approached or surpassed. There is definitely a basis for concern. Even with the tremendous dilution factor of a major river, amounts from less than on part per tillion (pptr) to 3 pptr were detected. These data still approach the 96 hr. LC_{50} values of some aquatic invertebrate and definitely exceed the Maximum Allowable Toxicity Concentrations of the Mysid Shrimp and approach the allowable limit for Daphnia magna (see toxicology data). The last two species are generally accepted as good indicator species for toxic contamination.

There cannot be any doubt that cypermethrin is an extremely toxic chemical that does enter the aquatic system under actual field conditions.

Probably, through not confirmed, the detected parent cypermethrin was soil-bound. This is the crux of the problem. ICI does not deny that cypermethrin will enter the aquatic system (Dr. I. Hill personal communication), but only as soil-bound residues, discounting spray drift. ICI maintains that the soil-bound residues are biologically unavailable, degrade quickly in the sediment, and if any are desorbed they are in the form of a much less toxic metabolite. The toxicity of the metabolite is in the parts per million range to aquatics (see toxicology data), and would not reach these levels under normal use conditions. These conclusions are based in part on proprietary data that has not been submitted to EEB to date. Until this data is evaluated EEB defers from making any definite statements on this subject at this time.

EEB's primary concern is the chronic effects of soil-bound cypermethrin on benthic organisms. The affects of these residues are unknown. In the case of pecans, like cotton, runoff will eventually be deposited in reservoirs or estuaries. Both of these are sediment traps, and if chronic effects occur it will be there. Estuaries are of primary concern. They provide breeding, nursery, and spawning areas for many commerical and aesthetically appealing organisms. If cypermethrin does have long term chronic effects, the species diversity and ecological richness can be irreparably changed. The estuary is a staging area for many organisms, and if they are adversely affected they might not be able to recover rapidly, or possibly not at all.

Another complication is the detection of residues. Essentially, cypermethrin has toxicity levels that approach or exceed present levels of detection. Much of the LC_{50} data is based on nominal concentrations. The possibility does exist that adverse effects could occur where residue studies would show no contamination.

Since the question of the toxicity of sediment-bound cypermethrin is unresolved, a use pattern as submitted for pecans could result in undesirable adverse effects. Also, the height of pecan trees would increase the hazard of aquatic contamination for drift which should be taken into consideration.

101.3 Endangered Species Consideration

The data available are insufficient to address the endangered species question.

101.4 Adequacy of Toxicity Data

The minimum tests have been completed. A field study request to address the aquatic hazard is still outstanding. Recently, 1/84, ICI has submitted a document in lieu of a field study. They maintain that enough data has been collected to address the aquatic problem. EEB has cursorily examined the document. The study was submitted at a late date so it could not bear on the pecan registration. The study does contain proprietary data that has not been submitted to EEB. The field study request could be withdrawn provided the submitted study does provide adequate information.

102 Classification

In a cotton review (T. Johnston, 4/27/82) RPAR criteria were met. A field study addressing the effects of drift and runoff on benthic organisms was requested.

103. Conclusions

Ecological Effects Branch has reviewed the proposed registration of cypermethrin for use on pecans. EEB is unable to complete a full risk assessment (3(c)(5) finding) for this use because pertinent ecological effects data are lacking. In order to complete this assessment EEB requires a field study to address the benthic organisms impact.

Wayne C. Faatz, Ph.D
Wildlife Biologist
Ecological Effects Branch, HED

Dave Coppage
Head, Section #3
Ecological Effects Branch, HED

2/10/89

Clayton Bushong
Branch Chief
Ecological Effects Branch, HED