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SHAUGHNESSEY NO.

REVIEW NO.

EEB REVIEW

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

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. G. LaRocca (15)

PRODUCT NAME(S) Cymbush 2E and Cymbush 3E

COMPANY NAME ICI Americas, Inc.

SUBMISSION PURPOSE Proposed registration for use on bulb onions and garlic

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

Cypermethrin

ECOLOGICAL EFFECTS BRANCH REVIEW

CYPERMETHRIN

100.0 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

The registration of Cypermethrin products, Cymbush 2E, Cymbush 3E and Ammo 2.5 = EC, on bulb onions and garlic.

100.2 Formulation Information

Active Ingredient: Cypermethrin:

(+) a-cyano-(3-phenoxyphenyl) methyl (+)-cis,trans-3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate

Cymbush 2E:

Active ingredient.....22.86%  
Inert ingredients.....77.14%

cis/trans ratio: 45/55 + 10

Contains 2 lb ai/gallon

Cymbush 3E:

Active ingredient.....35.6%  
Inert ingredients.....64.4%

cis/trans ratio: 45/55 + 10

Contains 3 lb ai/gallon

Ammo 2.5 EC:

Active ingredient.....30.6%  
Inert ingredients.....69.4%

cis/trans ratio: Max. 55% (+) cis and min. 45% (+) trans

Contains 2.5 lb ai/gallon

Contains xylene range aromatic solvents.

100.3 Application Methods, Directions, Rates

Onion thrips--0.08 to 0.1 lb ai/a.

Aphids, armyworms, cutworms, leafminers, onion maggot adults and stink bugs--0.04 to 0.1 lb ai/a.

Apply in a minimum of 20 gallons per acre with ground equipment or in a minimum of 3 gallons per acre by aircraft. Begin applications when pests appear and repeat as necessary to maintain control.

Use lower rates under light to moderate infestations; higher rates under heavy insect pressure.

To control onion thrips: use higher rates as population increases and avoid rescue situations.

Do not apply more than 0.5 lb ai per acre per season.

Do not apply within 7 days of harvest.

#### 100.4 Target Organisms

Onion thrips	Aphids
Armyworms	Cutworms
Leafminers	Stinkbugs
Onion maggot adults	

#### 100.5 Precautionary Labeling

This product is highly toxic to bees exposed to direct treatment or blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area.

This product is extremely toxic to fish. Use with care when applying in areas adjacent to any body of water.\* Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes.

\*The label for Cymbush 2E has this additional statement here: Keep out of lakes, streams, ponds, tidal marshes, or estuaries.

#### 101.0 Hazard Assessment

##### 101.1 Discussion

Garlic is a minor crop that is grown during the winter in California. According to Agricultural Statistics, 1984 onions are grown on 121,540 acres in the U.S. The following table is taken from the index.

Season and State	Acreage (1983)
<u>Spring</u>	
Arizona	1,600
California	7,600
Texas	19,000
Total	28,200
<u>Summer Non-storage</u>	
New Mexico	3,900
Texas	6,200
Washington	1,200
Non-storage total	11,300
<u>Summer Storage</u>	
Colorado	10,400
Idaho	4,700
Michigan	7,400
Minnesota	790
New York	13,300
Ohio	550
Oregon (east)	8,000
Oregon (west)	2,500
Utah	1,900
Washington	3,500
Wisconsin	1,600
Storage total	54,640
California summer	27,400
Total summer	93,340
U.S.	121,540

Cypermethrin is to be applied to garlic and bulb onions at 0.04 to 0.1 lb ai/a. No more than 0.5 lb ai/a can be applied per season. Cypermethrin is currently registered on cotton and pecans at the rate of 0.06 to 0.1 lb ai/a. The maximum amount that can be applied is 1.0 lb ai/a per season on cotton and 0.8 lb ai/a per season on pecans. As California and Texas grow two crops these states can potentially apply up 1.0 lb ai/a in one year.

#### 101.2 Likelihood of Adverse Effects to Nontarget Organisms

Cypermethrin is practically nontoxic to terrestrial wildlife. The acute oral LD<sub>50</sub> values for male and female rats are, respectively, 5 g/kg and 10 g/kg. The acute oral and dietary toxicity values for mallard ducks are, respectively, > 4640 mg/kg and > 20,000 ppm. However, cypermethrin is very highly toxic to aquatic organisms. The LC<sub>50</sub> values for the freshwater species, bluegill, rainbow trout and *Daphnia magna* are 1.78 ppb, 0.82 ppb and 0.26 ppb, respectively. The LC<sub>50</sub> values for estuarine organisms, sheepshead minnow and pink shrimp, are 0.95 ppb and 0.043 ppb, respectively. Shell deposition in Eastern oysters was reduced 50% at 370 ppb.

4

Cypermethrin is also very highly toxic to aquatic organisms from chronic exposure. The MATC values for an embryo-larvae study with a freshwater fish and life-cycle studies with freshwater and estuarine invertebrates were: fathead minnow (0.14 ppb < MATC < 0.33 ppb); Daphnia magna (9 pptr < MATC < 20 pptr); and mysid shrimp (0.44 pptr < MATC < 0.64 pptr).

Cypermethrin is currently conditionally registered on cotton and pecans at the rate of 0.06 to 0.1 lb ai/a. The maximum amount that can be applied is 1.0 lb ai/a per season on cotton and 0.8 lb ai/a per season on pecans. The proposed rates on onions and garlic fall within the registered rates. Onion agriculture requires a good supply of moisture since they have a shallow root system. Therefore, either onion fields are irrigated or the crop is grown in muck soils, which are residual lake beds with high organic content, similar to peat. These soils are usually in close proximity to streams and lakes. According to EEB files all the acreage in California requires irrigation, whereas only 41% of the acreage in Michigan and only 8% of that in New York were irrigated since these two latter states have good muck soils.

The condition of the cotton registration was the conductance of a pond study to demonstrate that repeated applications of cypermethrin did not adversely affect populations of invertebrates and fish. The request for the pond study was based upon a monitoring study conducted in Alabama in 1980 which showed that repeated aerial applications (16) at 0.125 lb ai/a at 5-day intervals caused the presence of detectable amounts of cypermethrin residues as far as 8 miles downstream from the cotton field where the pesticide was applied. During this period there were three runoff events. The residues in water were < 0.001 to 0.024 ppb 165 meters from the point of runoff; < 0.001 to 0.013 ppb 2 miles from the point of runoff and < 0.001 to 0.003 ppb 8 miles downstream. The residues in sediment were 2 ppb 165 meters downstream.

Most of the cypermethrin found in the water samples was adsorbed to suspended sediment. The soilbinding properties of cypermethrin should reduce the concentration in water to levels below which the chemical cannot cause acute poisoning of fish. This will most likely occur in the muck soils which have a higher organic content, and, hence a greater pesticide-binding capability than the irrigated fields. Cypermethrin residues are more likely to enter waterways from irrigated fields. The study indicated that there were sufficient concentrations of cypermethrin in the water to potentially severely affect populations of planktonic aquatic invertebrates. The concentrations detected in the sediments were also high enough to deplete the benthic community. The planktonic and benthic communities of aquatic invertebrates are a food source for fish and contribute to the overall stability of the ecosystem.

Our concern about these effects is justified since a pond study conducted in Alabama in 1980 illustrated that aquatic insects were affected by cypermethrin. There were 16 aerial applications at 0.125 lb ai/a. A full pond study, in which not only populations of invertebrates but also fish and the stability of the pond were studied, was conducted in 1987 in Alabama.

Until the results of the pond study show that the chemical is safe in aquatic ecosystems, our assessment that the use of cypermethrin is hazardous to aquatic organisms is still valid as the available data support our viewpoint.

### 101.3 Endangered Species Considerations

EEB is contacting USFWS regarding the adoption of reasonable and prudent alternatives as reflected in the biological opinion for the use of captafol on fruits and vegetables (onions included). The OES opinion, written May 1, 1985, indicated that bonytail chub (Utah, Arizona), leopard darter (Oklahoma, Arkansas), unarmored three-spine stickleback (California), slackwater darter (Tennessee, Alabama), slender chub (Tennessee), Colorado squawfish (Colorado, Utah), woundfin (Utah, Nevada, Arizona), humpback chub (Colorado, Utah), Ozark cavefish (Arkansas, Oklahoma, Missouri), Maryland darter (Maryland), yellowfin madtom (Virginia, Tennessee), spotfin chub (Virginia, North Carolina, Tennessee), all listed mussels (Alabama, Iowa, Kentucky, Tennessee, Virginia, Arkansas, Indiana, Illinois, Missouri, Wisconsin, Ohio, West Virginia), Delta green ground beetle (California), Kern primrose sphinx moth (California), valley elderberry longhorn beetle (California), wood stork (Florida, Georgia, South Carolina) and Everglade kite (Florida) were likely to be jeopardized by these uses of captafol. This consultation is necessary to determine if the same or additional species are likely to be jeopardized by the use of cypermethrin on onions and garlic. Until we receive OES's opinion, we cannot make any decision regarding the impact cypermethrin may have on endangered species that occur in the vicinity of garlic and bulb onion fields.

### 101.4 Adequacy of Toxicity Data

The results of the aquatic field study will be submitted this year for our review. We are also awaiting the results of the fish full life cycle study.

### 102. Classification

Cypermethrin is a restricted use pesticide.

103.0 Conclusions

EEB has reviewed the proposed registration of cypermethrin on garlic and bulb onions. The agricultural practices for growing onions, such as irrigation, are expected to increase the exposure of nontarget aquatic organisms. The available data indicate that cypermethrin is very highly toxic to aquatic organisms and can potentially adversely impact aquatic ecosystems. Until the results of the pond study show that the chemical is safe in aquatic ecosystems, our assessment that the use of cypermethrin is hazardous to aquatic organisms is still valid, and the available data support our viewpoint.

Based upon a previous OES biological opinion for captafol on fruits and vegetables (onions included), EEB is asking OES to adopt reasonable and prudent alternatives as reflected in this earlier opinion. Until we receive the biological opinion from OES we cannot make any decision regarding the impact cypermethrin may have on any endangered species that occur in the vicinity of bulb onion and garlic fields.

*Ann Stavola 2/19/88*

Ann Stavola  
Aquatic Biologist  
Ecological Effects Branch  
Hazard Evaluation Division

*Douglas J Urban 2/21/88*

Douglas Urban  
Section Head  
Ecological Effects Branch  
Hazard Evaluation Division

*Harry Craven 2/22/88*

Harry Craven  
Acting Branch Chief  
Ecological Effects Branch  
Hazard Evaluation Division



# Cypermethrin Review

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Pages 8 through 16 are not included in this copy.

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The material not included contains the following type of information:

- \_\_\_\_\_ Identity of product inert ingredients.
  - \_\_\_\_\_ Identity of product impurities.
  - \_\_\_\_\_ Description of the product manufacturing process.
  - \_\_\_\_\_ Description of quality control procedures.
  - \_\_\_\_\_ Identity of the source of product ingredients.
  - \_\_\_\_\_ Sales or other commercial/financial information.
  - A draft product label.
  - \_\_\_\_\_ The product confidential statement of formula.
  - \_\_\_\_\_ Information about a pending registration action.
  - \_\_\_\_\_ FIFRA registration data.
  - \_\_\_\_\_ The document is a duplicate of page(s) \_\_\_\_\_.
  - \_\_\_\_\_ The document is not responsive to the request.
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The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

FEB 23 1988

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

Department of the Interior  
U.S. Fish and Wildlife Service  
Lloyd 500 Building, Suite 1692  
500 NE Multnomah Street  
Portland, Oregon 97232

Attention: David Riley  
Assistant Regional Director  
Office of Endangered Species

The U.S. Environmental Protection Agency believes that the enclosed information enables us to adopt reasonable and prudent alternatives for the pyrethroid insecticide, cypermethrin, based on a previous biological opinion for the fungicide, captafol, on onions.

To facilitate expeditious processing of this request we have included two copies each of the form entitled "Summary of Adoption of Reasonable and Prudent Alternatives". Please sign, date and return one copy to us within 30 days of receipt of this letter. Also enclosed is supporting documentation for the risks of cypermethrin to nontarget fish and wildlife.

If you have any questions regarding this request please call either Ann Stavola (FTS 557-1354) or Ray Matheny (FTS 557-1134).

Sincerely yours,

*Harry Craven*  
Harry Craven, Acting Chief  
Ecological Effects Branch  
Hazard Evaluation Division  
(TS-769c)

Summary of EPA Adoption  
of Reasonable and Prudent Alternatives

Pesticide Cypermethrin Action Insecticide  
name(s) i.e., insecticide, herbicide

Registration No. 109702 Registration Standard? No

Use patterns(s) Bulb onions ; \_\_\_\_\_ ;  
Garlic ; \_\_\_\_\_ ;  
\_\_\_\_\_ ; \_\_\_\_\_ .

May affect situation determined because of toxicity to:

Aquatic

Fish

Invertebrate

Terrestrial

Avian\*

Mammal

Insect

Plant

\*Avian species are listed because of toxic effects to their food sources (snails and fish).

**Rationale:**

Cypermethrin is practically nontoxic to terrestrial wildlife (birds and mammals), but it is very highly toxic to aquatic organisms on both an acute and a chronic exposure. A residue monitoring study indicated that detectable residues were present as far as 8 miles downstream from the site of application. The residues in water exceed the acute trigger (1/20 LC50) for endangered invertebrates and possibly endangered fish and the chronic trigger for invertebrates (greater than the no-effect level). A preliminary pond study indicated that there were impacts on aquatic insects. Fish effects were not studied in this preliminary study.

Biological opinion(s) referenced: Captafol, dated May 1, 1985;  
\_\_\_\_\_, dated \_\_\_\_\_;  
\_\_\_\_\_, dated \_\_\_\_\_.

Listed species in jeopardy:

bonytail chub	leopard darter
unarmored three-spine stickleback	slackwater darter
slender chub	Colorado squawfish
woundfin	humpback chub
Ozark cavefish	Maryland darter
yellowfin madtom	spotfin chub
all listed mussels	Delta green ground beetle
Kern primrose sphinx moth	valley elderberry longhorn beetle
wood stork	Everglade kite

Signature	Title	Date
( ) Concur	( ) Non-concur (indicate reason below)	

Comments: \_\_\_\_\_  
\_\_\_\_\_