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MEMORANDUM

Subject: Review of Two Section 18 Actions for Permethrin

From: Patricia Ott, Chemist Patricia Ott
Environmental Chemistry Review Section #1
EFGWB/EFED (H7507C)

To: Andrea Beard, PM Team Reviewer for Permethrin
Emergency Response and Minor Use Section
Registration Support Branch, Registration Div. (H7505C)

Through: Henry Jacoby, Branch Chief Henry Jacoby
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Paul J. Mastradone, Ph. D., Section Chief
Environmental Chemistry Review Seciton #1
EFGWB/EFED (H7507C)

Section 18 Request #1: Rice in Texas

Background:

The State of Texas (Department of Agriculture) requested an exemption to authorize aerial application of permethrin on 100,000 acres (17 Upper Gulf Coast Counties) of rice to control fall armyworm. Two formulations (Ambush, 0.075-0.1 lb ai/A and Pounce 3.2, 0.075-0.1 lb ai/A) were used (2 applications/rice growing season), and a maximum of 20,000 pounds ai was applied.

The Texas Department of Agriculture was notified of a serious outbreak of fall armyworm on 5/26/92 and issued a crisis exemption on 5/27/92. Their request for a specific exemption from EPA extended to 9/1/92.

Permethrin is a restricted use pesticide and is toxic to aquatic species. The State of Texas implemented several measures to protect aquatic and endangered species and notified the U. S. Fish and Wildlife Service.

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A map showing the general location of the 17 counties was provided, but no specific soil characteristics or site information was given.

Section 18 Request #2: Small Grains in Montana

Background:

The State of Montana (Department of Agriculture) requested an emergency exemption to apply permethrin to 80,000 acres of small grains to control army and pale western cutworms (no site information provided). A maximum of 12,000 pounds of active ingredient (at a maximum rate of 0.1 lbs ai/acre, 1.5 applications assumed) was used. Applications were made between 3/15 and 7/1/92 and applied by either ground or air application, using 2 formulations (Pounce, 4 oz/A and Ambush, 6.4 oz/A).

Permethrin is a restricted use pesticide and is toxic to aquatic species; accordingly, the State of Montana implemented several measures to protect aquatic and endangered species. The U.S. Fish and Wildlife Service was informed, also.

Use Pattern: (Source: SACS Reregistration Summary Report)

Permethrin is registered for many uses (terrestrial food, terrestrial nonfood, indoor, outdoor residential, greenhouse nonfood, and aquatic nonfood). Terrestrial food uses include alfalfa, almond, amaranth, apple, artichoke, asparagus, avocado, broccoli, brussels sprouts, cabbage, cauliflower, celery, chard, cherry, chervil, collards, corn, cotton, cress, cucumber, sorrel, eggplant, endive, fennel, hazelnut, garlic, gherkin, gourd, grasses, honeydew melon, horseradish, lettuce, melons, mushrooms, onion, papaya, parsley, peach, pear, pepper, pistachio, potato, pumpkin, rhubarb, soybeans, spinach, squash, tomato, turnip, and walnut.

Conclusions:

EFGWB can not, based on a very incomplete environmental fate data base (only 3 laboratory data requirements are fulfilled--hydrolysis, photolysis in water and on soil), make any environmental assessment with regard to these 2 Section 18 requests. (Requested application dates are passed.)

Environmental Fate Profile: (Source: EFGWB #91-0593 review (6/24/91)

Because there are only three acceptable studies in the environmental fate data base, little information is available on the degradation, mobility, or accumulation of permethrin in the environment.

Based on the limited acceptable information, permethrin does

not degrade via hydrolysis or photolysis. Unacceptable laboratory studies of aerobic and anaerobic soil metabolism indicate half-lives ranging from 70 to >98 days, respectively. Major identified degradates, other than CO_2, include cis 3-(2,2-dichlorovinyl)-2,3,2-dimethyl-cyclopropane carboxylic acid (DCVA), trans DCVA, 3-phen-oxybenzyl alcohol, phenoxybenzaldehyde and 3-phenoxybenzoic acid. The reliability of these data are questionable at best.

Unacceptable data on the mobiity of permethrin indicated high mobility (K_d = 0.386). This is not consistent with mobility data available for other synthetic pyrethroids. In most cases, synthetic pyrethroids have been found to bind tightly to soils, limiting their potential mobility to ground water.

Unacceptable fish bioaccumulation studies indicate relatively low bioconcentation factors of 21x and 715x (edible and nonedible tissues) for bluegill sunfish (after 21-28 days' exposure) and 91x and 703x (28 days' exposure) for catfish. Depuration was rapid, with 92 and 97% (edible and nonedible) of the residues declining in bluegill sunfish during the 14 day depuration period; edible and nonedible residues in catfish declined 64 and 84%.

Unacceptable field dissipation data yielded half-lives ranging from 7-30 days; however, the reliability of these data are also questionable.

In summary, the environmental fate data base is largely incomplete, with little information on the routes of dissipation in the environment available for permethrin. No acceptable data are available on the mobility of permethrin, although synthetic pyrethroids, in general, are not known to be mobile. Degradation pathways, rates, and degradates are not definitively elucidated at this time.