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

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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

DEC 6 1989

MEMORANDUM

SUBJECT: Request for Experimental Use Permit for Field Testing of Orthene 75 (Acephate) on Feral Honey Bees. I. D. No. 62549-EUP-R. Record No. 253271. MRID No. 41250901. DEB No. 5893.

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THRU: Andrew Rathman, Section Head
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TO: W. Miller, PM 16
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Background

The USDA Agricultural Research Service, Honey Bee Breeding, Genetics, and Physiology Laboratory, Baton Rouge, LA has filed application for the use of Orthene 75S (Acephate) in a syrup-honey bait to test the effectiveness of this chemical system for the abatement of feral European type honey bee colonies. Orthene 75S (75% soluble concentrate solid Acephate, Registration No. 239-2418), or O,S-dimethyl acetylphosphoramidothioate, is a systemic insecticide with numerous RAC tolerances for the combined residues of acephate and its metabolite O,S-dimethylphosphor-amidothioate (methamidophos). Tolerances range from 0.1 ppm in cattle, sheep, goats, hogs, horses, and poultry to 15 ppm in grass (40CFR180.108). Acephate dietary exposure has been reviewed recently (DEB Memorandum, F. B. Suhre, 01/12/89).

Proposal

The USDA-ARS plans to apply Orthene 75S in sucrose syrup-honey bait feeders located on two 4 square kilometer sites (1976 acres total)

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on scrub brush pasture areas near Weslaco, Texas. Nine bait stations maximum will be located at 500-meter intervals over the 1 square kilometer central area of each site. The total amount of Orthene 75S applied will not exceed 10 grams (7.5 g a. i. total, 0.0038 g a. i. per acre). The label restricts each application of Orthene 75S in syrup-honey bait to no more than 0.1 gram per acre.

Target bee colonies are attracted with sucrose-honey bait (50% wt/wt sucrose/water with 10% honey by volume). When a suitable foraging level is noted (100 bees/feeder), tared feeder cans containing 0.67 g Orthene 75S in 300 ml of sucrose-honey bait (1675 ppm acephate) are substituted for each feeder containing sucrose-honey only. Bait stations are monitored for approximately 30 minutes, including numbers of feeding bees and flight directions. The feeders are weighed after treatment (30 minutes) to determine the amount of Orthene 75S removed by the foragers. The estimated maximum number of feral colonies at the two sites is 180. This will be supplemented by the introduction of 20 USDA-owned simulated feral (managed) colonies. This is approximately 4,000,000 bees total.

In addition to counts and amounts removed, non-target insect feeders will be identified, and acephate and methamidophos residues will be determined in dead bees, wax combs, honey, and pollen. A maximum of 160 samples will be analyzed for residues: 4 applications X 5 colonies/site X 2 colony types = 40 samples each of wax, honey, pollen, and bees.

The proposed EUP is for one year, November 1, 1989 through October 31, 1990. Two additional years of tests are contemplated, including studies in areas with large populations of Africanized bees.

The projected registration application will be for non-crop, restricted area outdoor use for feral honey bee control in high-use land areas (college campuses, building complexes, zoos, outdoor athletic facilities).

Discussion

In support of the EUP application, the applicant submitted a study on acephate and methamidophos residues in dead bees and honey-beeswax resulting from colonies exposed to 500 ppm acephate in a sucrose-honey bait. The study was conducted on five colonies, and dead bees and honey-beeswax mix analyzed at 12 intervals from pretreatment to 10 weeks. The dead bees (25 - 30 g) were taken from a thoroughly mixed tray of all dead bees that accumulated after colony treatment. Average acephate and average methamidophos concentrations in dead bees were a maximum one day after treatment, 9.74 ppm and 3.07 ppm, respectively. The average residues declined to 1.10 ppm acephate and 1.30 ppm methamidophos ten weeks after exposure. Acephate concentration in honey-beeswax peaked at 1.14

ppm two weeks after treatment, and methamidophos concentration peaked at 0.07 ppm ten days after treatment. For both dead bees and honey-beeswax, there is a large variation in the results of the five colonies, i.e., the standard deviations are 50% to 100% of the mean values.

The analytical method involves homogenization of a 20 g sample with 200 ml of 65:35 acetone:water, followed by 1:1 methylene chloride:petroleum ether and methylene chloride extractions of the homogenization filtrate. The extract is concentrated and solvent exchanged into acetone. Residues in the extracts are analyzed by GC (nitrogen phosphorus detector) on two columns, a DB-5 wide bore capillary column and a 2 mm (i.d.) 2% stabilized DEGS packed column. Quantification is by peak height comparison to authentic standards. No raw data or chromatograms are supplied. The applicant reports recoveries of 84% acephate and 89% methamidophos for 50 ppm level spikes in the honey-wax and 80% acephate and 80% methamidophos for 0.1 ppm level spikes in dead bees.

The proposed label specifies that all honey bee products (honey, wax, combs) from the experimental hives be incinerated in a metal drum and that any remaining residue and any excess bait containing Orthene 75S be handled by a certified waste disposal firm. There will be no food/feed use of the honey. Bees are not a food/feed item.

The ultimate registration application will involve abatement of feral honey bee populations in high-use land areas and will require safeguards to prevent contamination of commercial honey, namely the total absence of non-feral bee colony hives. Presumably, such hives are not normally located in high-use areas.

Conclusions

The analytical method is adequate for generating residue data from the proposed EUP study.

Several discrepancies exist in the proposal. In the Proposed Experimental Program section, 0.67 gram Orthene 75S in 300 ml bait is called a 375 ppm Orthene 75S solution. The actual concentration is about 2200 ppm Orthene, or 1680 ppm acephate. Mr. Williams (USDA-ARS) confirmed by telephone on 11/15/89 that 0.67 g and 300 ml are correct. A total of 10 g will be used, according to the label. One application at each bait site would require 12 grams and would provide no Orthene 75S for the additional applications referenced. Also, the study submitted refers to 375 ppm Orthene and 500 ppm acephate. Presumably, the 500 ppm acephate is correct.

The limited size of the area to be treated and the destruction of the hives and honey preclude any food/feed use.

Any registration application must consider methods of maintaining the non-food/non-feed use, or provide the residue studies to support a tolerance.

Recommendation

For the purposes of this EUP only, DEB regards the proposed use of acephate against feral honey bees to be a non-food/non-feed use. DEB recommends for the EUP. The registrant should be advised that maintenance of the non-feed/non-food use for the probable registration use may not be possible/practical.

cc: RF, Acephate SF, Non-Food Use File, R. Schmitt (Branch Chief),
Funk, Circ., Eldredge (PMSD, ISB).

RDI:A. Rathman:12/05/89:E. Zager:12/05/89:

H7509C:DEB:S.Funk:557-1439:CM#2:Rm803-A:SF(Acepha.1):12/05/89.