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122804
SHAUGHNESSEY NO

REVIEW NO.

EEB REVIEW

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TYPE PRODUCT(S) Insecticide/Miticide

DATA ACCESSION NO(S)

PRODUCT MANAGER, NO. Pemberton (41)

PRODUCT NAME(S) Agri Mek (Avermectin B_1, 0.15 EC)

COMPANY NAME Oregon Dept. of Agriculture

SUBMISSION PURPOSE Section 18 for Pears

SHAUGHNESSEY NO.	CHEMICAL	% A.I.
122804	Avermectin	

ECOLOGICAL EFFECTS BRANCH REVIEW
SECTION 18

Avermectin

100 Section 18 Application

100.1 Nature and Scope of Emergency

The Oregon Department of Agriculture requests a specific exemption,(under FIFRA, Section 18), for use of Avermectin B_1 0.15 EC miticide/insecticide for use on pears in Oregon. The spider mites have become serious pests to pears and have become resistant to several of the existing pesticides, and other pesticides only offer limited control. Avermectin is expected to provide more effective and longer lasting control while at the same time negligibly affecting natural control agents possibly allowing for overall reduction in pesticide use.

100.2 Target Organisms

Two-Spotted Spider Mite (*Tetranychus urticae*)
Yellow Spider Mite (*Eotetranychus carpini borealis*)
McDaniel Spider Mite (*Tetranychus mcdanieli*)

100.3 Date, Duration

April 20, 1990 to September 1, 1990

100.4 Application Methods, Directions, Rates

Rate of application is to be 10-20 fluid ounces (fl.oz.)of Avermectin B_1 0.15 EC per acre. For dilute sprays, 2.5 to 5.0 fl.oz. per 100 gallons (gal.) of water will be used. The rate of Avermectin B_1 0.15 EC per 100 gal. is based on a standard volume of 400 gal. per acre dilute spray. If less than 400 gal. of dilute spray solution per acre is applied, a minimum of 10 fl.oz. per acre in the appropriate volume to obtain good coverage will be used. For concentrate sprays 10-20 fl. ounces per acre in sufficient water to obtain thorough coverage will be used. A maximum of 20 fl.oz. per acre will be allowed. Applications will be made with a minimum of 0.25% paraffinic oil in the dilute spray mixture and not less than 1.0 gal. of paraffinic spray oil per acre in the final finished spray.

There will be a minimum seven-day preharvest interval. Avermectin B_1 0.15 EC miticide will not be applied through any type of irrigation system. Applications will not be made when weather conditions favor drift from target areas. This pesticide is toxic to fish and wildlife. This product is highly toxic to bees exposed to direct treatment or to residues on blooming crops or weeds. Applications will not be made or allowed to drift to blooming crops or weeds if bees are visiting the treatment area.

Applications will be made only to pear orchards where mite resistance to registered pesticides is known to occur. Treatment of pears will begin when field scouting reports indicate there is an average of two mites per leaf.

100.5 Treatment Area

The exemption requested is for one application for use on two distinct Oregon pear growing areas: 8,000 acres of pears in Jackson and Josephine counties in southwestern Oregon and 10,000 acres of pears in Hood River and Wasco counties in the Mid-Columbian region (18,000 acres total).

100.6 Precautionary Labeling

No precautionary labeling was provided with this submission, however, warnings on toxicity to fish and wildlife and to honey bees are outlined under 100.4 above.

101 Hazard Assessment

101.1 Discussion

Avermectin will be applied at 0.012 to 0.023 lbs. a.i./Acre. This exemption request is for one application on 18,000 acres of pears. (A previous request was submitted to and reviewed by EEB in February of 1988)

101.2 Likelihood of Adverse Effects on Nontarget Organisms

The known toxicity data and environmental fate information can be found summarized in a review by D. Rieder, 4/11/89.

Terrestrial Exposure

If Avermectin is applied at 0.023 lbs. a.i./ Acre, the following residues (ppm) are expected to occur on terrestrial food items immediately after treatment as calculated using a nomograph presented in Hoerger and Kenaga (1972) based on historical measured residue data.

	Short Grass	Long Grass	Leafy Crops	Insect Forage	Seeds Pods	Fruit
Maximum	4.8	2.2	2.5	1.16	0.24	0.14
Typical	2.5	1.8	0.7	0.66	0.06	0.03

Birds

The above residues do not exceed the lowest avian dietary LC_{50} of 383 ppm nor the avian reproductive NOEL of 12 ppm. Therefore, no acute or chronic hazard to birds is expected.

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Mammals

The acute oral LD_{50} value of 10 mg/kg for adult rats and the LD_{50} value of 1.5 mg/kg for weanling rats were used to calculate 1-day adult LC_{50} values (ppm) and weanling 1-day LC_{50} values respectively, for selected mammals using the formula:

LC_{50} (ppm) = LD_{50} x Body Weight (g)/Daily Consumption (g)

Reproductive NOEL values for selected mammals were extrapolated from the rat 1-generation reproductive test using the formula:

Repro. NOEL (ppm)=Rat NOEL x Body Weight(g)/Daily Consumption(g)

Materno-Toxicity NOEL values for selected mammals were extrapolated from mouse 10-day test using the formula:

$$\text{10-Day Materno-Toxicity NOEL(ppm)} = \frac{\text{Mouse NOEL(mg/kg) x Weight(g)}}{\text{Daily Consumption (g)}}$$

The following values were obtained:

	1-Day LC_{50} (ppm)		Repro. NOEL (ppm)	Materno-Toxic NOEL (ppm)
	Adult	Weanling		
Grazing Herbivores				
meadow vole	16	2.5	0.16	0.08
swamp rabbit	24	3.6	0.24	0.16
deer	412	61.4	4.12	2.06
Granivores				
red squirrel	142	21.3	1.40	0.70
Omnivores				
deer mouse	51	7.7	0.50	0.26
marsh rice rat	218	32.6	2.20	1.09
raccoon	470	70.8	4.70	2.36
Insectivores				
least shrew	9	1.4	0.09	0.05
Carnivores				
least weasel	40	6.0	0.40	0.20

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(The following was excerpted from the 9-25-89, Section 18 Review by Nimish Vyas)

The estimated residues on terrestrial food items are below the extrapolated adult LC_{50} values. The estimated residues on short and long grasses and leafy crops equal or exceed the 1-day LC_{50} values for weanling meadow voles. Therefore, acute effects may occur to certain young mammals.

The extrapolated reproductive NOEL values are exceeded by typical residues on terrestrial food items for grazing herbivores, omnivores and insectivores of small size. Granivores and carnivores would not likely ingest food with residues greater than their reproductive NOEL.

Typical residues on most vegetation and insects exceed the materno--toxicity NOEL for small herbivores and insectivores, respectively. This level is expected to result in mortality to pregnant mother feeding on contaminated materials.

Based on this data, it is likely that with the use of Avermectin at 0.02 lbs ai/acre, acute effects may occur to young grazers, materno-toxicity to herbivores, omnivores and insectivores, and chronic effects to certain grazing herbivores, omnivores, and insectivores.

Multiple applications of Avermectin may result in repeated exposures to certain mammals during their gestation period. Even though Avermectin is short-lived in light. it is likely that small mammals will experience adverse effects, either from residues which are not exposed to light or by the photodegradate (delta 8, 9-isomer) which is more toxic to mammals than the parent chemical.

Aquatic Exposure

Assuming 2% runoff, based on Avermectin's solubility (7.8 ppm), aquatic EEC's were calculated using the formulas for aerial application (see attached). Application rates of 0.012 to 0.023 lbs. a.i./Acre are estimated to result in EEC's of 0.124 to 0.239 ppb. a.i. in a 1 acre pond 6 ft. deep. These levels are less than 1/10 the LC_{50} values for fish but are greater than ½ the LC_{50} values and the MATC values for aquatic invertebrates (both freshwater and estuarine). As such, the proposed use of Avermectin poses considerable risk to aquatic organisms and may cause serious adverse effects to local aquatic populations. The adverse effects will be minimized by the limited acreage involved (18,000 acres).

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101.3 Endangered Species Considerations

The endangered species triggers are:

Group	Trigger	
	Repro. NOEL	Acute
Birds	12 ppm	38.3 ppm ($LC_{50}/10$)
Mammals	0.09 ppm	0.14 ppm ($LC_{50}/10$)
Fish	0.52 ppb	0.16 ppb ($LC_{50}/20$)
Aquatic Invertebrates	0.03 ppb	0.011 ppb ($LC_{50}/20$)

Maximum residues do not exceed the avian endangered species triggers. Since the only endangered species present in the proposed spray area are the Bald Eagle (in all four counties) and the Northern Spotted Owl (in Josephine and Jackson counties), the proposed use of Avermectin is not expected to adversely effect endangered species.

101.4 Adequacy of Data

The available data were adequate to quantify the risks of this section 18.

101.5 Adequacy of Labeling

The following labeling would be required on any Avermectin label.

"This pesticide is toxic to birds, mammals, fish and aquatic invertebrates. Do not apply directly to water or wetlands (swamps, bogs, marshes and potholes). Drift and Runoff may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwater or rinsate."

102 Conclusions

The EEB has reviewed the section 18 emergency exemption request submitted by the Oregon Department of Agriculture (a previous request was submitted to and reviewed by EEB in February of 1988). Based on the use and toxicity information regarding the proposed use, no acute or chronic hazards to birds is expected.

The proposed use will pose an acute and chronic hazard to small herbivore, omnivore, and insectivore mammals, reptiles, and terrestrial amphibians.

Since Avermectin is very highly toxic to both freshwater and estuarine fish and invertebrates the proposed use requested may pose an acute and chronic hazard to aquatic organisms through drift and runoff. As such it is advised that a minimum 100 yard buffer strip bordering all aquatic habitats (excluding irrigation ditches) be maintained in those areas located in flood plains or those orchards planted on high clay soils or any other situation that may experience a potential for runoff.
Note: A buffer strip will not be an option for section 3 requests.

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Attachment

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Attachment A

EEC CALCULATION SHEET

I. For un-incorporated ground application

A. Runoff

___lb(s) x 0.0_ (_% runoff) x 10 (A) (from 10 A. drainage basin) = _____lb(s) (tot.runoff)

EEC of 1 lb a.i. direct application to 1 A. pond 6-foot deep = 61 ppb

Therefore, EEC = 61 ppb x ____(lb) = _____ ppb

II. For incorporated ground application

A. Runoff

___lb(s) ÷ _____ (cm) (depth of incorporation) x 0.0_ (_% runoff) x 10 (A) (10 A d.basin) = _____lb(s) (tot.runoff)

Therefore, EEC = 61 ppb x _____(lbs) = _____ppb

III. For aerial application (or mist blower)

A. Runoff

____ lb(s) x 0.6 (appl. efficiency) x 0.0 (_% runoff) x 10 (A) (10 A. d.basin) = _____lb(s) (tot.runoff)

B. Drift

_____ lb(s) x 0.05 (5 % drift) = _____ lb(s) (tot. drift)

Tot. loading = _____ lb(s) (tot. runoff) + _____ lb(s) (tot. drift) = _____lb(s)

Therefore, EEC = 61 ppb x _____(lbs) = _____ppb