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EEE BRANCH REVIEW

DATE: IN 11/8/76 OUT 11/10/76 IN _____ OUT _____ IN _____ OUT _____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. _____

PETITION OR EXP. PERMIT NO. EUP 3842-EUP-1,2 6G1850/6H5145

DATE DIV. RECEIVED 8/10/76

DATE OF SUBMISSION _____

DATE SUBMISSION ACCEPTED _____

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

PRODUCT MGR. NO. L. Zink

PRODUCT NAME(S) NEMACUR 3/15% Granular

COMPANY NAME CHEMAGRO

SUBMISSION PURPOSE EUP - Pineapple

CHEMICAL & FORMULATION Ethyl 3 methyl-4-(methylthio)phenyl (1-methylethyl) phorphoramidate

7 PAGES

NEMACUR

Environmental Safety

100.0 Pesticidal Use

To control the major genera of nematodes infesting pineapple plants. When applied as a preplant soil treatment, MEMACUR protects young developing root systems.

101.1 Application methods/directions

Crop	Pest	Pounds of Nemacur 15% G	Remarks
Pine-apple (Hawaii only)	Nema-todes	67 to 133	Apply specified dosage (10 to 20 lbs. active ingredient) per acre as a preplant broadcast treatment. Thoroughly incorporate the granules to a depth of 4 to 6 inches into the soil using suitable tillage equipment. NOTE: Postplanting applications of NEMACUR 3 can be made in addition to a preplant application of NEMACUR 15% Granular. Refer to the experimental permit labeling for NEMACUR 3 for directions and dosage rates.

Do not apply more than a total of 40 lbs. active ingredient per acre per crop season regardless of the formulation or method of application.

Crop	Pest	Gallons of MEMACUR 3	Remarks
Pine-apple(Hawaii only)	Nematodes	3-1/3 to 6-2/3	Preplant soil application: Apply specified dosage (10 to 20 lbs. active ingredient) per acre as a preplant broadcast treatment. Thoroughly incorporate thechemical to a depth of 4 to 6 inches into the soil using suitable tillage equipment.
		1/3 to 1	Postplant Broadcast Application: - Plant Corp. Apply specified dosage (1 to 3 lbs. active ingredient) in 50 to 250 gallons of water per acre as a broadcast spray. Begin applications 1 to 3 months after planting. Make additional applications at intervals of 1 to 3 months as needed. Oo not apply within 30 days before harvest.

NOTE: A preplant soil application using MEMACUR 3, NEMACUR 15% Granular or a soil fumigant according to label directions should be made in addition to postplant broadcast applications of NEMACUR 3. Do not apply more than a total of 40 lbs. active ingredient of NEMACUR per acre to the plant crop regardless of formulation or method of application.

- First Ratoon Crop.
Apply specified dosage in 50 to 250 gallons of water per acre as a broadcast spray. Make the first application immediately following crop harvest. Make additional applications at intervals of 1 to 3 months as needed. Do not apply within 30 days before harvest.

NOTE: Do not apply more than a total of 30 lbs. active ingredient (10 gallons of NEMACUR 3) per acre to the first ratoon crop.

Important: Do not feed or graze treated pineapple fields.

101.2 Proposed EUP

Objectives: To evaluate NEMACUR 15% Granular in a preplant soil application and NEMACUR 3 Emulsifiable in a postplant spray application for control of nematodes infesting pineapple in Hawaii.

Applications of NEMACUR 15% Granular and NEMACUR 3 Emulsifiable to pineapple during this proposed experimental program will be made with commercial equipment as indicated below:

Plant crop

a. A preplant soil application using NEMACUR 15% Granular, NEMACUR 3 Emulsifiable or a fumigant (standard) will be made before planting. NEMACUR (15% Granualr or 3 Emulsifiable) will be broadcast at rates of 10 to 50 pounds active ingredient per acre and incorporated to a depth of 4 to 6 inches into the soil. The soil fumigant will be applied at labeled rates.

b. Beginning one to three months after planting, and at intervals of one to three months thereafter, NEMACUR 3 Emulsifiable will be applied as a foliar spray at rates of 1 to 3 pounds active ingredient per acre.

Ratoon crop
Beginning immediately following harvest of the plant crop, and at intervals of one to three months thereafter, NEMACUR 3 Emulsifiable will be applied as a foliar spray at rates of 1 to 3 pounds active ingredient per acre.

Tests under this proposed experimental program will be conducted on unreplicated plots of approximately two acres each.

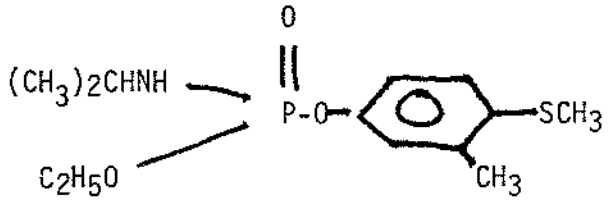
For this proposed experimental program on pineapple, the registrant is requesting total quantities of 6,800 pounds of NEMACUR 15% Granular and 3,450 gallons of NEMACUR 3 emulsifiable. Total active ingredient to be used is 11,370 lbs. A total of 100 acres of pineapple will be treated under the proposed experimental permits over a period of 3 years.

101.0 Chemical and Physical Properties

101.1 Chemical Name: Ethyl 3-methyl-4-(methyl thio) phenyl (1-methyl ethyl) phosphoramidate

101.2 Common Name: NEMACUR

101.3 Structural Formula



101.4 Molecular Weight: 303

101.5 Physical State: Tan waxy solid

101.6 Solubility: Soluble in most oranic solvents.
Soluble in water: ca 400 ppm

102.0 Behaviour in the Environment
No data submitted.

103.0 Toxicity Data

103.1 Acute Toxicity

103.1.1 Mammalian
Rat acute oral LD50 = 4.75 - 8.1 mg/kg

103.1.2 Avian
Bobwhite quail acute oral LD_{50} = 4.75 - 8.1 mg/kg
Mallard duck acute oral LD_{50} = 0.9 - 1.1 mg/kg

103.1.3 Aquatic
Rainbow trout 96 hr LC_{50} - 0.11 ppm
Catfish 96 hr LC_{50} = 3.8 ppm

103.2 Field Toxicity
Simulated Field Study Abstracts (31L5-EGA)

A. Pheasants - 3 lb/gal/Conc
Formulation foliar sprayed on pineapple at 5 lb a.i./A, birds penned on treated areas.
Results - No toxicity to birds penned on 100% exposure area for 14 days.

B. Pheasants - 15% granular
Birds caged on pineapple bed incorporated with 15% granular at 40 lbs. a.i./A
Results: ≈ 20% mortality in 100% exposure area, 14 days. No mortality in 50% exposure area, 14 days.

C. Rice bird (bobolink) - 15% granular
Birds caged on pineapple bed incorporated with 15% granular at 40 lbs. a.i./A
Results = 10% mortality in 100% exposure area, 14 days. No mortality attributable in treatment in 50% exposure 14 days.

D. Rice birds - 3 lbs gallon/Conc
Formulation foliar sprayed ag 5 lbs a.i./A birds penned on treated areas.
Results = 25% mortality in 100% exposure area, 14 days. No toxicity in 50% exposure area, 14 days.

Residues:

A. Nemacur was rapidly metabolized in soil to mainly the sulfoxide and lesser amounts of sulfone

B. Degradation rapid first 3 months with 1/2 life ≈ 1 month

C. NEMACUR applied at 6 lbs. a.i. /A yielded a 1.5 ppm in runoff water. Break down in water has 1/2 life of 5 days. Accumulation did not occur in fish.

D. Leaching - NEMACUR adsorbed in soil and resists leaching.

104.0 Hazard Assessment

104.1 Adequacy of Toxicity data
No basic toxicity data submitted with this application. Previous review data adequate to comply with Section 5 requirements.

104.2 Additional Data Required
Prior to consideration for registration, EPA Section 3 regulations for basic data must be complied with. In light of these requirements, avian subacute dietary LC_{50} data are required for one species of upland game bird and one species of waterfowl. In addition, a 48 hour LC_{50} static bioassay for an aquatic invertebrate is required.

It is the opinion of this reviewer that prior to registration, chronic ~~effects~~ studies on birds will be necessary for evaluating proposed use on pineapples. NEMACUR is persistent in the environment and, in addition, the monthly repeat applications will likely subject avian species to continued exposure.

104.3 Likelihood of exposure to non-target species.

The most significant potential pathways of NEMACUR exposure to non-target species are:

1. Exposure of Avian species which might feed or loaf in treated areas.
2. Exposure of aquatic species from irrigation and precipitation runoff.

The proposed use calls for a preplant application of 10-20 lbs. a.i./A and a postplant application each succeeding month at 3 lbs a.i./A. It has been estimated that a rate of 3 lbs. ai/A will yield a maximum expected residue of 380 ppm on leaves and leafy crops such as pineapple. It has also been calculated from the acute toxicity data on hand, that the mallard and bobwhite dietary LC_{50}s are 22.5 ppm and 51.9 ppm respectively.

From this, it can easily be shown that the Avian LC_{50} can be exceeded many times over in residues following a single application. Add to this, the fact that NEMACUR is persistent (1/2

life = 1 month) and the proposed use calls for repeat applications each month, a serious hazard to avian species appears to be surfacing here. In addition, the list of endangered avian species native to the Hawaiian chain is rather extensive.

The proposed use of NEMACUR indirectly poses a threat to aquatic species by its possible presence in runoff. The heavy and repeated application routes, coupled with a high annual (rainfall, typical of tropical islands, would seem to indicate a possibility for high levels of NEMACUR present in runoff - runoff which could interface with aquatic features.

105.0 Conclusions

1) The Environmental Safety Review Staff concurs with the EUP for NEMACUR on pineapples.
2) Certain data will be required to support registration. These data must include studies to determine both acute and chronic effects to wildlife that may result from ~~repeated~~ elated applications and/or high rates of application. Several of these studies are already present in our files.
3) Required registration data must include:

   A. Avian acute oral LD_{50}
   B. Acute fish LC_{50}
   C. Avian subacute dietary LC_{50}
   D. Acute aquatic invertebrate LC_{50}

4) Additional supporting data will be needed to determine the effects of repeated applications/continued exposure to birds. Such data will require avian reproduction (laboratory) and/or large pen field studies designed to evaluate chronic effects on birds.

   Unless supporting evidence is provided to show that the proposed use patterns will not contaminate aquatic environments, additional data on effects of NEMACUR on aquatic organism may be required for registration.
5) NEMACUR is acutely toxic to fish and wildlife. The proposed label contains no Environmental Hazard Statement. Modify label to read:
   "This pesticide is extremely toxic to fish and wildlife. Use with care when applying in areas frequently by wildlife or adjacent to any body of water."

Gerald L. Gavin
Environmental Safety Review Section
EEEB