100601
SHAUGHNESSEY NO.

24
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 1/10/83 OUT 3/9/83

FILE OR REG. NO. 3125-283

PETITION OR EXP.

DATE OF SUBMISSION December 6, 1982

DATE RECEIVED BY HED January 7, 1983

RD REQUESTED COMPLETION DATE March 13, 1983

EEB ESTIMATED COMPLETION DATE March 4, 1983

RD ACTION CODE/TYPE OF REVIEW 335/Amendment

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

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. H. Jacoby (21)

PRODUCT NAME(S) NEMACUR 3E

COMPANY NAME MOBAY CHEMICAL CORPORATION

SUBMISSION PURPOSE Proposed conditional registration of pineapple use

SHAUGHNESSEY NO.	CHEMICAL & FORMULATION	% A.I.
100601	Ethyl-3-methyl-4-(methylthio)phenyl-	
	(1-methylethy)phosphoramidate	35
	Inert ingredients	65
	TOTAL	100

9 pages w/ Appendix 1 (4 pages) and Appendix 2 (10 pages)

100. PESTICIDE USE

The registrant is requesting that Nemacur 3 be conditionally registered as a nematicide for use on pineapples grown in the Hawaiian Islands.

100.1 APPLICATION RATES/METHODS/DIRECTIONS

See proposed ammendment to existing product label in Appendix I.

101. CHEMICAL PHYSICAL PROPERTIES

See previous reviews by Gessner 12/3/80; Regelman (EFB) 1/19/83.

101.3 PRECAUTIONARY LABEL STATEMENTS

This product is toxic to fish, birds, and other wildlife. Keep out of lakes, streams or ponds. Bird feeding in treated areas maybe killed. In cleaning equipment or disposal of wastes, do not contaminate water.

See also Section 107.3 for suggested label changes.

102. BEHAVIOR IN THE ENVIRONMENT

103. TOXICOLOGICAL PROPERTIES

Data submitted in support of the proposed pineapple registration are as follows:

STUDY	SPECIES	FORMULATION	RESULTS	VALIDATION STATUS
Acute avian	Bobwhite	90% A.I.	LD_{50}=1.6 mg/kg	Core
Avian reproduction	Bobwhite	90% A.I.	No Impairment NOEL 8 ppm	Core
Avian reproduction	Mallard	90% A.I.	Impairment NOEL 2 ppm	Core
Simulated field study	Bobwhite	NEMACUR 3	NOEL 10 lb AI/A	Suppl.
Orchard field study	Mixed species	NEMACUR 3	Substantial mortality over first 5 Days	Suppl.

Additional fish and wildlife toxicity data are outline in previous product reviews by Gavin (01/10/76), Gessner (12/03/80), and Rabert (09/28/82).

104. HAZARD ASSESSMENT

Introduction

The registrant (Mobay Chemical Corporation) proposes to apply Nemacur 3 to pineapple fields (1-1/3 to 8 pints) as a broadcast spray or through drip irrigation. Applications may begin immediately after planting or immediately after crop harvest. Additional applications may be made at intervals of one (1) to three (3) months as needed.

Nemacur's active ingredient (Fenamiphos) is currently registered for use on soybeans (71,586,000 acres), peanuts (1,549,700 acres), and cotton (13,947,000 acres). The proposed pineapple (25,314 acres) registration could theoretically result in a 0.02% increase in overall product usage. However, according to the 1978 Census of Agriculture very limited amounts of soybeans, peanuts, and cotton are grown in the Hawaiian Islands. Therefore, the proposed registration could represent a minimal increase in exposure to "new" non-target fish and wildlife populations.

Avian Exposure

Fenamiphos (90% AI) is highly toxic to upland game birds (bobwhite LC_{50}=38 ppm; Japanese quail LC_{50}=59 ppm) and moderately toxic to waterfowl (mallard LC_{50}=316 ppm). No observable effect levels (NOEL's) have been determined for both the mallard duck (14-weeks NOEL = 2 ppm) and bobwhite quail (25-weeks NOEL = 8 ppm). No data are available on the subacute toxicity of sulfoxide and sulfone metabolites to non-target avian species.

Nemacur adsorbs to soil particles but can leach in soils which have a low adsorption coefficient. These would tend to be light soils with less organic matter or fine clay particles. Nemacur generally converts to sulfoxide and sulfone phenols within three (3) weeks, but residues of (20 lbs/a.i.) Nemacur and its metabolites have been found in a soil sample 2 years after the last application. These soil residues were noted to be tightly bound to soil particles in heavier soils. Hydrolysis is not a mode of soil degradation as Nemacur binds to soil molecules. Because of this some runoff occurs (Cook, R.W. EFB 10/03/73).

Fenamiphos and its soil metabolites are readily absorbed by plants. Data characterizing soil photolysis are not currently available but have been requested by the Environmental Fate Branch (Fletcher 01/19/83).

A bobwhite quail feeding study (LC_{50} = 38 ppm) was used to establish a theoretical no effect trigger (1/5 LC_{50}) of 7.6 ppm. The extent to which potential avian dietary items and non-target birds could be contaminated are demonstrated in Table 1A-C (See Appendix II). Exposure estimates are based upon one (1) application at the maximum labeled rate (i.e., 3 lbs AI/acre). Comparisons between total estimated daily pesticide body burdens and no effect triggers (1/5 LC_{50}) determined for eight species of non-target birds suggest the following:

1. That small upland game birds feeding on dietary items contaminated by Fenamiphos residues could exceed the 7.6 ppm/day no effect trigger by a factor of 19X (Table 1B; 14-day bobwhite).

2. That small (>50 g.) insectivorous birds (14-day old bobwhite, Carolina wren, etc.) are likely to be exposed at the highest Fenamiphos residues (Tables 1B and 1C).

3. That seed eating birds (morning dove) should be exposed to lower Fenamiphos residues (Table 1B).

Avian 8-day subacute bioassays were unable to demonstrate a no observable effect level (NOEL) for Fenamiphos on upland game birds and waterfowl. Bioassays conducted on bobwhite and mallard duck suggest that short term NOEL's are > 46.4 ppm and >10 ppm, respectively. Field soil photolysis studies requested by EFB are needed to predict the extent and duration of Fenamiphos residues on avian dietary items (See also Section 107.6 EEB's Conclusions).

The effects of Fenamiphos on upland game birds under field use conditions were tested on two previous occasions. Abstracts of these studies are presented below:

> Bobwhite quail were tested in a 14-day field study on soil to evaluate the toxic effects of Nemacur 3 under simulated field conditions. The test substance was applied at rates of 6, 10, and 20 pounds AI/acre and immediately incorporated to a depth of 2 to 3 inches. Under the conditions of this study Nemacur had no significant effect on mortality, weight gain, clinical signs, gross lesions or brain cholinesterase activity (Author's Abstract).
>
> The toxicity of Nemacur 3 to resident birds was tested in a 41-day orchard field study. The compound was broadcast at 23.8 lbs AI/acre during the late spring and not incorporated. Under these conditons it represents a hazard to those species which forage on the ground in the treated areas. Significant (0.9 inches) rainfall appears to eliminate the hazard (Author's Abstract).

Rates of application and use sites in both the above cited studies do not reflect the agricultural practices or labeled rates for pineapple and as such, do not adequately reflect avian

hazards assoicated with the proposed action. Nevertheless, some of the observations recorded do provide useful information. The fact that test mortalities were limited to the first two days in the 14-day small pen study is believed to be dependent upon incorporation and the relatively heavy body weight (150-200 g.) of the test subjects used (See Table 1B; adult quail). The large scale avian mortality observed during the orchard field study clearly demonstrates the increased hazard associated with un-incorporated broadcast spray applications.

In conclusion, registration of Fenamiphos for an additional 25,000 acres of pineapples grown in the Hawaiian Islands will provide for a minmal increase in exposure, but there are acute risks to non-target birds. More specifically, mortalities are expected to result from the ingestion of contaminated dietary items and, as such, the likelihood of an avian species ingesting a lethal dose of Fenamiphos should increase with the rate of product application (1 1/3 to 8 pints). Avian mortalities are expected to occur primarily in small birds (less than 50 grams) and to be heaviest during the first week following product application. The hazard to non-target avian wildlife will be significantly reduced following rainfall or irrigation of target areas. Label changes proposed in Section 107.3 could help reduce the number of non-target mortalities. The field soil photolysis data requested by EFB are also needed to assess the potential chronic effects of low level Fenamiphos residues on non-target birds.

Aquatic Exposure

Fenamiphos is highly toxic to fish and extremely toxic to freshwater invertebrates. A 96-hour bluegill sunfish LC_{50} of 9.5 ppb was used to establish a theoretical no effect trigger (1/10 LC_{50}) of 0.95 ppb for warmwater fishes. A Daphnia magna LC_{50} of 1.6 ppb was used to establish a theoretical no-effect trigger (1/10 LC_{50}) of 0.16 ppb for freshwater invertebrates. No data are available on the chronic toxicity of Fenamiphos to freshwater fish or aquatic invertebrates.

As indicated earlier, Nemacur is soluble (ca 400 ppm) in water and readily adsorbs to soil molecules and as such, can contaminate rainwater runoff and/or irrigation return flow waters. The half life of Nemacur in water (pH 7) was noted to be about 5 days.

Exposure to non-target aquatic organisms is expected to occur via runoff (i.e., rainwater, irrigation return flow waters) and/or spray drift (See recomended label changes 107.3). Estimated Aquatic Concentrations (EAC's) for a theoretical one (1) acre lentic ecosystem contaminated by direct application or rainwater

Table 2. Estimated aquatic residues for a one (1) acre lentic ecosystems contaminated by direct application (100%) or rainwater runoff (5% to 0.5%). Estimates are based upon the minimum and maximum labeled rate of product application (i.e., 0.5 to 3 lbs AI/A).

Pounds Active/ Acre	Percent Exposure	6 inches of water (ppm)	12 inches of water (ppm)	2 feet of water (ppm)	3 feet of water (ppm)	6 feet of water (ppm)	10 feet of Water (ppm)
0.5	100	0.367	0.183	0.091	0.061	0.030	0.018
0.5	5	0.018	0.009	0.004	0.003	0.0015	0.0009
0.5	1	0.003	0.001	0.0009	0.0006	0.0003	0.0001
0.5	0.5	0.0018	0.0009	0.0004	0.0003	0.0001	0.00009
3.0	100	2.2	1.103	0.552	0.368	0.184	0.110
3.0	5	0.11	0.055	0.027	0.018	0.009	0.005
3.0	1	0.022	0.011	0.005	0.003	0.0018	0.001
3.0	0.5	0.011	0.005	0.0027	0.0018	0.0009	0.0005

runoff are shown in Table 2. Comparison of the above fish and invertebrate no effect triggers to estimated EAC's suggests the following:

1. Non-target fishes and aquatic invertebrates indigenous to small ponds (worst case situation) receiving 0.05 to 1.0% runoff could be exposed to Fenamiphos residues that exceed their respecitve no effect triggers.

2. EAC's based on the 0.5 lbs AI/acre application rate indicate that between 1-2 feet and 6-10 feet of water are needed to dilute Fenamiphos residues to below the level of potential effect for fish and aquatic invertebrates, respectively.

3. Water depths required to dilute EAC's projected for the maximum rate of application (3.0 lbs AI/acre) are 6-10 feet for fish and greater than 10 feet for aquatic invertebrates.

4. Runoff estimates for watersheds drained by lotic ecosystems were not calcuated but are presumed to be below the levels of concern for fish and invertebrates due to dilution, the short duration of exposure, and the short half life of this product in water.

In conclusion, the registration of Fenamiphos as a nematicide for use on pineapples grown in the Hawaiian Islands will provide for a minimal increase in exposure, but there are acute risks to non-target fish and aquatic invertebrates. More specifically, aquatic organisms indigenous to water sheds adjacent to or immediately downstream from target areas could be exposed to lethal Fenamiphos residues. However, the available data indicate that such exposures should be short in duration and sufficiently diluted so as avoid large scale adverse impact. Label directions recomended in Section 107.3 could help reduce the likelihood of this product reaching water.

Endangered Species Considerations

As demonstrated earlier (See Avian Exposure), Fenamiphos can represent a hazard to small upland game birds. Telephone conversations with Washington based endangered species representative, Dr. Jay Shepard (FTS 235-1975) reveal that there are three major groups of federally protected birds inhabiting the Hawaiian Islands. Dr. Shepard identified the following three groups: (1) seabirds; (2) forest birds; and (3) waterbirds. In the opinion of Dr. Shepard, the habitat requirements of the first two groups preclude their exposure to Fenamiphos residues. However, Waterbirds (coots, gallinets, stilts) are known to inhabit large freshwater marshes located adjacent to agricultural areas in the Hawaiian Islands.

Given the above scenario, the primary route of exposure to these marshy areas would be via contaminated rainwater runoff. A mallard duck LC50 of 316 ppm was used to calculate a theoretical no-effect trigger of (1/10 LC50) of 31.6 ppm. Comparison of this waterfowl trigger to

anticipated level of exposure in the aquatic environment (Table 2) short half life of this material in water (5 days) suggests that the use of this product should not pose a toxicological hazard to federally protected waterfowl in Hawaii.

In conclusion, the available data indicate that the use of Nemacur 3 on pineapple grown in the Hawaiian Islands could result in a minimal increase in exposure, but no acute risks to federally threatened or endangered species inhabiting the Hawaiian Islands.

107. CONCLUSIONS

107. DATA ADEQUACY

The following studies have been classified as acceptable and as such, can be used in support of product registration.

1. Acute Oral LD_{50} of NEMACUR Technical to Bobwhite Quail
   Ref: TOX 243; AC 80372

2. Fenamiphos Reproduction Study with Mallard Duck
   Ref: TOX 305; AC 82225

3. Fenamiphos Reproduction Study with Bobwhite Quail
   Ref: TOX 304; AC 82224

4. NEMACUR 3 Field Study with Bobwhite Quail
   Ref: TOX 284; AC 80748

5. NEMACUR 3 Avian Field Study
   Ref: TOX 320; AC 82266

107.3 LABELLING

EEB recommends that the registrant's existing label be amended to read as follows:

" This product is extremely toxic to fish, birds, and other wildlife. Keep out of lakes, ponds or streams. Do not apply when weather conditions favor drift from target area. Do not contaminate water by cleaning of equipment or disposal of wastes."

107.6 EEB FINDINGS

EEB has completed an incremental risk assessment (3(c)(7) finding) of the proposed conditional registration of NEMACUR 3 on pineapples grown in Hawaii. Based on the available data EEB concludes that the proposed use provides for a minimal increase in exposure, but there are acute risks to nontarget organisms. EEB wants to emphasize, however, that it can not assess the impact of chronic exposures on non-target birds because pertinent environmental fate data are missing. In order to completely assess the risks associated with repeat applications, EEB requires the field soil photolysis data requested by the Environmental Fate Branch (Fletcher memo 01/19/83).

Charles A. Bowen II
Fisheries Biologist, Section No. 1
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

Date: 03/09/83

Raymond Matheny
Head, Review Section No. 1
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

Date: 3/9/83

Clayton Bushong, Chief
Ecological Effects Branch
Hazard Evalution Division (TS-769)

3/9/83

Date:

APPENDIX I

(PROPOSED PRODUCT LABEL)

NEMAL

Reason to Issue: To add use on pineapple in Hawaii only. 9/20/76 Draft: To revise and correct "Remarks." 11/12/76 Draft: To delete pre-plant uses for NEMACUR and limit to 20 lbs. a.i./acre/crop season. 5/6/77 Draft: Revise as required by EPA. 12/1/82 Draft: Product Development revision.
EPA Reg. No. 3125-283

U.S. LABEL

Date of Draft: 12/1/82 (Pre-Reg) (H)
Supersedes Pre-Reg Draft Dated: 5/6/77

® NEMACUR 3

Emulsifiable Nematicide

ACTIVE INGREDIENT:
Ethyl-3-methyl-4-(methylthio)phenyl (1-methylethyl) phosphoramidate 35%

AMENDMENT
To Previously Registered Labeling

ADD THE FOLLOWING:

RECOMMENDED APPLICATIONS

CROP	PEST	DOSAGE OF NEMACUR 3	REMARKS
Pineapple (Hawaii only)	Nematodes (Rotylenchulus and Meloidogyne species)	1-1/3 to 8 pints	POSTPLANT APPLICATION: - PLANT CROP. Apply specified dosage in 50 to 250 gallons of water per acre as a broadcast spray or through drip irrigation. Applications may begin immediately after planting. Make additional applications at intervals of 1 to 3 months as needed. Do not apply within 30 days before harvest. Do not apply more than a total of 13.3 gallons of NEMACUR 3 per acre per plant crop. -RATOON CROP. Apply specified dosage in 50 to 250 gallons of water per acre as a broadcast spray or through drip irrigation. The first application may be made immediately following crop harvest. Make additional applications at intervals of 1 to 3 months as needed. Do not apply within 30 days before harvest. Do not apply more than a total of 6.7 gallons of NEMACUR 3 to each ratoon crop.

2

Reduced to 85% of Actual Size

RESTRICTED USE PESTICIDE

For retail sale to, and use only by, Certified Applicators or persons under their direct supervision, and only for those uses covered by the Certified Applicator's certification.

ACCEPTED

MAR 16 1982

Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 3125-283

Nemacur 3

Emulsifiable Systemic Insecticide—Nematicide

For effective control of nematodes in certain field crops.

ACTIVE INGREDIENT:	
Ethyl 3-methyl-4-(methylthio)phenyl (1-methylethyl)phosphoramidate	35%
INERT INGREDIENTS	65%
	100%

EPA Reg. No. 3125-283
EPA Est. 3125-MO-1

Contains 3 pounds per gallon of Ethyl 3-methyl-4-(methylthio)phenyl (1-methylethyl)phosphoramidate.

Do not store below 32° F. Keep in a cool dry place. Keep away from heat and open flame.

STOP—Read the label before use.

DANGER ☠ **POISON**

Keep out of reach of children.
(See Antidote and Danger Statement on Rear Panel)

NET CONTENTS 5 GALLONS

Mobay Chemical Corporation
Agricultural Chemicals Division
Box 4913, Kansas City, Mo. 64120

Aviso.

AL USUARIO: Si usted no puede leer o entender inglés, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

(TO THE USER: If you cannot read or understand English, do not use this product until the label has been fully explained to you.)

Directions for use.

IMPORTANT: Read these entire Directions and Conditions of Sale before using NEMACUR 3 nematicide.

CONDITIONS OF SALE: The directions on this label were determined through research to be the directions for correct use of this product. This product has been tested for a range of weather conditions similar to those weather conditions that are ordinary and customary in the geographic area where the product is used. Insufficient control of pests may result from the occurrence of extraordinary or unusual weather, or from failure to follow label directions. In addition, failure to follow label directions may cause injury to the crop to which the product is applied, other crops, animals, man, or the environment. Mobay and the seller offer, and the buy accepts and uses, this product subject to the conditions that extraordinary or unusual weather, or failure to follow label directions are beyond the control of Mobay and are, therefore, the responsibility of the buyer.

NEMACUR 3 nematicide has shown excellent activity against the major genera of nematodes attacking the following crops. NEMACUR kills nematodes by contact action. An application at planting time has provided season-long protection from nematode damage.

COTTON AND PEANUTS: When applied according to directions on this label NEMACUR 3 will provide early season reduction of thrips infesting cotton and peanuts, and control of thrips infesting cotton.

111 810

Recommended applications.

CROP	PEST	DOSAGE NEMACUR 3 IN FURROW OR BAND FL. OZS./1000 Ft. of row	REMARKS
FIELD CROPS Cotton	Thrips (early season reduction)	2.4 to 3.3 fl. oz. per 1000 ft. of row for any row spacing. (1 to 1-1/3 quarts per acre based on 40 inch rows).	In furrow/covering soil:* Apply specified dosage per 1000 ft. of row as a spray in furrow or band in covering soil behind the seed drop and in front of covering devices.
	Nematodes Thrips	3.3 to 7.1 fl. oz. per 1000 ft. of row for any row spacing. (1-1/3 to 2.9 quarts per acre based on 40 inch rows).	In furrow/covering soil:* Apply specified dosage per 1000 ft. of row as a spray in furrow or band in covering soil behind the seed drop and in front of covering devices. Band: Apply specified dosage per 1000 ft. of row as a spray in a 6 to 12 inch band over the row. Incorporate thoroughly to insure uniform distribution.†

Suggested use rates of NEMACUR 3 in fluid oz./1000 feet of row based on nematode infestation levels:**

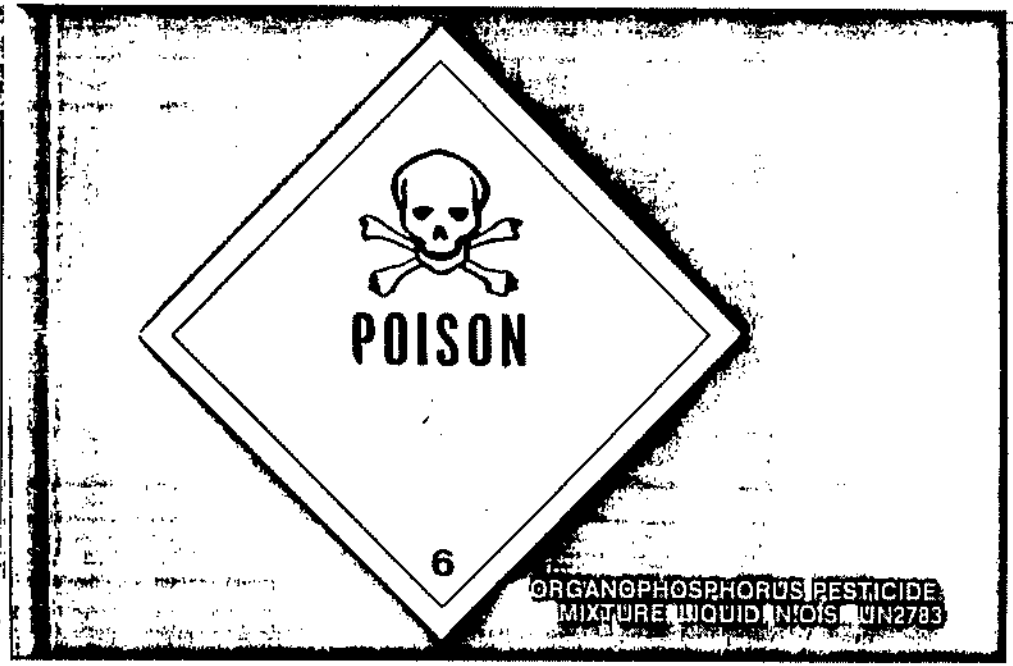
Bandwidth	Low	Moderate	High**
In furrow	3.3	4.0	4.8
In covering soil	3.3	4.0	4.8
6 inch band	3.3	4.0	4.8
8 inch band	4.0	4.8	5.7
10 inch band	4.4	5.2	6.2
12 inch band	4.8	5.7	7.1

*Application of NEMACUR 3 in furrow/covering soil is not recommended in Florida, Georgia, North Carolina, South Carolina, or Virginia.

**Use the highest recommended rates in fields with a history of nematode problems.

IMPORTANT: Do not overlap bands on narrow row crops. Do not feed or graze cotton foliage. Under very heavy thrip pressure additional control measures may be needed.

†The action of some planters during planting operation may provide adequate incorporation. When using planters which do not disturb enough soil for incorporation or under dry conditions, additional incorporation can be achieved with scratchers, paddlewheels, ground driven rotovators or similar equipment behind the planter.



Recommended applications.

CROP	PEST	DOSAGE NEMACUR 3 BAND: FL. OZS./1000 Ft. of Row	DOSAGE NEMACUR 3 BROADCAST: GALLONS/ACRE	REMARKS
FIELD CROPS				FOR BAND OR BROADCAST APPLICATION:
Peanuts	Nematodes Thrips (early season reduction)	4.3 to 8.3 fl. oz. for any row spacing (or 2 to 3.3 quarts per acre on 36-inch rows)	1 to 1.6 gallons	BAND: Apply specified dosage of fl. oz. per 1000 ft. of row as a water emulsion spray in a 12 to 18 inch band over the row in front of the planter shoe. Use sufficient water and incorporate thoroughly to insure uniform distribution. Use the high rate in fields with high populations of nematodes or in fields having a history of serious nematode damage. WHEN BAND APPLICATIONS ARE USED ON NARROW ROW CROPS, DO NOT USE BAND WIDTHS THAT WILL ALLOW TREATED AREAS TO OVERLAP.
Soybeans	Nematodes	3 to 11 fl. oz. for any row spacing (or 1.3 to 5 quarts per acre on 36-inch rows)	1.3 to 2 gallons	BROADCAST: Apply as a water emulsion spray over the entire area to be treated using sufficient water and thorough incorporation to insure uniform distribution. Use the high rate in fields with high populations of nematodes or in fields having a history of serious nematode damage. Plant crop in the usual manner. NOTE: When NEMACUR is applied to soybeans, crop injury from Propanil drift may be intensified. For both band and broadcast applications do not feed or graze soybean vines, green peanut vines or peanut vine hay. Do not hog down treated peanut fields.

Restrictions.

Do not use on other crops. Use only according to label directions.

Any food crop not specified on this label may be planted into treated areas 120 days after the last application. Any cover crops that are planted during the 120 day period must be plowed under and not grazed.

This product is toxic to fish, birds and other wildlife. Keep out of lakes, streams, or ponds. Birds feeding on treated areas may be killed. In cleaning of equipment or disposal of wastes, do not contaminate water.

Container disposal.

DO NOT REUSE THE CONTAINER—Completely empty the contents and bury the unused chemical at least 18 inches deep in an isolated location away from water supplies.

Rinse empty can by filling with water and adding 2 tablespoonfuls of household lye. Burn rinse solution at least 18 inches deep in an isolated area away from water supply. Punch holes in the top and bottom of the can, crush the can, and bury deeply in an isolated location.

Do not use container in any connection with feed, food, and drinking water.

DANGER POISON

Fatal if swallowed or absorbed through the skin. Causes eye damage. May be fatal if inhaled. Do not get in eyes, on skin or on clothing. Wear protective clothing, rubber gloves, and goggles or face shield when handling. Wash thoroughly with soap and water after handling and before eating or smoking.

Do not breathe fumes or spray mist. For protection against organophosphorous insecticides, wear a mask or respirator jointly approved by the Mining Enforcement and Safety Administration (formerly the U.S. Bureau of Mines), and by the National Institute for Occupational Safety and Health under the provisions of 30 CFR Part 11.

Do not contaminate feed or food. Keep out of reach of children. Keep all unprotected persons out of the operating area or vicinity. Wash hands, arms, and face thoroughly with soap and warm water before eating or smoking.

HANDLING OF CONTAMINATED ARTICLES: Clothing and rags receiving undiluted NEMACUR 3 as a result of leaks, spills, or mishaps should be removed immediately and not reused. These contaminated articles should be buried in the same manner as the empty container; see container disposal section for directions. (Contaminated articles which should be discarded would include: hats, gloves, aprons, coats, boots, etc. not made of rubber or coated with rubber or other similar materials). Clothing receiving spray mist or droplets from the mixed, diluted NEMACUR 3 should be removed and decontaminated before reuse. This clothing can be decontaminated by machine washing separately from other items with soap or detergent and bleach in hot water twice before reuse. Protective clothing and equipment should be washed down with detergent or soap and bleach in water. Wash water from the cleaning of protective clothing or equipment should not be allowed to run off or otherwise enter water supplies.

SYMPTOMS OF POISONING: A sense of "tightness" in the chest. Sweating. Contracted pupils. Stomach pains. Vomiting and diarrhea.

TREATMENT: In case of poisoning, call a physician immediately. Have patient lie down and keep quiet. If swallowed, vomiting should be induced. Administer milk or water freely, and induce vomiting by giving one dose (½ oz. or 15 ml.) of syrup of ipecac. If vomiting does not occur within 10 to 20 minutes, administer second dose. If syrup of ipecac is not available, induce vomiting by sticking finger down throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Professional medical assistance should be secured immediately. If on skin, remove contaminated clothing and wash skin immediately with soap and warm water. If eyes are contaminated, wash with flowing water for at least 15 minutes. If inhaled, remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth.

To physician:

ANTIDOTE—Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is also antidotal and may be administered in conjunction with atropine.

Compound inhibits cholinesterase resulting in stimulation of the central nervous system, the parasympathetic nervous system, and the somatic motor nerves. Do not give morphine. Watch for pulmonary edema, which may develop in serious cases of poisoning even after 12 hours. At first sign of pulmonary edema, the patient should be placed in an oxygen tent and treated symptomatically.

088070

APPENDIX II

CALCULATED LC50 VALUES AND ESTIMATED FENAMIPHOS EXPOSURE FOR SEVEN SPECIES OF NON-TARGET BIRDS.

Table 1A. Calculated LC_{50} values and estimated Fenamiphos exposure (MG/KG/DAY and MG/ANIMAL/DAY) for seven species of non-target birds.

SPECIES	BODY WGT. (GMS.)	FOOD CONS. (GMS.)	F. CONS./ B. WGT (%)	CALCULATED LC50 (PPM) 6/	TOXICANT 4/ MG/KG/DAY	CONSUMED 5/ MG/ANIMAL/DAY	1/5 CALCULATED LC50 6/ 7/	1/5 7/ LC10
1. Bobwhite Quail (Young)	30.0 1/	6.0 2/	20.0	38.0 3/	7.6	0.2	7.6	3.3
2. Bobwhite Quail (Adult)	170.00	15.20	8.94	85.0	7.6	1.3	17.0	7.3
3. Robin	81.10	8.11	10.00	75.9	7.6	0.6	15.2	6.5
4. Mourning Dove	100.00	11.20	11.20	67.9	7.6	0.8	13.6	5.8
5. Eastern Cowbird	50.00	7.00	14.00	54.3	7.6	0.4	10.9	4.7
6. Field Sparrow	13.90	4.60	33.10	23.0	7.6	0.1	4.6	2.0
7. Grasshopper Sparrow	13.90	4.60	33.10	23.0	7.6	0.1	4.6	2.0
8. Carolina Wren	19.00	6.50	34.20	22.2	7.6	0.1	4.4	1.9

1/ Milligrams body WGT. (Average weight) 17 day old birds.

2/ Average 5-day food consumption, 17 day old birds.

3/ LC_{50} determined by registrant's testing facility.

4/ $\text{MG/KG/Day} = \text{LC50 (ppm)} \times \frac{\text{F. Con. (g)}}{\text{B. WGT. (g)}}$

5/ MG/ANIMAL/DAY = MG/KG/DAY X Body weight (kg).

6/ $\text{LC50 (ppm)} = \frac{\text{MG/KG/Day}}{\text{F. Con.(g) / B. WGT (g)}}$

7/ 1/5 LC10 represents the theoretical no-effect level for federally threatened and endangered species (Slope = 3.50034).

7 Registrant's testimony

Table 1B. Dietary contamination and total estimated Fenamiphos residues for eight species of non-target birds.

SPECIES	CALCULATED LC_{50} (PPM) [1]	1/5 CALC. LC_{50} (PPM) [2]	FOOD CONSUMED [3] Animal (%)	Plant	MAXIMUM EXPECTED RESIDUES [4] (PPM) Animal	Plant	MAXIMUM ADJUSTED RESIDUES [5] Animal	Plant	TOTAL RESIDUES [6] (PPM) Both Plant/Animal
Bobwhite Quail (14-Day)	38.0	7.6	80% Beetles Weevils Grasshoppers Etc.	20% Seeds: Ragweed Lespedeza Corn Etc.	174.0 ppm (k) [7]	36.0 ppm (k)	139.2 ppm [8]	7.2 ppm [9]	146.4 ppm
Bobwhite Quail (Adult)	85.0	17.0	27% Beetles Weevils Grasshoppers etc.	73% Seeds: Ragweed Lespedeza Corn etc.	174.0 ppm (k)	36.0 ppm (k)	47.0 ppm	26.3 ppm	73.3 ppm
Robin	75.9	15.2	40% Caterpillars Beetles Weevils Earthworms Etc.	60% Seeds/ Fruits: Cherry Dogwood Holly	174.0 ppm (k)	36.0 ppm (k)	69.6 ppm	21.6 ppm	91.2 ppm
Mourning Dove	67.9	13.6	0%	100% Seeds: Corn Pigweed Etc.	174.0	36.0 ppm (k)	0.0	36.0 ppm	36.0 ppm

FOOTNOTES IN TABLE 1C.

Table 1C. Dietary contamination and total estimated Fenamiphos residues for eight species of non-target birds.

SPECIES	CALCULATED LC_{50} (PPM) [1]	1/5 CALC. LC_{50} (PPM) [2]	FOOD CONSUMED(%) [3] Animal	Plant	MAXIMUM EXPECTED RESIDUES [4] (PPM) Animal	Plant	MAXIMUM ADJUSTED RESIDUES [5] Animal	Plant	TOTAL [6] RESIDUES(ppm) Both Plant/Animal
Eastern Cowbird (Adult)	54.3	10.9	52% Grasshoppers Beetles Caterpillars	48% Seeds: Bristlegrass Oats	174.0 ppm(k)	36.0 ppm(k)	90.5 ppm [8]	17.3 ppm [9]	107.8 ppm
Field Sparrow (Adult)	23.0	4.6	51% Beetles Grasshoppers Caterpillars Etc.	49% Seeds: Crabgrass Bristlegrass Panicgrass Etc.	174.0 ppm(k)	36.0 ppm(k)	88.7 ppm	17.6 ppm	106.4 ppm
Grasshopper Sparrow (Adult)	23.0	4.6	61% Grasshoppers Caterpillars Ants Etc.	39% Seeds: Bristlegrass Ragweed Knotweed Etc.	174.0 ppm(k)	36.0 ppm(k)	106.1 ppm	14.0 ppm	120.2 ppm
Carolina Wren (Adult)	22.2	4.4	99% Ants Flies Millipedes Etc.	1% Seeds Poison-Ivy Pine Oaks Etc.	174.0 ppm(k)	36.0 ppm(k)	172.3 ppm	0.4 ppm	172.6 ppm

FOOTNOTES IN TABLE 1C.

FOOTNOTES FOR TABLE 1B AND 1C

1/ Refer to table 1A (Footnote 6) for an explanation of how the "calculated LC_{50}'s" were obtained.

2/ Application of Sec. 102.11(c)(2)(iii)(B) criterion of Sec. 3 Regulations.

3/ This information is taken from:

Martin, Alexander C., et al., American Wildlife and Plants; A Guide to Wildlife Food Habits, Dover Publ., Inc., N.Y., 1951

4/ Based upon a 3.0 lb. active ingredient per acre, application to expected food items using following references:

(a) Hoerger, F.D. and E.E. Kenaga, Pesticide Residues on Plants. Correlation of Representative Data as a Basis for Estimation of Their Magnitude in the Environment. Environmental Quality, Academic Press, New York, I: 9-28, 1972.

(b) Kenaga, E.E., Factors to be Considered in the Evaluation of the Toxicity of Pesticides to Birds in Their Environment, Environmental Quality and Safety, Academic Press, N.Y., II: 166-181, 1973.

5/ Residue values adjusted to reflect % animal/plant matter consumed. Examples:

(a) Bobwhite Quail, Adult:

174.0 ppm x 0.27 (27%) = 47.0 ppm
36.0 ppm x 0.73 (73%) = 26.3 ppm

(b) Robin, Adult:

147.0 ppm x 0.40 (40%) = 69.6 ppm
36.0 ppm x 0.60 (60%) = 21.6 ppm

6/ Reflects total residues expected in the diet: animal or plant alone or a total of animal and plant food items. Examples:

(a) Robin, Adult:

69.6 + 21.6 = 91.2 ppm total for animal and plant foods.

(b) Mourning Dove, Adult:

36.0 ppm total expected in food items consumed (i.e., 1.00 (100%) x 36.0 ppm = 36 ppm).

7/ (k) refers to maximum expected residues as per (4)(a), and (b) above.

8/ This is the maximum expected residue value for daily pesticide burden occurring from animal items.

9/ Daily pesticide burden occuring from ingested plant items.

DATA EVALUATION RECORD

1. Chemical: Nemacur

2. Formulation: Technical (90%)

3. Citation: Lamb, D.W. 1982. Acute oral LD_{50} of Nemacur Technical to bobwhite. Mobay Chemical Corporation. Study Number: 81-0f15-02. Accession Number: 071291.

4. Reviewed By: Charles A. Bowen II
Fisheries Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. Date Reviewed:

6. Test Type: Acute Oral LD_{50}

A. Test Species: Bobwhite Quail (Colinus virginianus)

7. Reported Results:

LD_{50} = 1.6 mg/kg $\frac{\text{95\% C.I.}}{\text{(1.3 to 1.9 mg/kg)}}$

NOEL = 0.5 mg/kg.

8. Reviewer's Conclusion:

This bioassay is scientifically sound and demonstrates that Technial Nemacur is very highly toxic to upland game birds. This study will fulfill the requirement for a 14-day acute oral LD_{50} study.

DATA EVALUATION RECORD

1. Chemical: Nemacur

2. Formulation: Technical (90%)

3. Citation: Lamb, D.W. and Carsel, M.A. 1982. Fenamiphos Reproduction Study with Mallard Duck. Reference Tox. 305; AC 82225. Mobay Chemical Corporation (EPA Acc. No. 071291).

4. Reviewed By: Charles A. Bowen II
Fisheries Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. Date Reviewed: March 3, 1983

6. Test Type: 14-Week Avian Reproduction Study

A. Test Species: Mallard Duck (Anus platyrhynchos)

7. Reported Results:

Fenaiphos significantly reduced measured feed consumption and egg shell production when present at 16 ppm in the diet but not at lower (4 ppm, 8 ppm) concentrations. The no significant effect level, based on mortality, gross lesions, egg shell thickness, egg production, embryo and hatchling survival, was 8 ppm.

8. Reviewer's Conclusion:

This bioassay is scientifically sound and demonstrates that chronic technical Nemacur dietary exposures as low as 8 ppm can adversely effect reproduction in waterfowl. This study will fulfill the requirement for a avian reproduction study of mallard duck.

DATA EVALUATION RECORD

1. Chemical: Nemacur

2. Formulation: Technical (90%)

3. Citation: Lamb, D.W. and Carsel, M.A. 1982. Fenamiphos Reproduction Study with Bobwhite Quail. Reference Tox. 305; AC 8224 Mobay Chemical Corporation (EPA Acc. No. 071291)

4. Reviewed By: Charles A. Bowen II
Fisheries Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. Date Reviewed: March 3, 1983

6. Test Type: 25-Week Avian Reproduction Study

A. Test Species: Bobwhite Quail (Colinus virginianus)

7. Reported Results:

Dietary exposures of 0.5, 2.0, or 8.0 ppm fenamiphos had no significant effects on adult body weight, feed consumption, brain cholinesterase, survival or egg production, shell thickness, cracking, fertility or hatchling, or on weight of chicks. Chick survival to 14 days was reduced by 31% in the 8.0 ppm group. The highest no observed effect level (NOEL) was 2.0 ppm.

8. Reviewer's Conclusion:

This bioassay is scientifically sound and demonstrates that chronic dietary exposure up to 8.0 ppm should not effect the reproductive success of upland birds. This study will fulfill the requirement for a avian reproduction study on bobwhite quail.

DATA EVALUATION RECORD

1. Chemical: Nemacur

2. Formulation: Nemacur 3 (35% A.I.)

3. Citation: Carlisle, J.C. 1982. Nemacur 3 Avian Field Study. Reference Tox 320; 82266. Mobay Chemical Corporation (EPA Acc. No. 071291).

4. Reviewed By: Charles A. Bowen II
Fisheries Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. Date Reviewed: March 3, 1983

6. Test Type: 14-Day Simulated Field Study

A. Test Species: Bobwhite Quail (Colinus virginianus)

7. Reported Results:

Fenamiphos was applied to bare soil at the rate of 6, 10, 20 pound a.i./acre and immediately incorporated to a depth of 2 to 3 inches. Under the conditions of this study Nemacur 3 had no significant effect on mortality, weight gain, clinical signs, gross lesions or brain cholinesterase activity. All study mortalities were limited to day 1, no further signs of intoxication were observed.

8. Reviewer's Conclusion:

This bioassay is scientifically sound and deomonstrates that incorporated applications significantly reduces the hazard to large (150-200g) upland gamebirds. This study is acceptable and can be used in support of product of product registration.

DATA EVALUATION RECORD

1. Chemical: Nemacur

2. Formulation: Nemacur 3 (35% A.I.)

3. Citation: Lamb, D.W. 1982. Nemacur 3 Field Study With Bobwhite Quail. Reference Tox. 320; Acc. No. 80748. Mobay Chemical Corporation (EPA Acc.# 071291).

4. Reviewed By: Charles A. Bowen II
Fisheries Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. Date Reviewed: March 3, 1983

6. Test Type: 41-day Field Study

A. Test Species: Mixed Avian Species

7. Reported Results:

Twenty six (26) acres of orchard were sprayed at the rate of 23.8 lbs. a.i./acre in the late spring of 1982. Under these conditions Nemacur 3 was associated with significant avian (Robins, Sparrows, Starlings) and mammalian (Rabbits, Woodchucks) mortalities over the next five days. The hazard to non-target wildlife was apparently eliminated by 0.9 inches of rainfall. Repopulation of the treated orchard was nearly complete by one month post application.

8. Reviewer's Conclusion:

This bioassay is scientifically sound and demonstrates that high rates Nemacur 3 can represent a hazard to birds and small mammals that forage in treated areas. This study is acceptable and can be used to support product registration.