

US EPA ARCHIVE DOCUMENT

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.
<u>100601</u>	<u>Ethyl-3-methyl-4-(methylthio)phenyl-</u>	
	<u>(1-methylethyl)phosphoramidate</u>	<u>35</u>
	<u>Inert ingredients</u>	<u>65</u>
	<u>TOTAL</u>	<u>100</u>

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

100. PESTICIDE USE

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

100.1 APPLICATION RATES/METHODS/DIRECTIONS

See proposed amendment 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 LC₅₀=38 ppm; Japanese quail LC₅₀=59 ppm) and moderately toxic to waterfowl (mallard LC₅₀=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 conditions 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 associated 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 minimal 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 LC₅₀ of 9.5 ppb was used to establish a theoretical no effect trigger (1/10 LC₅₀) of 0.95 ppb for warmwater fishes. A Daphnia magna LC₅₀ of 1.6 ppb was used to establish a theoretical no-effect trigger (1/10 LC₅₀) 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, Nematicur 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 Nematicur 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 recommended 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).

<u>Pounds Active/Acre</u>	<u>Percent Exposure</u>	<u>6 inches of water (ppm)</u>	<u>12 inches of water (ppm)</u>	<u>2 feet of water (ppm)</u>	<u>3 feet of water (ppm)</u>	<u>6 feet of water (ppm)</u>	<u>10 feet of Water (ppm)</u>
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 respective 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 calculated 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 recommended 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 LD₅₀ 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

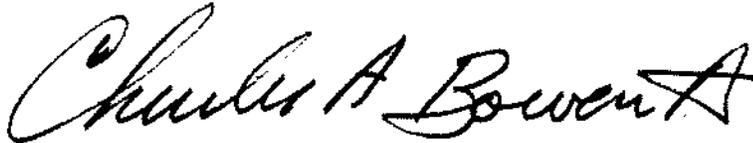
EEB recommends that the registrant's existing label be amended to read as follows:

" 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).



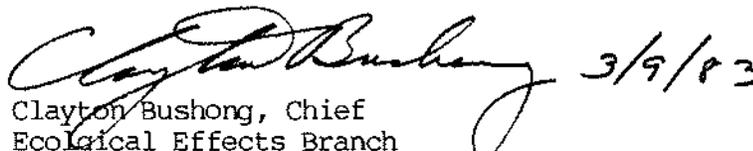
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APPENDIX I
(PROPOSED PRODUCT LABEL)

NEMAL

U.S. LABEL

Reason to Issue: To add use on pineapple in Hawaii only.

Date of Draft: 12/1/82 (Pre-Reg) (H)

9/20/76 Draft: To revise and correct "Remarks." 11/12/76

Supersedes Pre-Reg Draft Dated: 5/6/77

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

[®]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 (<u>Rotylenchulus</u> and <u>Meloidogyne</u> species)	1-1/3 to 8 pints	<p><u>POSTPLANT APPLICATION:</u></p> <p>- <u>PLANT CROP.</u> 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.</p> <p>Do not apply more than a total of 13.3 gallons of NEMACUR 3 per acre per plant crop.</p> <p>- <u>RATOON CROP.</u></p> <p>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.</p> <p>Do not apply more than a total of 6.7 gallons of NEMACUR 3 to each ratoon crop.</p>

Approved to 8590 of Retail 7222

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 as shown under EPA Reg. No. 7222-281

Nemacur 3

Emulsifiable Systemic Insecticide—Nematicide

For effective control of nematodes in certain field crops.

ACTIVE INGREDIENT:
Ethyl 3-methyl-4-[(methylthio)phenyl]-1H-imidazo[5,1-b]phosphorimidate 33%
INERT INGREDIENTS 67%

EPA Reg. No. 3125-283
EPA Est. 3125-MO-1
Contains 3 pounds per gallon of Ethyl 3-methyl-4-[(methylthio)phenyl]-1H-imidazo[5,1-b]phosphorimidate.

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 le etiquete le haya sido explicada simplificada.
(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. In some cases, contact of pests may result from the occurrence of unusual weather, or from failure to follow label directions. Inability to follow label directions may cause injury to the crop to which the product is applied, other crops, animals, or the environment. Mobay and the seller offer, and the buyer 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 3 nematicide 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 injury to nesting cotton and peanuts, and control of trips infesting cotton.

111 810

Recommended applications.

CROP	PEST	OSDADE NEMACUR 3 IN FURROW OR BAND FL. OZ. / 1000 FL. OZ. OF ROW	REMARKS
FIELD CROPS Cotton	Thrips leaf-miner mosaic reduction	2.4 to 3.2 fl. oz. per 1000 fl. oz. of row or 1 to 1 1/2 quarts per acre based on 40 inch rows.	In furrow/covering soil: Apply specified dosage per 1000 fl. oz. of row or based on band or covering devices. Band: Apply specified dosage per 1000 fl. oz. of row as a spray in a 6 to 12 inch band over the row. Incorporate thoroughly to insure uniform distribution.
	Nematodes Thrips	2.3 to 7.1 fl. oz. per 1000 fl. oz. of row or 1.2 to 3.8 quarts per acre based on 40 inch rows.	In furrow/covering soil: Apply specified dosage per 1000 fl. oz. of row or based on band or covering devices. Band: Apply specified dosage per 1000 fl. oz. 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 fl. oz. / 1000 fl. oz. of row based on nematode infestation level**	
		Row/cover	High**
		33	40
		33	48
		33	48
		40	57
		44	57
		48	57

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

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

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

The action of some plant-insecting sprays may provide adequate insect control. When using pesticides which do not overlap enough to insure uniform distribution, additional incorporation can be achieved with a cultivator, puddler, harrow, or ground driven roller. Use of similar equipment behind the planter.

Recommended applications.

CROP	PEST	OSDADE NEMACUR 3 BAND: FL. OZ. / 1000 FL. OZ. OF ROW	BROADCAST: GALLONS/ACRE	REMARKS
FIELD CROPS Peanuts	Nematodes Thrips leaf-miner mosaic reduction	4.5 to 8.5 fl. oz. for every row spacing for 2 to 3 quarts per acre on 36-inch rows.	1 to 1 1/2 gallons	TOX BAND BROADCAST APPLICATIONS: BAND: Apply specified dosage in a 6 to 12 inch band over the row as a water emulsion spray in a 6 to 12 inch band over the row. Incorporate thoroughly to insure uniform distribution. Use the high rate in fields with high populations of nematodes or in fields having a history of nematode infestation. Use the low rate in fields with low populations of nematodes or in fields having a history of nematode infestation. 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 nematode infestation. Use the low rate in fields with low populations of nematodes or in fields having a history of nematode infestation. NOTE: When NEMACUR 3 is applied to soybeans, crop injury from Propant drift may be minimized. For both band and broadcast applications do not feed or graze soybeans until green peanut vines or pods are visible. Do not log down treated peanut fields.
	Soybeans	Nematodes	3 to 11 fl. oz. for every row spacing for 1.5 to 3 quarts per acre on 36-inch rows.	1.5 to 2 gallons

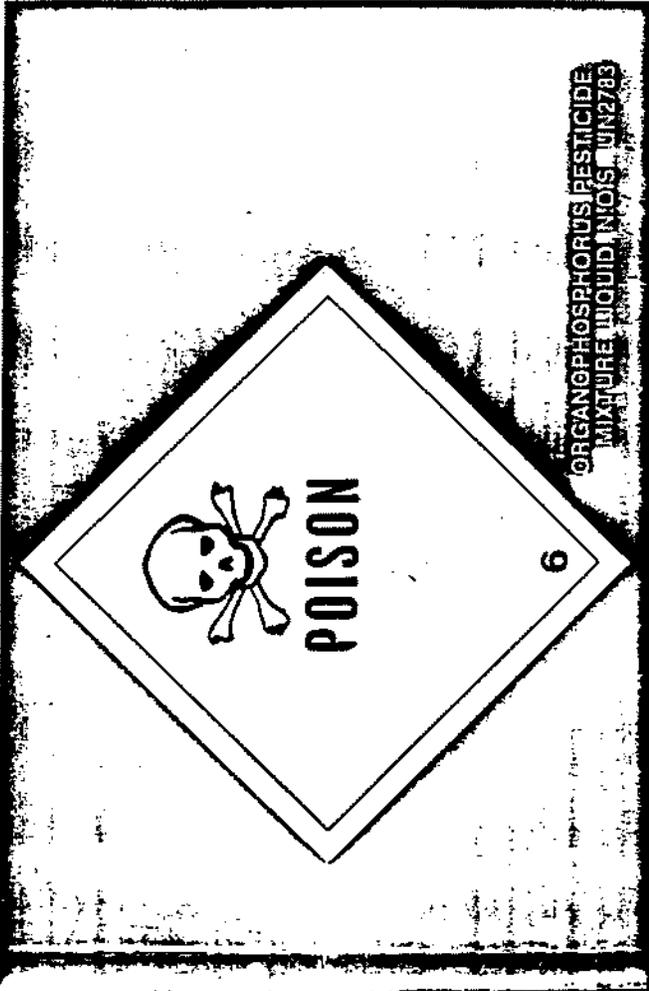
Restrictions.

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

Do not use on any crop not specified on this label (only be placed on 100 clover or other legume crops).

Any cover crops that are planted during the 120 day period must be plowed under and not grazed.

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 container into the unused chemical of least value deep in an isolated location away from water supplies.

Reuse empty can by filling with waste and adding 2 lbs. of household lye. Bury the 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 combination with feed, food, and drinking water.

CONTAINER DISPOSAL

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. Wash thoroughly with soap and water after handling and before eating or drinking.

Do not breathe fumes or spray mist. For protection against peroxophosphorus insecticides, wear a mask or respirator (only 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:

Do not receive untreated 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 de-

containing spray mist or droplets from the mixed, diluted NEMACUR 3 should be removed and decontaminated before reuse. The clothing can be decontaminated by machine washing separately from other items with soap or detergent. Do not use the clothing for other purposes. Do not use the clothing for other purposes. Do not use the clothing for other purposes.

SYMPTOMS OF POISONING:

A sense of "tightness" in the chest. Sweating. Contracted pupils. Stomach pain. Vomiting and diarrhea.

TREATMENT: In case of poisoning call a physician immediately. Have patient lie down and keep warm. If swallowed, vomiting should be induced. Administer milk or water freely and induce vomiting by giving one dose (1/2 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 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 alkaline solution to large toxic doses. Removal is necessary to the point of tolerance. 2-PAM is also indicated and may be administered in conjunction with atropine.

Compound inebrius 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.

NEMACUR 3 is a Reg. U.S. Pat. & Tm. Office
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APPENDIX II

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

Table IA. Calculated LC50 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)	TOXICANT ⁴ / MG/KG/DAY	CONSUMED ⁵ / MG/ANIMAL/DAY	1/5 CALCULATED LC50 6.7	1/ 107 / ⁵ 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. 6/ LC50 (ppm) = $\frac{\text{MG/KG/Day}}{\text{F. Con. (g) / B. WGT (g)}}$

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

3/ LC50 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/ $\text{MG/ANIMAL/DAY} = \text{MG/KG/DAY} \times \text{Body weight (kg)}$.

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

7 Registrant's name

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

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

FOOTNOTES IN TABLE 1C.

DATA EVALUATION RECORD

1. Chemical: Nema-cur
2. Formulation: Technical (90%)
3. Citation: Lamb, D.W. 1982. Acute oral LD₅₀ of Nema-cur 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 LD₅₀
 - A. Test Species: Bobwhite Quail (Colinus virginianus)
7. Reported Results:

95% C.I.
LD₅₀ = 1.6 mg/kg (1.3 to 1.9 mg/kg)

NOEL = 0.5 mg/kg.

8. Reviewer's Conclusion:

This bioassay is scientifically sound and demonstrates that Technical Nema-cur is very highly toxic to upland game birds. This study will fulfill the requirement for a 14-day acute oral LD₅₀ study.

DATA EVALUATION RECORD

1. Chemical: Nemaicur
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. Moby 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 Nemaicur 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: Namacur
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 demonstrates 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: Nema-cur
2. Formulation: Nema-cur 3 (35% A.I.)
3. Citation: Lamb, D.W. 1982. Nema-cur 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 Nema-cur 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 Nema-cur 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.