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EEE BRANCH REVIEW

Original: amended 9/27/78

DATE: IN 5/28/77 OUT 11/28/77 IN ____ OUT ____ IN ____ OUT ____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 3125 283-236-237

PETITION OR EXP. PERMIT NO. 3968-EUP-5

DATE DIV. RECEIVED

DATE OF SUBMISSION

DATE SUBMISSION ACCEPTED

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

DATA ACCESSION NO(S).

PRODUCT MGR. NO. 21 Wilson

PRODUCT NAME(S) Nemacur 3; Nemacur 15; Nemacur 10

COMPANY NAME Chemagro

SUBMISSION PURPOSE Registration Tobacco

CHEMICAL & FORMULATION Ethyl 3-Methyl-4-(Methylthio) phenyl (1-methylethyl) phosphoramidate

Nemacur 3 (3125-283)	35% A.I.
Nemacur 15 (3125-236)	15% A.I.
Nemacur 10 (3125-237)	10% A.I.

16 pages

NEMACUR 3,10,15 IN: 5/28/77 OUT: 11/28/77 - 3

101.0 Physical and Chemical Properties

(Refer to Environmental Safty Review by Gerald L. Gavin dtd 10 Nov 1976., ALSO See NEMACUR REVIEW O'BRIEN 25 NOV. 1977 for Citrus

102.0 Behavior to the Environment

No Data Submitted: See NEMACUR (3125-283-236-237) Citrus O'Brien NOV 25, 1977

Plants

There is no information concerning the method of broadcast application of ~~the~~ NEMACUR 3. The method of application may influence the ~~extent~~ possibility of drift into non-target areas.

103.0 Toxicological Properties

See related review on Nemacur (Citrus 3125-283-236-237) NOV 25, 1977, O'Brien

104.0 Hazard Assessment

104.1 Discussion

For additional information see Nemacur (Citrus 3125-283-236-237) NOV 25, 1977

Broadcast application of Nemacur on tobacco will result in the following residues

Nemacur 3 6 LB A.I./acre = 133 ppm on Surface
with 6 inches soil incorporation = 26.5 ppm

Nemacur 10 G at 6 LBS A.I./acre 6 inch SOIL INCORPORATION
= 6.246 mg / Ft²

Nemacur 15 G at 6 LBS A.I./acre 6 inch SOIL INCORPORATION
= 6.246 mg / ft²

that acute toxicity criteria may be exceeded even with maximum soil incorporation.

Nemacur 3 6 LBS A.I./acre = 133 ppm

Bob white 2.02 mg > 0.152 mg/animal

Mallard 6.65 mg > 2.016 mg/animal

White footed Mouse 0.5985 > 0.1425 mg/animal

Meadow vole 0.931 > 0.325 mg/animal

Nemacur 10 G + 15 G = at 6 LB A.I./acre

Bob white 6.246 mg/ft² > 0.152 mg/animal

Mallard 6.246 mg/ft² > "

White footed Mouse 6.246 mg/ft² > "

Meadow Vole 6.246 mg/ft² > "

The above figures represent what this reviewer feels are minimum residues that would occur, due to inefficiencies in application and incorporation techniques by unskilled applicators. It is also important to note here that the Environmental Safety Section does not have adequate information concerning Nemacurs subacute effects to birds to accurately predict how serious the environmental hazard actually is. It is apparent however that Nemacur is highly toxic and is not

104.1.4 ADDITional Data Required

See Conclusions section 107.5

105.0. Classification

This product lacks basic data upon which classification considerations ~~determinations~~ are made, however it is the opinion of this reviewer that future consideration be given to classifying the use restricted based upon available information

107.0 Conclusions

107.1 Environmental Fate and Toxicology

The Environmental Safety Section has not been supplied with a current review of either Environmental Chemistry or Human Toxicology data

107.3 Labeling

The Nemacur 3, 10 + 15 labels should have the addition of the following statements to the Environmental Safety section of the label.

"Do not contaminate water by cleaning of equipment or disposal of waste."

"This pesticide is toxic to bees exposed to direct application or the residues remaining on the treated areas."

"This pesticide should not be applied in areas associated with use by endangered species of fish and wildlife. For guidance contact your Regional Office of the Environmental Protection Agency."

107.4. Data Adequacy

The following data have been found acceptable to support the [redacted] registration of this product.

A. The fish acute 96 hr LC_{50} cold water fish species. Technical Nemacur.

B. The fish Acute 96 hr LC_{50} warm water fish species. Technical Nemacur.

107.5 Data Requests

The following data are required by the Environmental Safety Section before an Environmental Hazard Assessment can be made. These data requests are to fill data gaps where previously studies have been submitted and found unacceptable or data has not been referenced or submitted and a need is felt to exist for the studies.

A. THE Avian Acute oral LD_{50} for one species of waterfowl (Mallard duck, preferably) or one species of upland game bird (ring-necked pheasant or bobwhite quail). The studies submitted are not acceptable because they were not conducted using the technical grade material as is required.

B. The Dietary LC_{50} for one species of waterfowl (Mallard Duck) and one species of upland game bird (Bob-white Quail or ring-necked pheasant). This study must be conducted on the technical grade material

C. The ~~##~~ Acute 48 hour LC_{50} for an aquatic invertebrate (Daphnia sp., preferably) study must be conducted on the technical grade material

D. AN Avian Reproduction study is required on Bob White Quail and Mallard Duck. This study is required for the technical grade material. Levels that should be tested will depend upon dietary LC_{50} values for these species and residue levels that will be expected under field condition. The registrant should consult the ~~environ-~~ mental safety section for guidance.

E. AN MAMMAL Acute LD_{50} ON a Representative species of wild mammal will be required due to the toxic nature of the chemical, the likelihood of exposure and the possibility of exposure to endangered species

E. A small open simulated field study utilizing birds and mammals will be required. These studies should be conducted under field conditions that most closely represent the use pattern, rates of application and label directions. The registrant should contact the Environmental Safety section for guidance.

F. The registrant should also be informed that the Environmental Safety Section is concerned about the [redacted] impurities in Technical Mirex. Pending input of information from Environmental Chemistry, additional toxicity data may be required for the impurities and the degradates. The registrant should address the problem and the relative persistance of these impurities and their degradates.

H. The registrant should also be informed that the Environmental Safety Section is concerned about the toxic nature of this chemical as it relates to benefical insects. The registrant should address means of identifying if exposure problems could occur. THE Registrant SHOULD ALSO Stay INFORMED of possible data requirements that may come into existance in the future for benefical insects.

INFORMATION ON IMPURITIES (MANUFACTURING INFORMATION) IS NOT INCLUDED

107. Recommendations

The Environmental Safety Section can not concur with the registration of Nemacur 3, 10G or 15G on Tobacco. The reasons for this decision are as follows.

1. The use pattern is considered as a major crop addition
2. Environmental Chemistry and Toxicology Reviews are not available for use in a hazard assessment
3. Basic data required for registration is not availdble
4. Application rates of this product are high and without all basic data it is not possible to predict the severity of adverse ecological effects.

THOMAS F. O'BRIEN NOV 28, 1977
ENVIRONMENTAL Safety Section
EEEB - RD WH 567

Amended 9/27/78

100.0 Pesticidal Use

Nemacur 3, 10 G, and 15 G are proposed for use on flue-cured tobacco for control of root-knot nematode.

100.1 Application methods/rates/directions

The following are the added directions for Nemacur on tobacco.

NEMACUR 3

Active Ingredient: 35%

RECOMMENDED APPLICATIONS

CROP	DOSAGE NEMACUR 3 BAND: FLUID OUNCES/ 1,000 Ft. of Row	DOSAGE NEMACUR 3 BROADCAST: GALLONS/ACRE	REMARKS
FIELD CROPS			BROADCAST: Apply as a water emulsion spray over the entire area to be treated, using sufficient water and thorough incorporation to insure uniform distribution. Where a range in rates is recommended 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.
Tobacco (Not for use on shade grown tobacco)	(Use Only Broadcast Application On Tobacco)	2 6 Lbs A.I./Acre	

9/27/78

NEMACUR 10% Granular

Active Ingredient 10%

RECOMMENDED APPLICATION

CROP	DOSAGE NEMACUR 10% Granular BAND: OZS/1,000 FT. OR ROW	BROADCAST:LBS/ ACRE	REMARKS
Tobacco (Not for use on shade grown tobacco)	(Use only broadcast application on tobacco)	60 Pounds/ acre 6 Lbs A.I./ Acre	BROADCAST: Distribute the granules uniformly over the entire area to be treated and immediately incorporate thoroughly to insure uniform distribution. Where a range in rates is recommended, use the high rate in fields with high populations of nematodes or in fields having a history of serious nematode damage.

9/27/78

NEMACUR 15% Granular

Active Ingredient 15%

RECOMMENDED APPLICATION

CROP	DOSAGE NEMACUR 15% Granular BAND: OZS/1,000 FT. OR ROW	BROADCAST:LBS/ ACRE	REMARKS
Tobacco (Not for use on shade grown tobacco)	(Use only broadcast application on tobacco)	40 Pounds/ Acre 6 Lbs A.I./ Acre	BROADCAST: Distribute the granules uniformly over the entire area to be treated and immediately incorporate thoroughly to insure uniform distribution. Where a range in rates is recommended, use the high rate in fields with high populations of nematodes or in fields having a history of serious nematode damage.

NOTE: Under Remarks, the underlined text refers specifically to rate ranges currently registered for use on other crops.

101.0 Chemical and Physical Properties

101.1 Chemical Name

ethyl-3-methyl-4-(methylthio) phenyl (1-methylethyl) phosphoramidate

101.2 Common Name

Nemacur

101.3 through 103 See related reviews on Nemacur for citrus and for non bearing fruit trees by T.F. O'Brien, amended by L. Turner (11/25/77 and 11/29/77).

104.0 Hazard Assessment

9/27/77

104.1 Discussion

For additional information see Nemacur review for citrus by T.F. O'Brien, amended by L. Turner, 11/25/77.

Only broadcast applications are proposed on the label for tobacco use. The following residues can be expected following application of the different formulations. All formulations call for thorough incorporation, which is assumed equivalent to 4-6 inches and therefore has an SDF (Felthousen memo on granular formulations) of 50.

1. Nemacur 3 at 6 pounds A.I./Acre preplant would result in initial soil residues in the top 0.1 inch of 132 ppm. After incorporation, residues would be 132 ppm ÷ 50 = 2.7 ppm throughout the top 6 inches, if evenly mixed.

2. Nemacur 10 G and 15 G, both at 6 pounds A.I./Acre would result in initial surface residues of 62.5 mg/ft^2. After incorporation surface residues would be 62.5 ÷ 50 = 1.25 mg/ft^2.

104.1.1 Likelihood of Exposure to Non-Target Organisms

Nemacur is an organophosphate compound that is used to control soil nematodes. In 1975 there were 1,086,350 acres of tobacco harvested in the United States. The tobacco industry occurs in 17 states with the largest acreage in North Carolina and Kentucky. Other Southern states have a considerable portion of the remaining acreage. Tobacco as a crop is not considered to have particularly high wildlife utilization, but application of Nemacur as a soil nematicide is done pre-plant at a time when the ground is fallow. This fallow ground has potentially high utilization by birds when temporary spring ponds occur or when the ground is broken for pesticide incorporation or crop planting. The major species that may be affected are those birds that feed on such organisms as soil arthropods, annelids, crustaceans, etc. Nemacur is highly toxic and the likelihood of exposure to wild species is therefore estimated to be high enough that adverse ecological effects are possible. The following comparisons of application rates versus exposure to certain species indicate that acute toxicity risk criteria may be exceeded for the granular formulations even with maximum and immediate soil incorporation.

Nemacur 10 G and 15 G at 6 pounds A.I./Acre:

Bobwhite 1.25 mg/ft^2 > 0.152 mg/animal
Mallard 1.25 mg/ft^2 < 2.016 mg/animal
White-footed mouse 1.25 mg/ft^2 > 0.1425 mg/animal

The animal toxicity figures were developed in related review of Nemacur on citrus by T.F. O'Brien, amended by L. Turner, 11/25/77. Residue figures were developed above in accordance with R. Felthousen's memo on granulated formulations, 9/9/77, and are felt to be realistic.

Because Nemacur 3 is a liquid which is soil incorporated with soil residues of 2.7 ppm, it is expected that the hazard for this use pattern would be substantially less than for granular formulations. Some soil particles or pebbles might be picked up as grit, but residues contained therein would be far less than the concentrated doses contained in the granules.

It is important to note here that Ecological Effects is lacking any dietary and acceptable acute studies for birds. Without this information, the extent of the hazard cannot be adequately assessed.

It is also possible that Nemacur could adversely affect aquatic organisms. The fish LC_{50} values are 17.7 and 72.1 ppb for bluegill and rainbow trout, respectively. Nemacur can bind to heavier soils and could possibly be surface transported into aquatic environments. If it reached the aquatic environment, it is soluble more than 1000x of the fish LC_{50}s and may be somewhat persistent. Additional Environmental Fate data is required to accurately assess the potential hazard to fish.

For additional information see Nemacur review for citrus by T.F. O'Brien, amended by L. Turner, Nov. 25, 1977.

104.1.2 Endangered Species Considerations

Based upon the highly toxic nature of Nemacur and its lack of species specification it is very likely that registration of Nemacur on tobacco could have an impact on endangered species if they became exposed to it. Because of the wide use on a regional basis the only way to handle endangered species with Nemacur would be to label against its use in areas frequented by endangered species.

104.1.3 Adequacy of Toxicity Data

Toxicity data were validated in Nemacur on citrus review by T.F. O'Brien, amended by L. Turner, 11/25/77. See that review for adequacy data.

104.1.4 Additional Data Required

See Section 107.5

105.0 Classification

This product requires additional data before classification can be made. However, based upon available information, it is the opinion of this reviewer that this use should seriously be considered for restricted use.

107.0 Conclusions

107.1 Environmental Fate and Toxicology

Environmental Fate and Toxicology data were included in related reviews by T.F. O'Brien, amended by L. Turner, for Nemacur use on citrus (11/25/77) and non-bearing fruit trees (11/29/77).

107.3 Labeling

The labels for Nemacur 3, 10 G and 15 G require modification to reflect environmental hazards. The exact changes necessary cannot be determined until additional fish and wildlife studies are available.

107.4 Data Adequacy

The warmwater and coldwater fish acute 96 hour LC_{50} studies for technical Nemacur were found acceptable to support registration. All other studies were not acceptable to support registration for various reasons specified below and in section 104.1.3 of Nemacur on citrus review by T.F. O'Brien, amended by L. Turner, 11/25/78.

107.5 Data Requests

The following studies are required by Ecological Effects before an environmental hazard assessment can be made. These requests are to fill data gaps where no studies have been previously submitted or where submitted data was found unacceptable to support registration. These studies must be conducted on the technical grade of Nemacur.

1. Avian subacute dietary LC_{50} studies for both wild waterfowl (preferably mallard duck) and upland game bird (preferably bobwhite quail or ring-necked pheasant).

2. An avian acute oral LD_{50} study for one of the species tested in (1) above. Previously submitted studies were unacceptable because the formulated product was tested, inappropriate species were tested, or numbers of birds tested were insufficient.

3. An aquatic invertebrate acute 48 hour LC_{50} study (preferably for Daphnia magna).

In addition to the above studies using the technical grade of Nemacur, small pen simulated field studies are required, using the 10 G or 15 G formulations. Small pen studies have been previously requested for citrus, and if adequate will probably satisfy such a requirement for the use pattern on tobacco.

Information on the toxic nature of Nemacur as it relates to beneficial insects should be provided.

It is imperative that this Branch be supplied with the average and range of both sizes and weights of the 10 G and 15 G granules.

9/27/

107.7 Recommendations

The Ecological Effects Branch cannot concur with the registration of Nemacur 3, 10 G, and 15 G on tobacco. There are insufficient fish and wildlife data to complete a hazard assessment.

Thomas F. O'Brien
November 28, 1977

Amended by: Larry W. Turner
September 27, 1978
Ecological Effects Branch, Section 1

James W. Akerman, Section Head
Ecological Effects Branch, Section 1

9/27/78

Clayton Bushong, Acting Branch Chief
Ecological Effects Branch