101201
SHAUGHNESSY NO.

30
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 7-20-85 OUT 24 SEP 1985

FILE OR REG. NO. 3125-280

PETITION OR EXP. PERMIT NO.

DATE OF SUBMISSION 6-4-85

DATE RECEIVED BY HED 7-19-85

RD REQUESTED COMPLETION DATE 10-1-85

EEB ESTIMATED COMPLETION DATE 9-24-85

RD ACTION CODE/TYPE OF REVIEW 336/New Use

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

DATA ACCESSION NO(S). N/A

PRODUCT MANAGER NO. 16 - Miller

PRODUCT NAME(S) Monitor 4

COMPANY NAME Mobay

SUBMISSION PURPOSE To reinstate lettuce use on Federal label

SHAUGHNESSY NO.	CHEMICAL & FORMULATION	% A.I.
	Methamidophos	40

EEB REVIEW

Pesticide: Methamidophos (Monitor)

100.1 Submission Purpose and Pesticide Use:

To reinstate use on head lettuce by both ground and air; to restrict use to California and Arizona only; to control aphids, armyworms, cabbage looper, cutworms, leafhoppers, leafminers and thrips in head lettuce in California and Arizona.

100.2 Formulation Information:

Monitor® 4

Active Ingredient:	
0,S-Dimethyl phosphoramidothioate.....	40%
Inert Ingredients:	60%

100.3 Application Methods, Directions, Rates:

Apply 1 to 2 pints of Monitor® 4 per acre in 5 to 10 gallons of water by aircraft or 20 to 50 gallons of water by ground equipment.

In a Preventive Program: Use 1 pint (0.5 pounds active) per acre and apply at 7-day intervals.

For Cleanup of Existing Populations: Use 1.5 to 2 pints (0.75 to 1.0 pound active) per acre.

Note: A maximum of 6 pints per acre may be applied per crop season. The minimum preharvest interval for central California and corresponding coastal areas is 65 days, and 50 days for desert valley areas of California and Arizona. Regardless of the stated preharvest interval, last application must be made prior to head formation. Do not feed treated lettuce to livestock.

100.4 Target Organisms:

Aphids, armyworms, cabbage looper, cutworms, leafhoppers, leafminers, thrips.

100.5 Precautionary Labeling:

Restricted Use Pesticide.

This product is toxic to birds and other wildlife. Birds and other wildlife in treated areas may be killed. Keep out of any body of water. Do not apply when weather conditions favor drift from areas treated. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

This product is highly toxic to bees exposed to direct treatment or residues on crops. Avoid use during flowering and pollination periods. Protective information may be obtained from your Cooperative Agricultural Extension Service.

101. Hazard Assessment:

101.1 Discussion:

In 1983, in the January to June growing season, Arizona had some 25,700 acres and California 56,900 acres in lettuce production. In the 1983 July to December season, Arizona had 14,500 acres and California about 91,100 acres planted to lettuce (USDA 1984, Agricultural Statistics). EEB does not know what portion of these acres were (are) planted to crispy-type head lettuce only. Crisphead lettuce is, however, the most important type of lettuce grown commercially in the United States, and the majority of crisphead lettuce is grown in Arizona and California (USDA 1974, Lettuce Production in the U.S.). The principal areas for lettuce production are in the coastal vallies of California in summer, and in the desert vallies of California and in Yuma County of Arizona in winter (Ryder, 1979).

101.2 Likelihood of Adverse Effects to Nontarget Organisms:

In Arizona the primary bird species feeding in or otherwise utilizing lettuce fields are:

Lark Buntings, White-crowned Sparrows, Mourning Doves, Western Meadowlarks, and the Roadrunner. In California the primary bird species feeding in or otherwise using lettuce fields include: Valley Quail, Ring-necked Pheasant, Horned Larks, Western Meadowlarks, various species of blackbirds, various species of sparrows, Pipits, Kildeer, Long-billed Curlew, and American Coots.

In both Arizona and California cottontail and jack rabbits frequent some lettuce fields. Due to intensive cultivation, most use of lettuce fields by nontarget organisms is for feeding; nesting is infrequent. Birds and small mammals tend to make extensive use of lettuce field edges and uncultivated borders (Gusey and Maturgo, 1973, Wildlife Utilization of Croplands.)

Methamidophos is highly toxic to mammals:

Species	Test	Results	Test Material
Rat	Acute Oral	Male LD_{50} = 15.6 mg/kg Female LD_{50}= 13.0 mg/kg	95% ai
Rat	2-Year Feeding	NOEL = 10 ppm	97% ai
Rabbit	Acute Dermal	LD_{50} = 118 mg/kg	95% ai

Methamidophos is very highly toxic to birds:

Species	Test	Results	Test Material
Bobwhite Quail	Acute Oral	LD_{50} = 10./ mg/kg	technical
Bobwhite Quail	Acute Oral	LD_{50} = 8.0 mg/kg	technical
Mallard	Acute Oral	LD_{50} = 29.5 mg/kg	technical
Junco	Acute Oral	LD_{50} = 8.0 mg/kg	technical
Bobwhite Quail	Dietary	LC_{50} = 42 ppm	technical
Mallard	Dietary	LC_{50} = 1302 ppm	technical
Bobwhite Quail	Reproduction	NEL < 5 ppm	technical
Mallard	Reproduction	NEL > 15 ppm	technical

Methamidophos is moderately toxic to fish and very highly toxic to aquatic invertebrates:

Species	Test	Results	Test Material
Rainbow Trout	LC_{50}	25 ppm	technical
Bluegill Sunfish	LC_{50}	34 ppm	technical
Daphnia magna	EC_{50}	.026 ppm	technical

The proposed use of methamidaphos, a maximum application rate of 1.0 lb ai/A, may be repeated up to 3 lb ai/A total over the growing season. The proposed use provides for the following maximum expected residues after an initial application of 0.5 and 1.0 lb ai/A:

Vegetation/Insect Surface	Residues (ppm) 0.5 lb ai/A	1.0 lb ai/A
Sparse Foliage (Short Grasses)	120	240
Long Grasses	55	110
Leaves/Leafy Crops	67.5	125
Forage/Small Insects	29	58
Pods/Large Insects	5	10
Fruits	3.5	7

(Kenaga, 1973, Expected Residues on Vegetation)

Under similar conditions of 0.5 lb ai/A and 1.0 lb ai/A, soil residues may equal, at 0.1 inch depth, 11 ppm for the 0.5 lb rate and 22 ppm for the 1.0 lb ai/A rate, at initial application (EEB Soil/Residue Nomograph).

Estimates of the actual amounts of methamidophos that would be consumed on a daily basis by various birds feeding in treated areas are:

Maximum Residues in/on food types (ppm)[1] (at 1 lb ai/A)	Mg/kg/day consumed by different sized birds		
	20 g (18%)[2]	100 g (9.2%)[2]	1000 g (3.6%)[2]
240 (short grass)	43	22	9
58 (small insects)	10	5.3	2.1
10 (large insects)	1.8	0.9	0.4

[1] From Kenaga, 1973.

2 Percent of body weight ingested in dry food/day, from Kenaga, 1973.

These residues, in some instances, exceed the laboratory LD_{50} or LC_{50} toxicity levels for birds. The typical diet of young bobwhite quail is about 80 percent insects and 20 percent seeds. Estimating residue intake then, a 1.0 lb ai/A use would yield the following expected body burden:

(58 ppm x 80%) + (10 ppm x 20%) =
48.4 ppm.

This residue exceeds the LC_{50} of 42 ppm for bobwhite quail, and thus Special Review (RPAR) criteria are exceeded.

Given multiple applications, up to a total of 3.0 lb ai/A/season, accumulated residues, at or near critical levels, are expected to be present for an extended period of time. The proposed use, therefore, poses a serious, probably lethal exposure to birds in lettuce fields.

Methamidophos applied at 1.0 lb ai/A to a 6" body of water would yield 0.73 ppm residues, thus greatly exceeding 48-hour EC_{50} values for Daphnia magna of .026 ppm. EEB requires actual field residue data prior to a determination that this proposed use would trigger Special Review (RPAR) criteria under standard application practices.

101.3 Endangered Species:

A minimum list of endangered species that may be exposed in California and/or Arizona lettuce fields includes: Masked Bobwhite Quail, Yuma Clapper Rail, and the San Joaquin Kit Fox.

EEB will not, at this time, request an Office of Endangered Species (USFWS, USDI) Biological Opinion on this proposed use of methamidophos because EEB requires additional residue and field test data prior to completion of an EEB hazard assessment.

101.4 Adequacy of Toxicity Data:

EEB requires: a field residue monitoring study, and a field test for avian hazard from use of methamidophos on lettuce prior to completion of a hazard assessment for this proposed use.

101.5 Adequacy of Labeling:

N/A

102 Classification:

N/A

103 Conclusions:

EEB can only prepare a partial hazard assessment because critical residue and field data are not available. On the basis of available data EEB believes nontarget organisms will be put at unreasonable risk and exposure from use of methamidophos at up to 3.0 lb ai/A/season on lettuce. Special Review criteria are expected to be exceeded. EEB requires the following tests prior to a full hazard evaluation:

1. §70-1: Field Residue Monitoring in Lettuce
2. §71-5: Actual Field Testing in Lettuce

Protocols for the field residue and actual field testing must be approved by EEB prior to initiation of the tests.

Until such data are received and evaluated, EEB cannot concur on a proposed registration of methamidophos for use on lettuce.

M. Rostker 23 Sept 1985

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9.24.85

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REFERENCES

Ecological Effects Branch files.

Gusey, W.F. and Z.D. Maturgo. (1973) Wildlife Utilization of Croplands. Environmental Affairs, Shell Oil Company, Texas.

Kenaga, E.E. (1973) Factors to be Considered in the Evaluation of the Toxicity of Pesticides to Birds in Their Environment. Pp. 166-171 in Coulston (Editor). Environmental Quality and Safety, Vol. II. Academic Press, Inc., New York.

Ryder, E. J. 1979. Leafy salad vegetables. AVI Publlishing Company, Westport, Connecticut.

USDA. (1973) Lettuce Production in the United States. Agriculture Handbook No. 221. Agricultural Research Service. Revised, August 1974.

Methamidophos ecological effects review

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Pages _____ through _____ are not included in this copy.

The material not included contains the following type of information:

___ Identity of product inert ingredients

___ Identity of product impurities

___ Description of the product manufacturing process

___ Description of product quality control procedures

___ Identity of the source of product ingredients

___ Sales or other commercial/financial information

X A draft product label

___ The product confidential statement of formula

___ Information about a pending registration action

___ FIFRA registration data

___ The document is a duplicate of page(s) _____

___ The document is not responsive to the request

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
