101201
SHAUGHNESSY NO.

52
REVIEW NO.

EEB BRANCH REVIEW FEB 5 1986

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

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. W. Miller (16)

PRODUCT NAME(S) Monitor 4 Spray

COMPANY NAME Chevron Chemical Company

SUBMISSION PURPOSE Proposed registration of use on eggplant (Florida only)

SHAUGHNESSY NO.	CHEMICAL & FORMULATION	% A.I.
101201	Methamidophos	40

Ortho Monitor 4® Spray

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

Chevron Chemical Company is proposing full registration of Monitor 4® Spray for use on eggplant in Florida only. The target pests are spidermites, aphids, leafminers, and Lepidopterous larvae.

100.2 Formulation Information

Active Ingredient	
Methamidophos	40.0%
Inert Ingredients	60.0%

100.3 Application Methods, Directions, Rates

Apply 1 to 2 pints (0.5 to 1.0 lb ai) per acre. Spray at 7 to 10 -day intervals. Do not apply more than a total of 14 pints (7 lb ai/A/season) per acre per crop season. Do not apply later than 7 days before harvest. For ground and aerial application, use 20 to 150 gallons of water.

100.4 Target Organisms

Spidermites, aphid, leafminers, Lepidopterous larvae

100.5 Precautionary Labeling

"This product is extremely toxic to birds and other wildlife. Birds and other wildlife in treated areas may be killed. Do not apply directly to water bodies or wetlands (e.g., lakes, streams, ponds, canals).

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area."

101 Hazard Assessment

101.1 Discussion

This proposed full registration covers use of Monitor 4® Spray in Florida only, for use on eggplant.

The vegetable industry in Florida is generally located in an area with rich organic soils. Fields are often created by draining wetlands and are frequently located close to lakes, marshes, estuaries and other important wildlife habitats. In Palm Beach County, for example, many vegetable fields are located on the Southeast edge of Lake Okeechokee and these fields are drained via canals towards the Southeast and the Loxahatchee National Wildlife Refuge (EEB Review on Methamidophos, dated January 6, 1978). In Seminole County, fields drain directly into small lakes in the area. Due to the great interface with wetlands and other aquatic environments, pesticides introduced into drainage or irrigation canals are likely to reach nontarget aquatic habitats. Also, many bird species are in these areas due to the habitat variability and diversity of available food sources afforded by the terrestrial, wetland, and aquatic areas.

101.2 Likelihood of Adverse Effects to Nontarget Organisms

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} = 10.0 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
Mysid shrimp	LC_{50}	1.1 ppm	technical
Sheepshead minnow	EC_{50}	5.6 ppm	technical

The proposed use of Ortho Monitor 4® Spray provides for 0.5 to 1.0 lb ai/A methamidophos to be applied per treatment, up to a total of 7 lb ai/A/season. Applications are to be at 7-10 day intervals. The following residues are estimated following a single 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	100
Leaves/Leafy Crops	67.5	135
Forage/Small Insects	29	38
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 1.0 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	.9	.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} values for birds.

The typical diet of young bobwhite quail is composed of 80 percent small-to-medium-size insects and 20 percent seeds. Therefore, calculating estimated residue intake from the table above yields:

$$(80\% \times 58 \text{ ppm}) + (20\% \times 10 \text{ ppm}) = 48.4 \text{ ppm residue}$$

intake from application of 1.0 lb ai/A of methamidophos to avian food items. This residue exceeds the LC_{50} of 42 ppm for bobwhite quail as well as the chronic reproductive impairment level of 5 ppm. Given the repeated application (up to 7 lb ai/A/season) bobwhite quail are at risk of lethal and chronically hazardous exposure from this use of methamidophos.

Field evidence documents the hazard to birds. A 1980 bird kill in Wisconsin resulted when Monitor 4 was aerially sprayed on cabbage. Methamidophos residues (0.08 to 24 ppm) were detected in plant samples collected in and around the treated field. Brain cholinesterase analyses indicated significant inhibition in house sparrows and killdeer. Methamidophos residues ranging from 0.6 to 5.8

ppm were detected in bird specimens. It was concluded by personnel at USDI/FWS, Patuxent Wildlife Research Center, that the birds died from methamidophos poisoning.

Monitor applied at 1.0 lb ai/A to a 6-inch pond would theoretically result in a maximum calculated concentration of 0.73 ppm methamidophos in the water (EEB Standard Dilution Nomograph). While the most sensitive fish tested to date, the rainbow trout, has an LC_{50} = 25 ppm, the aquatic invertebrate, Daphnia magna, has an LC_{50} of 0.026 ppm. Under a worst-case scenario, Daphnia magna would be at serious risk from this proposed use of methamidophos.

At the maximum application rate, per treatment, of 1.0 ai/A, and using an assumption that 0.5 to 1.5 percent of the total amount of water-soluble insecticides such as methamidophos, applied to crops, will reach adjacent aquatic habitats via runoff alone (Wauchope 1978), the residues in water could range between 0.004 and 0.01 ppm methamidophos. Thus, estimates suggest that the proposed use of methamidophos could result in lethal concentrations for aquatic invertebrates in adjacent shallow waters. No data are available on the chronic effects of methamidophos to aquatic invertebrates.

101.3 Endangered Species Considerations

A variety of federally listed endangered species occur in Florida, many of them with a distribution that is state-wide. Endangered species with distributions throughout the state, and potentially at risk from the proposed use of Monitor 4 Spray include the Bald Eagle, Bachman's Warbler, American Alligator, and the Eastern Indigo Snake. Endangered species, potentially at risk, and with distributions within the general areas that cucumbers are grown are the Arctic Peregrine Falcon, the Everglade Kite, Kirtland's Warbler, the American Crocodile, and the Atlantic Salt Marsh Snake.

Eggplant is grown in relatively small-sized fields, which have considerable edge, or intersection, with surrounding nonagricultural habitat that tends to be heavily used by wildlife. These various non-target organisms, including endangered species, forage directly in the vegetable fields. Eggplant is considered an attractive forage crop for many birds and mammals. Also, predacious species, such as the Peregrine Falcon and Bald Eagle, may utilize cucumber sites as hunting grounds for preferred prey of small birds and for fish that are in the canels adjacent and internal to the fields.

There are no precautionary measures that would be efficacious in preventing exposure of these animals because the hazard from use of Monitor 4 Spray on eggplant, used as proposed with repeat applications, is both widespread throughout the dispersed areas in Florida where the crop is grown, and chronic throughout the growing season. Further, Monitor 4 Spray is lethal to most non-targets at very low exposure levels.

EEB is requesting, as per FIFRA, a formal consultation with the Office of Endangered Species because EEB believes this full registration may prrovide serious, acute and chronic hazard to endangered species. The time required for such a consultation is usually 90 days. When EEB receives the consultation, EEB will make a full evaluation of risk to endangered species.

101.4 Adequacy of Toxicity Data

Environmental fate, field residue monitoring, and avian field testing requirements are outstanding from the Registration Standard.

These data are necessary to confirm or rebut the residue and exposure estimates presented in this review. Until the estimates are fully rebutted, the presumption of hazard stands. In estimating residues exposure and risk EEB employed the best available techniques. Field evidence is necessary to confirm or adjust these estimates.

102 Conclusions

EEB is extremely concerned over this proposed use of methamidophos. This pesticide appears to pose serious risk to birds, mammals and aquatic organisms under application rates as low as 0.5 to 1.0 lb ai/A. Repeated applications exacerbate the hazard. Until EEB receives the requested consultation on endangered species, EEB cannot complete a full risk assessment for endangered species.

EEB does not concur with the requested registration. Additional testing is necessary prior to any determination that this highly toxic pesticide may be safely used on eggplant. EEB has required field and residue monitoring data in the methamidophos Registration Standard. These data will directly bear upon a hazard assessment for eggplant use. At such a time as these data are available, EEB will be able to evaluate a full registration request for use on eggplant.

Until that time, EEB finds that use of Monitor 4 Spray (methamidophos) on eggplant poses a serious exposure situation and is likely to result in both acute and chronic hazards to nontarget organisms.

In addition to nonconcurrence on this registration request, EEB notes that no other label additions will be considered until all required data are submitted.

EEB requests that it be informed of the disposition of this registration request.

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