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File

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

Subject: Toxicity Quotient Rankings for NTN on Turf.

To: Dennis Edwards, PM 19
Registration Division, H7505C

JUN 22 1993

From: Anthony F. Maciorowski, Chief *Anthony F. Maciorowski*
Ecological Effects Branch
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EEB has completed a hazard ranking of the toxicity quotients for NTN (Imidacloprid). NTN has Section 3 registrations pending for turf and ornamental uses. The two non-granular formulations for turf registration include a 75% Wettable Powder and a 21% Liquid. The preliminary hazard ranking includes the turf use only with the nine alternatives submitted by BEAD. Included are acute avian values and acute and chronic values for fish and invertebrates.

Please note:

- This is a preliminary toxicological hazard ranking and not a comparative risk assessment.
- Avian chronic reproductive effects require additional data review. EEB is awaiting receipt of data from the registrant concerning chronic hazard and persistence to finalize the NTN risk assessment.
- Four of the alternatives submitted by BEAD are in special review (these chemicals are marked - *) based on eco- and health concerns raised in the Turf cluster analysis .
- Preliminary Ornamentals runoff models indicate there is a potential for increased runoff compared to turf; thus, the potential risk to non-target organisms is therefore also increased. This ranking does not address the Ornamental alternatives.

The quotients were derived in the same manner as those of the Turf cluster analysis. Repeat applications, environmental fate (other than rough-cut aquatic EEC's) and dermal inhalation toxicity



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for birds are not included. Exposure estimates are based on immediate exposure following application for birds and standard runoff assumptions for aquatic organisms.

The avian hazard ranking uses LD50's/sq. ft. The acute aquatic ranking uses the EEC/LC50 quotient method. The aquatic chronic ranking used the EEC/LEL (low effect level).

The following should be noted:

- The Subsoil and Mites pest-group section from the Turf cluster was used for comparisons and values.

- A 1% runoff scenario was used for pyrethroids - as in the Turf cluster.

- The nine chemicals submitted by BEAD as alternatives to NTN were used for comparison; however, the rates used were taken from the Turf cluster - as several on the NTN submission were found to be in error.

- All data was not available for all chemicals; therefore, the number of values for each parameter is unequal.

Tables with quotient values are attached (Tables A - C). The following summaries list the chemicals in order of decreasing toxicity quotients [Key: EEC = Estimated Environmental Concentration, LEL Low Effect Level, LOC = Level of Concern]:

Ranking of Acute Avian Toxicity based on the Level Of Concern that an LD50/ft² = >1 indicates high risk:

Mallard:

- 1) Diazinon*
- 2) Bendiocarb
- 3) Ethoprop
- 4) Trichlorfon
- 5) Isofenphos*
- 6) Chlorpyrifos*
- 7) Isazaphos*
- 8) Carbaryl
- 9) Permethrin

Gamebird:

- 1) Diazinon*
- 2) Ethoprop
- 3) Trichlorfon
- 4) Isofenphos*
- 5) Bendiocarb
- 6) Isazaphos*
- 7) Chlorpyrifos*
- 8) Carbaryl
- 9) NTN (0.063)
- 10) Permethrin

Songbird:

- 1) Ethoprop
- 2) Diazinon*
- 3) Bendiocarb
- 4) Isofenphos*
- 5) Chlorpyrifos*
- 6) Trichlorfon
- 7) Carbaryl
- 8) NTN (10.07)
- 9) Permethrin

Ranking of Acute Aquatic Toxicity based on a Level of Concern that an EEC/0.5 LC50 = >1 indicates high risk :

<u>Fish LOC:</u>	<u>Invertebrate</u>
1) Chlorpyrifos*	1) Chlorpyrifos*
2) Isazaphos*	2) Trichlorfon
3) Ethoprop	3) Permethrin
4) Trichlorfon	4) Diazinon*
5) Permethrin	5) Ethoprop
6) Diazinon*	6) Isazaphos*
7) Carbaryl	7) Carbaryl
8) Bendiocarb	8) Isofenphos*
9) Isofenphos*	9) Bendiocarb
10) NTN (0.0003)	10) NTN (0.81)

Ranking of Chronic Aquatic Toxicity based on a Level of Concern that an EEC/LEL = >1 indicates high risk

<u>Fish</u>	<u>Invertebrate</u>
1) Diazinon*	1) Trichlorfon
2) Chlorpyrifos*	2) Chlorpyrifos*
3) Ethoprop	3) Ethoprop
4) Permethrin	4) Isofenphos*
5) Carbaryl	5) NTN (46.8)
6) Isofenphos*	6) Carbaryl
7) NTN (0.01)	7) Permethrin

Questions regarding the values or quotient methods, please contact Dana Lateulere at 308-2856.

References

"Pilot Turf Cluster Project", Memorandum from A. Barton (EFED) to D. Barolo (SRRD). March 1, 1993.

'Chesapeake Bay Project' Toxicity Database, Ecological Effects Branch, EFED.

cc:

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Table A: Acute Avian Risk Quotients

Pesticide	Application Rate (# ai/A)	Species	<u>1/2LD50</u> sq. ft.
Bendiocarb	4.2	Waterfowl Gamebird Songbird	26.04 25.84 240.70
Carbaryl	8.0	Waterfowl Gamebird Songbird	<0.06 <0.07 56.50
Chlorpyrifos	4.5	Waterfowl Gamebird Songbird	1.14 16.44 133.80
Diazinon	4.8	Waterfowl Gamebird Songbird	64.08 56.08 600.66
Ethoprop	10.0	Waterfowl Gamebird Songbird	15.24 42.52 949.28
Isazophos	1.91	Waterfowl Gamebird songbird	0.60 20.10 --
Isofenphos	2.0	Waterfowl Gamebird Songbird	1.20 26.86 148.10
NTN	0.5	Waterfowl Gamebird Songbird	-- 0.06 10.07
Permethrin	0.3	Waterfowl Gamebird Songbird	<0.001 <0.0004 <0.003
Trichlorfon	8.06	Waterfowl Gamebird Songbird	4.22 42.04 79.68

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Table B: Acute Aquatic Risk Quotients

Pesticide	Application Rate (# ai/A)	Species: -Fish -Invertebrate	Quotient: EEC (6') 1/2 LC50
Bendiocarb	4.2	Warmwater Est./Marine	0.22 15.30
Carbaryl	8.0	Coldwater Freshwater*	0.25 40.67
Chlorpyrifos	4.5	Warmwater Est./Marine	64.59 2745.00
Diazinon	4.8	Warmwater Freshwater*	1.14 146.40
Ethoprop	10.0	Warmwater Est./Marine*	2.03 95.31
Isazaphos	1.91	Warmwater Freshwater	30.42 83.22
Isofenphos	2.0	Warmwater Freshwater	0.03 30.50
NTN	0.5	Warmwater Est./Marine	0.0003 0.81
Permethrin	0.3	Coldwater Freshwater	1.26 192.63
Trichlorfon	8.06	Coldwater Freshwater*	1.33 2731.44

* Denotes that tested species differ from the two species normally chosen for testing (Freshwater = D. magna, Est./Marine = Mysid).

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Table C: Chronic Aquatic Risk Quotients

Pesticide	Application Rate (# ai/A)	Species:	Quotient:
		-Fish -Invertebrate	<u>EEC</u> (6') LEL
Bendiocarb	4.2	Fish Invertebrate	- -
Carbaryl	8.0	Fathead minnow <u>D. magna</u>	0.14 16.27
Chlorpyrifos	4.5	Fathead minnow <u>D. magna</u>	17.16 686.25
Diazinon	4.8	Fathead minnow <u>D. magna</u>	636.50 183.00
Ethoprop	10.0	Sheepshead minnow Mysid	14.50 491.90
Isazaphos	1.91	Fish Invertebrate	- -
Isofenphos	2.0	Rainbow Trout <u>D. magna</u>	0.06 116.20
NTN	0.5	Rainbow Trout Mysid	0.01 46.80
Permethrin	0.3	Fathead minnow <u>D. magna</u>	4.45 15.48
Trichlorfon	8.06	Fish <u>D. magna</u>	- 2858.50